Accuracy of tree constructed using information gain before pruning: 75.85%

Before pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 2 and K = 5 is 76.1%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 6 and K = 10 is 75.7%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 : 1

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 : 1

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 10 and K = 15 is 75.95%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 : 0

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 14 and K = 20 is 75.95%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 5 and K = 5 is 76.35%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 : 1

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 10 and K = 10 is 76.05%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 17 and K = 15 is 76.8%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 : 1

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 : 1

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 22 and K = 20 is 76.2%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 :

| | | | | | XG = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | XG = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 28 and K = 25 is 77.0%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XT = 0 :

| | | | | | | | | XL = 0 :

| | | | | | | | | | XE = 0 :

| | | | | | | | | | | XI = 0 : 0

| | | | | | | | | | | XI = 1 : 1

| | | | | | | | | | XE = 1 : 1

| | | | | | | | | XL = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 : 1

| | | | | XS = 1 : 1

| | | XH = 1 :

| | | | XJ = 0 :

| | | | | XC = 0 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XC = 1 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 : 0

| | | | | | | XF = 1 : 1

| | | | XJ = 1 : 1

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XP = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 :

| | | | | | XU = 0 : 1

| | | | | | XU = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XE = 0 : 1

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XB = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XG = 1 : 0

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 30 and K = 28 is 76.35%

After pruning:

XO = 0 :

| XM = 0 :

| | XF = 0 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XD = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 1

| | | | | XD = 1 :

| | | | | | XE = 0 : 0

| | | | | | XE = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | XB = 1 :

| | | | XD = 0 : 0

| | | | XD = 1 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XG = 0 : 1

| | | | | | XG = 1 : 0

| | XF = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XD = 0 :

| | | | XG = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 :

| | | | | | | XN = 0 : 1

| | | | | | | XN = 1 :

| | | | | | | | XE = 0 :

| | | | | | | | | XK = 0 : 0

| | | | | | | | | XK = 1 : 1

| | | | | | | | XE = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 1

| | | | XG = 1 :

| | | | | XU = 0 : 1

| | | | | XU = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XF = 0 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XP = 0 :

| | | | | | | | XS = 0 : 0

| | | | | | | | XS = 1 : 1

| | | | | | | XP = 1 : 0

| | | | | XF = 1 :

| | | | | | XJ = 0 : 1

| | | | | | XJ = 1 :

| | | | | | | XE = 0 :

| | | | | | | | XG = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 : 0

| | | | | | | | XG = 1 : 0

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XT = 1 : 1

| | | | XC = 1 : 0

| | XB = 1 :

| | | XI = 0 : 0

| | | XI = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XS = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | XS = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XI = 0 :

| | XM = 0 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XH = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 : 0

| | | | | XH = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 :

| | | | XJ = 0 :

| | | | | XN = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 : 0

| | | | XJ = 1 :

| | | | | XL = 0 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XL = 1 : 1

| | XM = 1 :

| | | XQ = 0 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XU = 0 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | | XU = 1 : 1

| | | | | XL = 1 :

| | | | | | XC = 0 :

| | | | | | | XB = 0 : 0

| | | | | | | XB = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | XC = 1 : 1

| | | | XF = 1 : 0

| | | XQ = 1 : 0

| XI = 1 :

| | XT = 0 :

| | | XH = 0 :

| | | | XP = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 :

| | | | | | | XK = 0 : 0

| | | | | | | XK = 1 : 1

| | | | XP = 1 :

| | | | | XS = 0 :

| | | | | | XD = 0 :

| | | | | | | XC = 0 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XN = 0 : 0

| | | | | | | | | XN = 1 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XM = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XM = 1 : 1

| | | | | XS = 1 : 1

| | | XH = 1 : 1

| | XT = 1 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XK = 0 :

| | | | | | XC = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XH = 0 :

| | | | | | | | | XE = 0 : 0

| | | | | | | | | XE = 1 : 1

| | | | | | | | XH = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XB = 1 : 0

| | | | | | XC = 1 : 1

| | | | | XK = 1 :

| | | | | | XD = 0 :

| | | | | | | XF = 0 : 0

| | | | | | | XF = 1 : 1

| | | | | | XD = 1 : 0

| | | | XQ = 1 :

| | | | | XM = 0 :

| | | | | | XN = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XM = 1 : 0

| | | XS = 1 :

| | | | XL = 0 :

| | | | | XD = 0 : 1

| | | | | XD = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 : 1

| | | | XL = 1 :

| | | | | XH = 0 :

| | | | | | XD = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XH = 1 : 0

Accuracy of tree constructed using impurity gain before pruning: 78.0%

Decision tree before pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XU = 0 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | XF = 1 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XU = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 :

| | | | XH = 0 :

| | | | | XP = 0 :

| | | | | | XN = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XN = 1 : 0

| | | | | XP = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XE = 0 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | | XE = 1 : 1

| | | | | | | XS = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XU = 0 : 1

| | | | | | | | | | XU = 1 :

| | | | | | | | | | | XC = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 :

| | | | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | | | XF = 1 :

| | | | | | | | | | | | | | XG = 0 : 1

| | | | | | | | | | | | | | XG = 1 :

| | | | | | | | | | | | | | | XK = 0 : 1

| | | | | | | | | | | | | | | XK = 1 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | | XT = 1 : 1

| | | | XH = 1 :

| | | | | XE = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | XE = 1 :

| | | | | | XJ = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XF = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XP = 0 : 0

| | | | | | | | | | | XP = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XF = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XT = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XI = 0 : 0

| | | | | | | | | | XI = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | XT = 1 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 2 and K = 5 is 78.2%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 : 1

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XU = 0 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | XF = 1 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XU = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 :

| | | | XH = 0 :

| | | | | XP = 0 :

| | | | | | XN = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XN = 1 : 0

| | | | | XP = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XE = 0 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | | XE = 1 : 1

| | | | | | | XS = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XU = 0 : 1

| | | | | | | | | | XU = 1 :

| | | | | | | | | | | XC = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 :

| | | | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | | | XF = 1 :

| | | | | | | | | | | | | | XG = 0 : 1

| | | | | | | | | | | | | | XG = 1 :

| | | | | | | | | | | | | | | XK = 0 : 1

| | | | | | | | | | | | | | | XK = 1 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | | XT = 1 : 1

| | | | XH = 1 :

| | | | | XE = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | XE = 1 :

| | | | | | XJ = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XF = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XP = 0 : 0

| | | | | | | | | | | XP = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XF = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XT = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XI = 0 : 0

| | | | | | | | | | XI = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | XT = 1 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 6 and K = 10 is 78.4%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 0

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 :

| | | | XH = 0 :

| | | | | XP = 0 :

| | | | | | XN = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XN = 1 : 0

| | | | | XP = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XE = 0 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | | XE = 1 : 1

| | | | | | | XS = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | | | XB = 1 : 1

| | | | XH = 1 :

| | | | | XE = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | XE = 1 :

| | | | | | XJ = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XT = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XI = 0 : 0

| | | | | | | | | | XI = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | XT = 1 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 10 and K = 15 is 78.7%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 : 1

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 :

| | | | XH = 0 :

| | | | | XP = 0 :

| | | | | | XN = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XN = 1 : 0

| | | | | XP = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XE = 0 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | | XE = 1 : 1

| | | | | | | XS = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XU = 0 : 1

| | | | | | | | | | XU = 1 :

| | | | | | | | | | | XC = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 :

| | | | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | | | XF = 1 :

| | | | | | | | | | | | | | XG = 0 : 1

| | | | | | | | | | | | | | XG = 1 :

| | | | | | | | | | | | | | | XK = 0 : 1

| | | | | | | | | | | | | | | XK = 1 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | | XT = 1 : 1

| | | | XH = 1 :

| | | | | XE = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XB = 0 : 0

| | | | | | | | | XB = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | XE = 1 :

| | | | | | XJ = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XF = 0 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XP = 0 : 0

| | | | | | | | | | | XP = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XF = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XT = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XI = 0 : 0

| | | | | | | | | | XI = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | XT = 1 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 14 and K = 20 is 78.8%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 1

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 5 and K = 5 is 78.2%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 1

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XU = 0 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | XF = 1 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XU = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 : 1

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 10 and K = 10 is 77.85%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 : 1

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 :

| | | | XH = 0 :

| | | | | XP = 0 :

| | | | | | XN = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 : 1

| | | | | | | XR = 1 : 0

| | | | | | XN = 1 : 0

| | | | | XP = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XE = 0 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | | XE = 1 : 1

| | | | | | | XS = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XT = 0 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XU = 0 : 1

| | | | | | | | | | XU = 1 :

| | | | | | | | | | | XC = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 :

| | | | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | | XT = 1 : 1

| | | | XH = 1 :

| | | | | XE = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 : 1

| | | | | XE = 1 :

| | | | | | XJ = 0 :

| | | | | | | XR = 0 : 1

| | | | | | | XR = 1 : 0

| | | | | | XJ = 1 :

| | | | | | | XT = 0 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 :

| | | | | | | | | XN = 0 :

| | | | | | | | | | XI = 0 : 0

| | | | | | | | | | XI = 1 : 1

| | | | | | | | | XN = 1 : 1

| | | | | | | XT = 1 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 17 and K = 15 is 78.6%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XU = 0 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | XF = 1 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XU = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 : 1

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 22 and K = 20 is 78.8%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XS = 0 :

| | | | | | | | | | XR = 0 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XR = 1 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XK = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | XK = 1 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XU = 0 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XF = 0 : 1

| | | | | | | | | | | XF = 1 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XU = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 28 and K = 25 is 77.9%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 : 1

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 0

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 30 and K = 28 is 79.1%

Decision tree after pruning:

XO = 0 :

| XM = 0 :

| | XS = 0 :

| | | XG = 0 :

| | | | XJ = 0 : 0

| | | | XJ = 1 :

| | | | | XT = 0 :

| | | | | | XC = 0 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 :

| | | | | | | | XI = 0 : 0

| | | | | | | | XI = 1 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | XC = 1 : 0

| | | | | XT = 1 : 0

| | | XG = 1 : 0

| | XS = 1 :

| | | XB = 0 :

| | | | XG = 0 : 0

| | | | XG = 1 :

| | | | | XF = 0 :

| | | | | | XD = 0 :

| | | | | | | XR = 0 :

| | | | | | | | XU = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XQ = 0 :

| | | | | | | | | | | XE = 0 :

| | | | | | | | | | | | XI = 0 : 1

| | | | | | | | | | | | XI = 1 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XQ = 1 : 1

| | | | | | | | XU = 1 : 1

| | | | | | | XR = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XI = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 0

| | | | | | | XI = 1 : 0

| | | | | XF = 1 : 0

| | | XB = 1 :

| | | | XN = 0 : 0

| | | | XN = 1 :

| | | | | XK = 0 :

| | | | | | XT = 0 : 0

| | | | | | XT = 1 :

| | | | | | | XU = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 : 1

| | | | | | | | XC = 1 : 0

| | | | | | | XU = 1 : 0

| | | | | XK = 1 : 0

| XM = 1 :

| | XB = 0 :

| | | XS = 0 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XD = 0 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XC = 0 : 0

| | | | | | | | | XC = 1 : 1

| | | | | XD = 1 :

| | | | | | XI = 0 :

| | | | | | | XQ = 0 : 0

| | | | | | | XQ = 1 : 1

| | | | | | XI = 1 : 1

| | | XS = 1 :

| | | | XG = 0 :

| | | | | XI = 0 : 0

| | | | | XI = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XJ = 0 : 0

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XH = 0 : 1

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | XG = 1 :

| | | | | XQ = 0 :

| | | | | | XD = 0 :

| | | | | | | XK = 0 : 1

| | | | | | | XK = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 1

| | | | | | XD = 1 :

| | | | | | | XF = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XR = 0 : 1

| | | | | | | | | XR = 1 : 0

| | | | | | | | XL = 1 : 0

| | | | | | | XF = 1 : 0

| | | | | XQ = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XU = 0 : 1

| | | | | | | | XU = 1 : 0

| | XB = 1 :

| | | XD = 0 : 0

| | | XD = 1 :

| | | | XC = 0 :

| | | | | XK = 0 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XG = 0 : 1

| | | | | | | | | | XG = 1 : 0

| | | | | | | | | XF = 1 : 0

| | | | | XK = 1 : 0

| | | | XC = 1 : 0

XO = 1 :

| XM = 0 :

| | XG = 0 :

| | | XJ = 0 :

| | | | XC = 0 :

| | | | | XT = 0 :

| | | | | | XH = 0 :

| | | | | | | XK = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XL = 0 : 0

| | | | | | | | | XL = 1 :

| | | | | | | | | | XU = 0 : 0

| | | | | | | | | | XU = 1 : 1

| | | | | | | XK = 1 : 0

| | | | | | XH = 1 : 1

| | | | | XT = 1 :

| | | | | | XF = 0 : 1

| | | | | | XF = 1 : 1

| | | | XC = 1 : 0

| | | XJ = 1 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XD = 0 : 1

| | | | | | XD = 1 : 1

| | | | XB = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 : 0

| | XG = 1 :

| | | XE = 0 :

| | | | XQ = 0 :

| | | | | XF = 0 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 :

| | | | | | | | | XI = 0 : 1

| | | | | | | | | XI = 1 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 : 1

| | | | | | | | | | XB = 1 : 0

| | | | | | | | XP = 1 : 1

| | | | | | | XC = 1 : 1

| | | | | XF = 1 :

| | | | | | XI = 0 : 0

| | | | | | XI = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XH = 1 : 0

| | | | XQ = 1 :

| | | | | XR = 0 :

| | | | | | XD = 0 : 1

| | | | | | XD = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 : 0

| | | | | | | XC = 1 : 1

| | | | | XR = 1 : 1

| | | XE = 1 :

| | | | XF = 0 : 1

| | | | XF = 1 :

| | | | | XB = 0 :

| | | | | | XR = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XQ = 0 : 0

| | | | | | | | XQ = 1 :

| | | | | | | | | XH = 0 : 1

| | | | | | | | | XH = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XL = 0 : 0

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | XD = 1 : 1

| | | | | | XR = 1 : 0

| | | | | XB = 1 : 0

| XM = 1 :

| | XQ = 0 :

| | | XD = 0 : 1

| | | XD = 1 :

| | | | XT = 0 :

| | | | | XC = 0 :

| | | | | | XG = 0 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XK = 0 :

| | | | | | | | | XI = 0 : 0

| | | | | | | | | XI = 1 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XU = 0 : 1

| | | | | | | | | | | | XU = 1 : 0

| | | | | | | | XK = 1 : 1

| | | | | | XG = 1 : 1

| | | | | XC = 1 : 1

| | | | XT = 1 :

| | | | | XK = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XI = 0 : 1

| | | | | | | | XI = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | XR = 1 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 : 1

| | | | | XK = 1 : 0

| | XQ = 1 : 0

**DATA Set 2:**

Accuracy of tree constructed using information gain before pruning: 72.33333333333333%

Before pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 2 and K = 5 is 72.33333333333333%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 6 and K = 10 is 73.5%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 : 1

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 : 1

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 10 and K = 15 is 72.33333333333333%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 14 and K = 20 is 74.83333333333333%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 : 1

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 : 1

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 : 1

| | | XT = 1 :

| | | | XB = 0 : 1

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 5 and K = 5 is 72.66666666666667%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 10 and K = 10 is 74.33333333333333%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 : 1

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 : 1

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 17 and K = 15 is 72.33333333333333%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 0

| | | | | | | | | | XK = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 :

| | | | | | | | XP = 0 : 0

| | | | | | | | XP = 1 :

| | | | | | | | | XQ = 0 : 1

| | | | | | | | | XQ = 1 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 0

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 22 and K = 20 is 75.5%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XC = 0 : 0

| | | | | | | | | | XC = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XS = 1 : 0

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 : 1

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 : 1

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 : 1

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 : 1

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XH = 0 : 0

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 : 1

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 28 and K = 25 is 71.5%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XR = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 :

| | | | | | | | | | XC = 0 :

| | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XC = 1 : 0

| | | | | | | XN = 1 : 0

| | | | | | XR = 1 : 1

| | | | | XL = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XH = 0 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XE = 0 : 1

| | | | | | | | | XE = 1 : 0

| | | | | | | XC = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XK = 0 : 1

| | | | | | | | | XK = 1 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 : 0

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 :

| | | | | | XF = 0 :

| | | | | | | XP = 0 :

| | | | | | | | XL = 0 :

| | | | | | | | | XC = 0 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | | | | XP = 1 : 1

| | | | | | XF = 1 : 0

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 : 0

| | | | | | XQ = 1 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XH = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XH = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XN = 0 : 1

| | | | | | | | | | XN = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XT = 0 : 1

| | | | | | XT = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XP = 0 : 1

| | | | | | | | XP = 1 :

| | | | | | | | | XB = 0 : 1

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 1

| | | | XG = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 : 0

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | XS = 1 :

| | | | XR = 0 :

| | | | | XN = 0 : 1

| | | | | XN = 1 :

| | | | | | XH = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 :

| | | | | | | | | XD = 0 : 0

| | | | | | | | | XD = 1 : 1

| | | | | | | | XM = 1 : 1

| | | | | | | XJ = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | XR = 1 :

| | | | | XG = 0 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 : 0

| | | | | | | XH = 1 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XM = 1 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 : 1

| | | | | XG = 1 : 0

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 :

| | | | | | | XO = 0 : 1

| | | | | | | XO = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using information gain after pruning with L = 30 and K = 28 is 75.66666666666667%

After pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XB = 0 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 :

| | | | | | | XG = 0 : 0

| | | | | | | XG = 1 : 1

| | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XB = 0 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XD = 1 : 0

| | | | | XB = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XB = 0 :

| | | | XT = 0 : 1

| | | | XT = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XM = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XL = 0 : 0

| | | | | | | | XL = 1 :

| | | | | | | | | XC = 0 :

| | | | | | | | | | XD = 0 : 0

| | | | | | | | | | XD = 1 : 1

| | | | | | | | | XC = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XM = 1 : 0

| | | XB = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 : 1

| | | | XB = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XJ = 0 :

| | | | | | | XC = 0 : 0

| | | | | | | XC = 1 :

| | | | | | | | XD = 0 : 0

| | | | | | | | XD = 1 : 1

| | | | | | XJ = 1 : 1

| | | XS = 1 :

| | | | XO = 0 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XN = 0 :

| | | | | | | XJ = 0 : 1

| | | | | | | XJ = 1 : 0

| | | | | | XN = 1 : 1

| | | | | XL = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XK = 0 :

| | XC = 0 : 1

| | XC = 1 :

| | | XD = 0 :

| | | | XS = 0 :

| | | | | XF = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 :

| | | | | | | XE = 0 : 0

| | | | | | | XE = 1 : 1

| | | | | XF = 1 :

| | | | | | XP = 0 : 1

| | | | | | XP = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XL = 0 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 :

| | | | | | | | | | XN = 0 : 0

| | | | | | | | | | XN = 1 : 1

| | | | | | | | XL = 1 : 0

| | | | XS = 1 :

| | | | | XJ = 0 :

| | | | | | XM = 0 : 0

| | | | | | XM = 1 :

| | | | | | | XQ = 0 :

| | | | | | | | XB = 0 : 1

| | | | | | | | XB = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | XQ = 1 : 0

| | | | | XJ = 1 :

| | | | | | XO = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | | | XF = 1 : 1

| | | | | | XO = 1 :

| | | | | | | XR = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XH = 0 : 0

| | | | | | | | | XH = 1 : 1

| | | | | | | | XB = 1 : 1

| | | | | | | XR = 1 : 1

| | | XD = 1 :

| | | | XF = 0 : 0

| | | | XF = 1 :

| | | | | XO = 0 : 0

| | | | | XO = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| XK = 1 :

| | XD = 0 :

| | | XT = 0 :

| | | | XF = 0 :

| | | | | XB = 0 :

| | | | | | XR = 0 : 0

| | | | | | XR = 1 : 1

| | | | | XB = 1 :

| | | | | | XO = 0 : 0

| | | | | | XO = 1 : 1

| | | | XF = 1 :

| | | | | XO = 0 : 1

| | | | | XO = 1 :

| | | | | | XH = 0 :

| | | | | | | XL = 0 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | XL = 1 : 1

| | | | | | XH = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | XT = 1 :

| | | | XB = 0 :

| | | | | XC = 0 :

| | | | | | XM = 0 : 1

| | | | | | XM = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XE = 0 : 0

| | | | | | | | XE = 1 : 1

| | | | | XC = 1 :

| | | | | | XH = 0 : 1

| | | | | | XH = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 : 0

| | | | XB = 1 : 0

| | XD = 1 : 0

Accuracy of tree constructed using impurity gain before pruning: 69.0%

Decision tree before pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 2 and K = 5 is 69.0%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 6 and K = 10 is 70.16666666666667%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 : 1

Accuracy of tree constructed using impurity gain after pruning: with L = 10 and K = 15 is 69.83333333333333%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 1

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 14 and K = 20 is 69.0%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 5 and K = 5 is 69.0%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 10 and K = 10 is 69.0%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 : 1

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 17 and K = 15 is 69.0%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 :

| | | | | | | | XS = 0 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XO = 0 : 1

| | | | | | | | | | XO = 1 :

| | | | | | | | | | | XD = 0 : 0

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | XG = 1 : 0

| | | | | | | | XS = 1 : 0

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 :

| | | | | | | | | | | | XE = 0 : 0

| | | | | | | | | | | | XE = 1 : 1

| | | | | | | | | | XM = 1 : 0

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 :

| | | | | | | | | XB = 0 :

| | | | | | | | | | XD = 0 : 1

| | | | | | | | | | XD = 1 : 0

| | | | | | | | | XB = 1 : 0

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 :

| | | | | | | | | | XJ = 0 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 : 1

| | | | | | | | | | XJ = 1 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 22 and K = 20 is 69.16666666666667%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 :

| | | | | | | | XK = 0 : 0

| | | | | | | | XK = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 : 1

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XO = 0 :

| | | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | | XO = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 1

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 : 1

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 :

| | | | | | | XF = 0 :

| | | | | | | | XC = 0 : 0

| | | | | | | | XC = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XM = 0 : 0

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XB = 0 : 1

| | | | | | | | | | | XB = 1 : 0

| | | | | | | | | XJ = 1 : 1

| | | | | | | XF = 1 :

| | | | | | | | XB = 0 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | | | | | | | XB = 1 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 1

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 28 and K = 25 is 66.83333333333333%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 : 1

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 1

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XD = 0 : 1

| | | | | | | | XD = 1 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 : 1

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 : 1

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XQ = 0 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 :

| | | | | | | | XC = 0 :

| | | | | | | | | XL = 0 : 1

| | | | | | | | | XL = 1 :

| | | | | | | | | | XM = 0 :

| | | | | | | | | | | XP = 0 : 1

| | | | | | | | | | | XP = 1 : 0

| | | | | | | | | | XM = 1 : 1

| | | | | | | | XC = 1 : 1

| | | | | | XQ = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 :

| | | | | | | | XC = 0 :

| | | | | | | | | XS = 0 : 1

| | | | | | | | | XS = 1 : 0

| | | | | | | | XC = 1 : 1

| | | | | | | XN = 1 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0

Accuracy of tree constructed using impurity gain after pruning: with L = 30 and K = 28 is 69.5%

Decision tree after pruning:

XI = 0 :

| XU = 0 :

| | XQ = 0 :

| | | XF = 0 :

| | | | XO = 0 :

| | | | | XM = 0 : 0

| | | | | XM = 1 :

| | | | | | XS = 0 : 0

| | | | | | XS = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XB = 1 : 0

| | | | XO = 1 :

| | | | | XL = 0 :

| | | | | | XB = 0 : 0

| | | | | | XB = 1 : 1

| | | | | XL = 1 :

| | | | | | XP = 0 : 0

| | | | | | XP = 1 : 1

| | | XF = 1 : 0

| | XQ = 1 :

| | | XT = 0 :

| | | | XN = 0 :

| | | | | XR = 0 :

| | | | | | XC = 0 :

| | | | | | | XH = 0 :

| | | | | | | | XG = 0 : 0

| | | | | | | | XG = 1 : 1

| | | | | | | XH = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XJ = 0 : 0

| | | | | | | XJ = 1 :

| | | | | | | | XD = 0 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 1

| | | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XS = 0 : 1

| | | | | | | XS = 1 : 0

| | | | XN = 1 :

| | | | | XJ = 0 : 0

| | | | | XJ = 1 :

| | | | | | XF = 0 :

| | | | | | | XR = 0 : 0

| | | | | | | XR = 1 :

| | | | | | | | XL = 0 : 1

| | | | | | | | XL = 1 : 0

| | | | | | XF = 1 : 1

| | | XT = 1 :

| | | | XD = 0 :

| | | | | XP = 0 :

| | | | | | XB = 0 :

| | | | | | | XE = 0 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 :

| | | | | | | | | | XJ = 0 : 1

| | | | | | | | | | XJ = 1 :

| | | | | | | | | | | XC = 0 : 0

| | | | | | | | | | | XC = 1 :

| | | | | | | | | | | | XH = 0 :

| | | | | | | | | | | | | XM = 0 :

| | | | | | | | | | | | | | XK = 0 : 0

| | | | | | | | | | | | | | XK = 1 : 1

| | | | | | | | | | | | | XM = 1 : 1

| | | | | | | | | | | | XH = 1 : 1

| | | | | | | XE = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XC = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XC = 1 : 0

| | | | | XP = 1 :

| | | | | | XL = 0 : 1

| | | | | | XL = 1 :

| | | | | | | XE = 0 : 1

| | | | | | | XE = 1 : 0

| | | | XD = 1 :

| | | | | XF = 0 : 1

| | | | | XF = 1 :

| | | | | | XB = 0 :

| | | | | | | XS = 0 :

| | | | | | | | XJ = 0 : 1

| | | | | | | | XJ = 1 :

| | | | | | | | | XG = 0 :

| | | | | | | | | | XM = 0 : 1

| | | | | | | | | | XM = 1 :

| | | | | | | | | | | XC = 0 : 1

| | | | | | | | | | | XC = 1 : 0

| | | | | | | | | XG = 1 : 1

| | | | | | | XS = 1 : 1

| | | | | | XB = 1 : 0

| XU = 1 :

| | XG = 0 :

| | | XS = 0 :

| | | | XQ = 0 :

| | | | | XB = 0 : 0

| | | | | XB = 1 :

| | | | | | XF = 0 :

| | | | | | | XO = 0 : 0

| | | | | | | XO = 1 :

| | | | | | | | XT = 0 : 0

| | | | | | | | XT = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 :

| | | | | | | | | | | | XE = 0 : 1

| | | | | | | | | | | | XE = 1 :

| | | | | | | | | | | | | XL = 0 : 1

| | | | | | | | | | | | | XL = 1 : 0

| | | | | | | | | | XK = 1 : 0

| | | | | | XF = 1 : 0

| | | | XQ = 1 :

| | | | | XE = 0 :

| | | | | | XF = 0 : 0

| | | | | | XF = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 :

| | | | | | | | | XD = 0 :

| | | | | | | | | | XK = 0 :

| | | | | | | | | | | XH = 0 : 0

| | | | | | | | | | | XH = 1 :

| | | | | | | | | | | | XL = 0 :

| | | | | | | | | | | | | XJ = 0 :

| | | | | | | | | | | | | | XN = 0 : 1

| | | | | | | | | | | | | | XN = 1 : 0

| | | | | | | | | | | | | XJ = 1 : 1

| | | | | | | | | | | | XL = 1 : 1

| | | | | | | | | | XK = 1 : 1

| | | | | | | | | XD = 1 : 1

| | | | | | | XB = 1 : 0

| | | | | XE = 1 :

| | | | | | XC = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XF = 0 : 0

| | | | | | | | XF = 1 : 1

| | | | | | XC = 1 : 1

| | | XS = 1 :

| | | | XF = 0 :

| | | | | XL = 0 :

| | | | | | XQ = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XB = 0 : 0

| | | | | | | | XB = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | XQ = 1 : 0

| | | | | XL = 1 : 0

| | | | XF = 1 : 0

| | XG = 1 : 0

XI = 1 :

| XE = 0 :

| | XK = 0 :

| | | XS = 0 :

| | | | XG = 0 :

| | | | | XC = 0 :

| | | | | | XO = 0 :

| | | | | | | XD = 0 : 0

| | | | | | | XD = 1 :

| | | | | | | | XN = 0 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XB = 0 : 0

| | | | | | | | | | | XB = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 1

| | | | | | | | XN = 1 : 1

| | | | | | XO = 1 : 1

| | | | | XC = 1 :

| | | | | | XD = 0 :

| | | | | | | XN = 0 : 0

| | | | | | | XN = 1 :

| | | | | | | | XO = 0 : 0

| | | | | | | | XO = 1 :

| | | | | | | | | XF = 0 : 0

| | | | | | | | | XF = 1 :

| | | | | | | | | | XL = 0 : 1

| | | | | | | | | | XL = 1 : 0

| | | | | | XD = 1 : 0

| | | | XG = 1 :

| | | | | XF = 0 : 0

| | | | | XF = 1 :

| | | | | | XN = 0 : 1

| | | | | | XN = 1 :

| | | | | | | XB = 0 :

| | | | | | | | XC = 0 : 1

| | | | | | | | XC = 1 : 1

| | | | | | | XB = 1 : 1

| | | XS = 1 :

| | | | XQ = 0 :

| | | | | XM = 0 :

| | | | | | XC = 0 :

| | | | | | | XT = 0 :

| | | | | | | | XB = 0 :

| | | | | | | | | XP = 0 : 1

| | | | | | | | | XP = 1 : 0

| | | | | | | | XB = 1 : 0

| | | | | | | XT = 1 : 1

| | | | | | XC = 1 :

| | | | | | | XL = 0 : 0

| | | | | | | XL = 1 : 0

| | | | | XM = 1 :

| | | | | | XB = 0 :

| | | | | | | XC = 0 : 1

| | | | | | | XC = 1 :

| | | | | | | | XR = 0 : 1

| | | | | | | | XR = 1 :

| | | | | | | | | XG = 0 : 1

| | | | | | | | | XG = 1 : 1

| | | | | | XB = 1 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XG = 0 :

| | | | | | | | | XO = 0 : 1

| | | | | | | | | XO = 1 :

| | | | | | | | | | XC = 0 : 1

| | | | | | | | | | XC = 1 :

| | | | | | | | | | | XD = 0 : 1

| | | | | | | | | | | XD = 1 : 0

| | | | | | | | XG = 1 :

| | | | | | | | | XJ = 0 : 1

| | | | | | | | | XJ = 1 : 0

| | | | XQ = 1 :

| | | | | XN = 0 : 0

| | | | | XN = 1 :

| | | | | | XG = 0 : 0

| | | | | | XG = 1 :

| | | | | | | XH = 0 : 1

| | | | | | | XH = 1 :

| | | | | | | | XJ = 0 : 0

| | | | | | | | XJ = 1 :

| | | | | | | | | XM = 0 : 1

| | | | | | | | | XM = 1 : 0

| | XK = 1 :

| | | XD = 0 :

| | | | XT = 0 :

| | | | | XL = 0 :

| | | | | | XN = 0 : 0

| | | | | | XN = 1 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XG = 0 : 1

| | | | | | | | XG = 1 : 0

| | | | | XL = 1 : 1

| | | | XT = 1 :

| | | | | XN = 0 :

| | | | | | XC = 0 : 0

| | | | | | XC = 1 :

| | | | | | | XB = 0 : 1

| | | | | | | XB = 1 : 0

| | | | | XN = 1 :

| | | | | | XR = 0 :

| | | | | | | XJ = 0 :

| | | | | | | | XM = 0 : 1

| | | | | | | | XM = 1 : 0

| | | | | | | XJ = 1 : 0

| | | | | | XR = 1 : 0

| | | XD = 1 : 0

| XE = 1 :

| | XO = 0 :

| | | XT = 0 :

| | | | XM = 0 : 1

| | | | XM = 1 :

| | | | | XC = 0 : 1

| | | | | XC = 1 :

| | | | | | XB = 0 :

| | | | | | | XD = 0 :

| | | | | | | | XN = 0 : 1

| | | | | | | | XN = 1 :

| | | | | | | | | XJ = 0 :

| | | | | | | | | | XH = 0 :

| | | | | | | | | | | XF = 0 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XH = 1 : 1

| | | | | | | | | XJ = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | | XB = 1 : 0

| | | XT = 1 :

| | | | XG = 0 :

| | | | | XR = 0 :

| | | | | | XL = 0 : 0

| | | | | | XL = 1 :

| | | | | | | XD = 0 :

| | | | | | | | XK = 0 : 1

| | | | | | | | XK = 1 : 0

| | | | | | | XD = 1 : 0

| | | | | XR = 1 :

| | | | | | XS = 0 : 1

| | | | | | XS = 1 :

| | | | | | | XL = 0 :

| | | | | | | | XF = 0 : 1

| | | | | | | | XF = 1 : 1

| | | | | | | XL = 1 : 0

| | | | XG = 1 :

| | | | | XM = 0 : 1

| | | | | XM = 1 :

| | | | | | XK = 0 :

| | | | | | | XU = 0 : 1

| | | | | | | XU = 1 :

| | | | | | | | XJ = 0 :

| | | | | | | | | XP = 0 :

| | | | | | | | | | XB = 0 :

| | | | | | | | | | | XF = 0 :

| | | | | | | | | | | | XQ = 0 : 1

| | | | | | | | | | | | XQ = 1 : 0

| | | | | | | | | | | XF = 1 : 1

| | | | | | | | | | XB = 1 : 1

| | | | | | | | | XP = 1 : 1

| | | | | | | | XJ = 1 : 0

| | | | | | XK = 1 : 1

| | XO = 1 :

| | | XG = 0 :

| | | | XB = 0 :

| | | | | XF = 0 : 0

| | | | | XF = 1 : 1

| | | | XB = 1 :

| | | | | XL = 0 :

| | | | | | XD = 0 : 1

| | | | | | XD = 1 : 0

| | | | | XL = 1 :

| | | | | | XJ = 0 : 0

| | | | | | XJ = 1 : 1

| | | XG = 1 :

| | | | XQ = 0 :

| | | | | XH = 0 :

| | | | | | XK = 0 : 1

| | | | | | XK = 1 :

| | | | | | | XD = 0 : 1

| | | | | | | XD = 1 : 0

| | | | | XH = 1 :

| | | | | | XD = 0 :

| | | | | | | XM = 0 : 1

| | | | | | | XM = 1 :

| | | | | | | | XS = 0 : 1

| | | | | | | | XS = 1 :

| | | | | | | | | XF = 0 : 1

| | | | | | | | | XF = 1 : 0

| | | | | | XD = 1 : 1

| | | | XQ = 1 :

| | | | | XD = 0 :

| | | | | | XB = 0 :

| | | | | | | XM = 0 :

| | | | | | | | XH = 0 : 0

| | | | | | | | XH = 1 :

| | | | | | | | | XT = 0 : 1

| | | | | | | | | XT = 1 : 0

| | | | | | | XM = 1 : 0

| | | | | | XB = 1 : 0

| | | | | XD = 1 : 0