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CSE 4309

Assignment 05

**Task 1**

decision\_tree('pendigits\_training', 'pendigits\_test', 'optimized', 50)

Print tree 1

tree= 1, node= 1, feature= 2, thr= 0.44, gain=0.351280

tree= 1, node= 2, feature= 0, thr= 0.65, gain=0.683503

tree= 1, node= 3, feature= 3, thr= 0.39, gain=0.178424

tree= 1, node= 4, feature= 2, thr= 0.39, gain=0.260442

tree= 1, node= 5, feature= 1, thr= 0.63, gain=0.475985

tree= 1, node= 6, feature= 0, thr= 0.67, gain=0.153219

tree= 1, node= 7, feature= 1, thr= 0.52, gain=0.240874

tree= 1, node= 8, feature= 1, thr= 0.58, gain=0.143850

tree= 1, node= 9, feature= 3, thr= 0.36, gain=0.345486

tree= 1, node= 10, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 11, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 12, feature= 7, thr= 0.32, gain=0.116192

tree= 1, node= 13, feature= 1, thr= 0.63, gain=0.664765

tree= 1, node= 14, feature= 1, thr= 0.36, gain=0.171108

tree= 1, node= 15, feature= 0, thr= 0.72, gain=0.416132

tree= 1, node= 16, feature= 3, thr= 0.14, gain=0.125352

tree= 1, node= 17, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 18, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 19, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 20, feature= 5, thr= 0.02, gain=0.053764

tree= 1, node= 21, feature= 2, thr= 0.46, gain=0.074130

tree= 1, node= 22, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 23, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 24, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 25, feature= 5, thr= 0.01, gain=0.122292

tree= 1, node= 26, feature= 0, thr= 0.35, gain=0.164928

tree= 1, node= 27, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 28, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 29, feature= 3, thr= 0.33, gain=0.113441

tree= 1, node= 30, feature= 1, thr= 0.40, gain=0.051319

tree= 1, node= 31, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 32, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 33, feature= 6, thr= 0.52, gain=0.034724

tree= 1, node= 34, feature= 7, thr= 0.34, gain=0.110989

tree= 1, node= 35, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 36, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 37, feature= 3, thr= 0.82, gain=0.125658

tree= 1, node= 38, feature= 0, thr= 0.55, gain=0.084121

tree= 1, node= 39, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 40, feature= 2, thr= 0.47, gain=0.109550

tree= 1, node= 41, feature= 3, thr= 0.30, gain=0.050848

tree= 1, node= 42, feature= 1, thr= 0.47, gain=0.112097

tree= 1, node= 43, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 44, feature= 6, thr= 0.38, gain=0.095148

tree= 1, node= 45, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 46, feature= 0, thr= 0.46, gain=0.070216

tree= 1, node= 47, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 48, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 49, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 50, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 51, feature= 2, thr= 0.58, gain=0.159833

tree= 1, node= 52, feature= 1, thr= 0.51, gain=0.044044

tree= 1, node= 53, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 54, feature= 7, thr= 0.49, gain=0.131526

tree= 1, node= 55, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 56, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 57, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 58, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 59, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 60, feature= 0, thr= 0.45, gain=0.151240

tree= 1, node= 61, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 62, feature= 2, thr= 0.52, gain=0.072564

tree= 1, node= 63, feature= 7, thr= 0.22, gain=0.097021

tree= 1, node= 64, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 65, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 66, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 67, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 68, feature= 2, thr= 0.47, gain=0.155574

tree= 1, node= 69, feature= 1, thr= 0.47, gain=0.069767

tree= 1, node= 70, feature= 2, thr= 0.50, gain=0.115873

tree= 1, node= 71, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 72, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 73, feature= 3, thr= 0.21, gain=0.085820

tree= 1, node= 74, feature= 3, thr= 0.24, gain=0.124984

tree= 1, node= 75, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 76, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 77, feature= 2, thr= 0.57, gain=0.221447

tree= 1, node= 78, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 79, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 80, feature= 0, thr= 0.58, gain=0.154865

tree= 1, node= 81, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 82, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 83, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 84, feature= 6, thr= 0.53, gain=0.087663

tree= 1, node= 85, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 86, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 87, feature=-1, thr= -1.00, gain=0.000000

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classification accuracy=0.5496

decision\_tree('pendigits\_training', 'pendigits\_test', 'randomized', 50)

Print tree 1

tree= 1, node= 1, feature= 0, thr= 0.66, gain=0.287019

tree= 1, node= 2, feature= 5, thr= 0.02, gain=0.054093

tree= 1, node= 3, feature= 2, thr= 0.45, gain=0.446325

tree= 1, node= 4, feature= 3, thr= 0.33, gain=0.166055

tree= 1, node= 5, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 6, feature= 7, thr= 0.28, gain=0.112869

tree= 1, node= 7, feature= 6, thr= 0.50, gain=0.167521

tree= 1, node= 8, feature= 8, thr= 2.10, gain=0.989423

tree= 1, node= 9, feature= 0, thr= 0.39, gain=0.101960

tree= 1, node= 10, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 11, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 12, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 13, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 14, feature= 8, thr= 1.02, gain=0.667889

tree= 1, node= 15, feature= 3, thr= 0.28, gain=0.012141

tree= 1, node= 16, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 17, feature= 4, thr= 0.51, gain=0.020960

tree= 1, node= 18, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 19, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 20, feature= 0, thr= 0.54, gain=0.035329

tree= 1, node= 21, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 22, feature= 7, thr= 0.21, gain=0.088329

tree= 1, node= 23, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 24, feature= 0, thr= 0.43, gain=0.035086

tree= 1, node= 25, feature= 3, thr= 0.14, gain=0.032563

tree= 1, node= 26, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 27, feature= 0, thr= 0.62, gain=0.050536

tree= 1, node= 28, feature= 5, thr= 0.00, gain=0.000000

tree= 1, node= 29, feature= 8, thr= 6.06, gain=0.796039

tree= 1, node= 30, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 31, feature= 8, thr= 5.12, gain=0.616166

tree= 1, node= 32, feature= 0, thr= 0.42, gain=0.042720

tree= 1, node= 33, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 34, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 35, feature= 0, thr= 0.33, gain=0.034297

tree= 1, node= 36, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 37, feature= 6, thr= 0.55, gain=0.013534

tree= 1, node= 38, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 39, feature= 1, thr= 0.58, gain=0.081253

tree= 1, node= 40, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 41, feature= 6, thr= 0.50, gain=0.032983

tree= 1, node= 42, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 43, feature= 0, thr= 0.37, gain=0.052457

tree= 1, node= 44, feature= 5, thr= 0.00, gain=0.000000

tree= 1, node= 45, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 46, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 47, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 48, feature= 3, thr= 0.55, gain=0.094184

tree= 1, node= 49, feature= 3, thr= 0.49, gain=0.173350

tree= 1, node= 50, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 51, feature= 8, thr= 5.12, gain=0.829059

tree= 1, node= 52, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 53, feature= 0, thr= 0.51, gain=0.024190

tree= 1, node= 54, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 55, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 56, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 57, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 58, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 59, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 60, feature= 8, thr= 7.04, gain=0.395538

tree= 1, node= 61, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 62, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 63, feature=-1, thr= -1.00, gain=0.000000

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classification accuracy=0.6426

decision\_tree('pendigits\_training', 'pendigits\_test', 'forest3', 50)

Print tree 1

tree= 1, node= 1, feature= 2, thr= 0.44, gain=0.351280

tree= 1, node= 2, feature= 4, thr= 0.51, gain=0.040845

tree= 1, node= 3, feature= 5, thr= 0.02, gain=0.063256

tree= 1, node= 4, feature= 1, thr= 0.63, gain=0.401785

tree= 1, node= 5, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 6, feature= 8, thr= 2.06, gain=0.995814

tree= 1, node= 7, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 8, feature= 5, thr= 0.02, gain=0.046906

tree= 1, node= 9, feature= 8, thr= 3.04, gain=0.830190

tree= 1, node= 10, feature= 0, thr= 0.44, gain=0.066009

tree= 1, node= 11, feature= 0, thr= 0.66, gain=0.291358

tree= 1, node= 12, feature= 6, thr= 0.53, gain=0.057505

tree= 1, node= 13, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 14, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 15, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 16, feature= 7, thr= 0.42, gain=0.060619

tree= 1, node= 17, feature= 8, thr= 1.02, gain=0.992112

tree= 1, node= 18, feature= 5, thr= 0.00, gain=0.000000

tree= 1, node= 19, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 20, feature= 7, thr= 0.28, gain=0.117866

tree= 1, node= 21, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 22, feature= 2, thr= 0.65, gain=0.057833

tree= 1, node= 23, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 24, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 25, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 26, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 27, feature= 6, thr= 0.48, gain=0.019239

tree= 1, node= 28, feature= 8, thr= 2.06, gain=0.835407

tree= 1, node= 29, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 30, feature= 8, thr= 1.02, gain=0.687315

tree= 1, node= 31, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 32, feature= 7, thr= 0.26, gain=0.049549

tree= 1, node= 33, feature= 3, thr= 0.23, gain=0.020270

tree= 1, node= 34, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 35, feature= 0, thr= 0.56, gain=0.269783

tree= 1, node= 36, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 37, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 38, feature= 2, thr= 0.53, gain=0.083201

tree= 1, node= 39, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 40, feature= 8, thr= 6.06, gain=0.290442

tree= 1, node= 41, feature= 3, thr= 0.28, gain=0.035371

tree= 1, node= 42, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 43, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 44, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 45, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 46, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 47, feature= 7, thr= 0.23, gain=0.040134

tree= 1, node= 48, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 49, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 50, feature= 7, thr= 0.11, gain=0.001504

tree= 1, node= 51, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 52, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 53, feature= 2, thr= 0.59, gain=0.019925

tree= 1, node= 54, feature= 4, thr= 0.50, gain=0.000000

tree= 1, node= 55, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 56, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 57, feature= 4, thr= 0.50, gain=0.000000

tree= 1, node= 58, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 59, feature= 0, thr= 0.64, gain=0.036344

tree= 1, node= 60, feature= 8, thr= 7.04, gain=0.387051

tree= 1, node= 61, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 62, feature=-1, thr= -1.00, gain=0.000000

tree= 1, node= 63, feature=-1, thr= -1.00, gain=0.000000

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Print tree 2

tree= 2, node= 1, feature= 6, thr= 0.53, gain=0.030243

tree= 2, node= 2, feature= 8, thr= 2.10, gain=0.999998

tree= 2, node= 3, feature= 0, thr= 0.67, gain=0.408854

tree= 2, node= 4, feature= 3, thr= 0.39, gain=0.219196

tree= 2, node= 5, feature= 7, thr= 0.21, gain=0.046444

tree= 2, node= 6, feature= 8, thr= 2.10, gain=0.990522

tree= 2, node= 7, feature= 3, thr= 0.24, gain=0.187050

tree= 2, node= 8, feature= 3, thr= 0.28, gain=0.031072

tree= 2, node= 9, feature= 0, thr= 0.33, gain=0.100651

tree= 2, node= 10, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 11, feature= 2, thr= 0.42, gain=0.552716

tree= 2, node= 12, feature= 2, thr= 0.34, gain=0.032833

tree= 2, node= 13, feature= 0, thr= 0.38, gain=0.083998

tree= 2, node= 14, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 15, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 16, feature= 6, thr= 0.46, gain=0.003725

tree= 2, node= 17, feature= 1, thr= 0.39, gain=0.150436

tree= 2, node= 18, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 19, feature= 8, thr= 1.02, gain=0.601435

tree= 2, node= 20, feature= 1, thr= 0.69, gain=0.490175

tree= 2, node= 21, feature= 7, thr= 0.28, gain=0.041663

tree= 2, node= 22, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 23, feature= 4, thr= 0.51, gain=0.006712

tree= 2, node= 24, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 25, feature= 4, thr= 0.51, gain=0.020766

tree= 2, node= 26, feature= 8, thr= 1.02, gain=0.497168

tree= 2, node= 27, feature= 0, thr= 0.58, gain=0.061229

tree= 2, node= 28, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 29, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 30, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 31, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 32, feature= 0, thr= 0.55, gain=0.370656

tree= 2, node= 33, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 34, feature= 4, thr= 0.51, gain=0.004057

tree= 2, node= 35, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 36, feature= 2, thr= 0.59, gain=0.037650

tree= 2, node= 37, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 38, feature= 6, thr= 0.55, gain=0.098851

tree= 2, node= 39, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 40, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 41, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 42, feature= 1, thr= 0.53, gain=0.072916

tree= 2, node= 43, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 44, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 45, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 46, feature= 2, thr= 0.47, gain=0.124701

tree= 2, node= 47, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 48, feature= 6, thr= 0.54, gain=0.013979

tree= 2, node= 49, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 50, feature= 3, thr= 0.13, gain=0.088447

tree= 2, node= 51, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 52, feature= 1, thr= 0.19, gain=0.045942

tree= 2, node= 53, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 54, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 55, feature= 4, thr= 0.50, gain=0.000000

tree= 2, node= 56, feature= 5, thr= 0.00, gain=0.000000

tree= 2, node= 57, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 58, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 59, feature= 2, thr= 0.43, gain=0.590392

tree= 2, node= 60, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 61, feature= 3, thr= 0.21, gain=0.068767

tree= 2, node= 62, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 63, feature= 3, thr= 0.21, gain=0.115624

tree= 2, node= 64, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 65, feature= 0, thr= 0.45, gain=0.143990

tree= 2, node= 66, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 67, feature= 5, thr= 0.02, gain=0.156341

tree= 2, node= 68, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 69, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 70, feature= 7, thr= 0.22, gain=0.037484

tree= 2, node= 71, feature= 4, thr= 0.50, gain=0.000000

tree= 2, node= 72, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 73, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 74, feature= 8, thr= 7.12, gain=0.462749

tree= 2, node= 75, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 76, feature= 2, thr= 0.54, gain=0.039570

tree= 2, node= 77, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 78, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 79, feature= 5, thr= 0.02, gain=0.198235

tree= 2, node= 80, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 81, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 82, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 83, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 84, feature= 8, thr= 7.12, gain=0.791858

tree= 2, node= 85, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 86, feature=-1, thr= -1.00, gain=0.000000

tree= 2, node= 87, feature=-1, thr= -1.00, gain=0.000000

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Print tree 3

tree= 3, node= 1, feature= 2, thr= 0.44, gain=0.351280

tree= 3, node= 2, feature= 3, thr= 0.23, gain=0.190808

tree= 3, node= 3, feature= 5, thr= 0.02, gain=0.063256

tree= 3, node= 4, feature= 1, thr= 0.60, gain=0.231850

tree= 3, node= 5, feature= 7, thr= 0.29, gain=0.144581

tree= 3, node= 6, feature= 5, thr= 0.00, gain=0.000000

tree= 3, node= 7, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 8, feature= 4, thr= 0.51, gain=0.006013

tree= 3, node= 9, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 10, feature= 1, thr= 0.69, gain=0.607406

tree= 3, node= 11, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 12, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 13, feature= 6, thr= 0.53, gain=0.020817

tree= 3, node= 14, feature= 7, thr= 0.48, gain=0.122933

tree= 3, node= 15, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 16, feature= 1, thr= 0.48, gain=0.169326

tree= 3, node= 17, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 18, feature= 4, thr= 0.51, gain=0.002699

tree= 3, node= 19, feature= 0, thr= 0.67, gain=0.188078

tree= 3, node= 20, feature= 2, thr= 0.39, gain=0.315488

tree= 3, node= 21, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 22, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 23, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 24, feature= 1, thr= 0.69, gain=0.168269

tree= 3, node= 25, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 26, feature= 8, thr= 2.10, gain=1.000000

tree= 3, node= 27, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 28, feature= 2, thr= 0.35, gain=0.072615

tree= 3, node= 29, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 30, feature= 6, thr= 0.45, gain=0.020857

tree= 3, node= 31, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 32, feature= 4, thr= 0.51, gain=0.007618

tree= 3, node= 33, feature= 3, thr= 0.22, gain=0.033876

tree= 3, node= 34, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 35, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 36, feature= 3, thr= 0.39, gain=0.088363

tree= 3, node= 37, feature= 8, thr= 2.10, gain=0.957796

tree= 3, node= 38, feature= 1, thr= 0.52, gain=0.126833

tree= 3, node= 39, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 40, feature= 2, thr= 0.46, gain=0.150052

tree= 3, node= 41, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 42, feature= 5, thr= 0.00, gain=0.000000

tree= 3, node= 43, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 44, feature= 0, thr= 0.43, gain=0.062357

tree= 3, node= 45, feature= 4, thr= 0.50, gain=0.000000

tree= 3, node= 46, feature= 8, thr= 1.02, gain=0.811278

tree= 3, node= 47, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 48, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 49, feature= 2, thr= 0.56, gain=0.024987

tree= 3, node= 50, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 51, feature= 2, thr= 0.49, gain=0.100185

tree= 3, node= 52, feature= 5, thr= 0.00, gain=0.000000

tree= 3, node= 53, feature= 4, thr= 0.50, gain=0.000000

tree= 3, node= 54, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 55, feature= 3, thr= 0.21, gain=0.040032

tree= 3, node= 56, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 57, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 58, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 59, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 60, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 61, feature= 3, thr= 0.13, gain=0.053907

tree= 3, node= 62, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 63, feature= 1, thr= 0.46, gain=0.061234

tree= 3, node= 64, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 65, feature= 0, thr= 0.58, gain=0.025490

tree= 3, node= 66, feature= 6, thr= 0.47, gain=0.046446

tree= 3, node= 67, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 68, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 69, feature= 8, thr= 2.06, gain=0.976635

tree= 3, node= 70, feature= 2, thr= 0.64, gain=0.069708

tree= 3, node= 71, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 72, feature= 6, thr= 0.50, gain=0.014516

tree= 3, node= 73, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 74, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 75, feature= 1, thr= 0.39, gain=0.055517

tree= 3, node= 76, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 77, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 78, feature= 7, thr= 0.23, gain=0.102044

tree= 3, node= 79, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 80, feature= 0, thr= 0.49, gain=0.043107

tree= 3, node= 81, feature= 6, thr= 0.51, gain=0.000666

tree= 3, node= 82, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 83, feature= 7, thr= 0.23, gain=0.067275

tree= 3, node= 84, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 85, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 86, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 87, feature= 1, thr= 0.60, gain=0.073437

tree= 3, node= 88, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 89, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 90, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 91, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 92, feature=-1, thr= -1.00, gain=0.000000

tree= 3, node= 93, feature=-1, thr= -1.00, gain=0.000000

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classification accuracy=0.7025