**Class Draw** extends JPanel implements MouseMotionListener, MouseListener

Member method

* Draw()
* clear()
* getData()

Member data

* boolean p
* boolean painting
* int px
* int py
* boolean[][] data
* DrawRealtime drawRealtime

**Class DrawWin** extends JFrame

Member method

* DrawWin()
* getSelectNumber()

Member data

* static JComboBox selectNumber
* private JButton clearBtn
* private JButton btnRecognize
* private JButton btnChecknumber
* private JToggleButton training
* private JToggleButton bgMusic
* private JLabel background
* private JLabel Numis
* private AudioStream as
* private ActionListener actionListener

**Class DrawRealtime** extends JPanel

Member method

* DrawRealtime()
* paint()
* clear()

Member data

* int oldr1
* int oldr2
* int oldr3
* oldr4

**Class ImagePanel** extends JPanel

Member method

* ImagePanel()
* paint()

Member data

**Class Recognition** extends JFrame

Member method

* Recognition()
* getImage() : BufferedImage
* boolean[][] getImageBits()
* int[] getRectangleCoords()
* loadImage()
* String recognize()

Member data

* + private ImagePanel imagePanel = new ImagePanel()
  + private TrainPanel TrainPanel = new TrainPanel()
  + private JButton btnReset
  + private BufferedImage image
  + private int[] rectCoords
  + private boolean[][] bits
  + private ActionListener actionListener

**Class TrainPanel** extends JComponent implements WindowListener

Member method

* TrainPanel()
* createSide()
* loadTrainPatterns()
* loadWriteFile()
* saveLastData()

Member data

* private JButton btnSave
* private JButton btnTrain
* private JTextField txtIterLimit
* private JTextField txtLearningRate
* private JTextField txtHLNeurons
* private JLabel lblError
* private JLabel lblIters
* private JLabel lblSuccess
* private JLabel lblMSE
* private JLabel lblSave
* private String hintLimit
* private String hintLearningRate
* private FileWriter trainDataFile
* private NeuralNetwork nn
* private int[][] trainPatterns
* private int[][] expectedOutputs
* private int N

**Class Main**

Member method

* main()

Member data

* public static DrawWin drawWin
* public static Draw drawPanel
* public static DrawRealtime drawRealtime
* public static Recognition recognition
* public static NeuralNetwork neuralNet

**Class Image**

Member method

* boolean[][] getBits()
* getImage() : BufferedImage
* int[] getRectangle()

Member data

**Class NeuralNetwork**

Member method

* NeuralNetwork()
* NeuralNetwork()
* backPropagation()
* dSigmoid()
* defaultInit()
* defaultInit()
* forwardPropagation()
* init()
* interpret()
* iters()
* loadWeights()
* loadWeights()
* main()
* maxIndex()
* rand()
* randomizeWeights()
* int resultIndex()
* saveWeights()
* double[] test()
* train()

Member data

* + private int hiddenSize, inputSize, outputSize, iters
  + private double[][] weightsItoH
  + private double[][] weightsHtoO
  + private double[] ah
  + private double[] ai
  + private double[] ao
  + private double LEARNING\_RATE

**Class Pattern**

Member method

* String getBinary()

Member data

* static HashMap<Integer, String> binary;