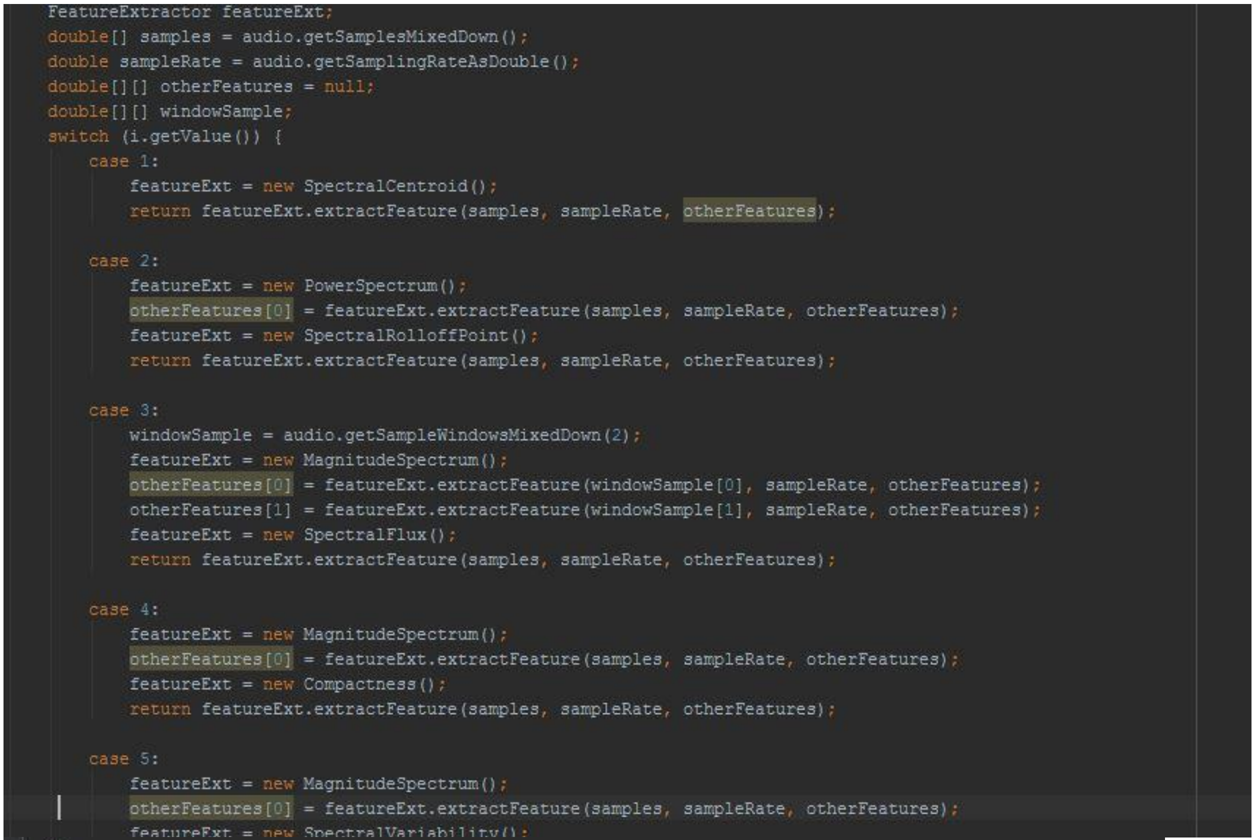
Assignment 10 Documentation Report
CS 5542 Big Data Analytics and applications



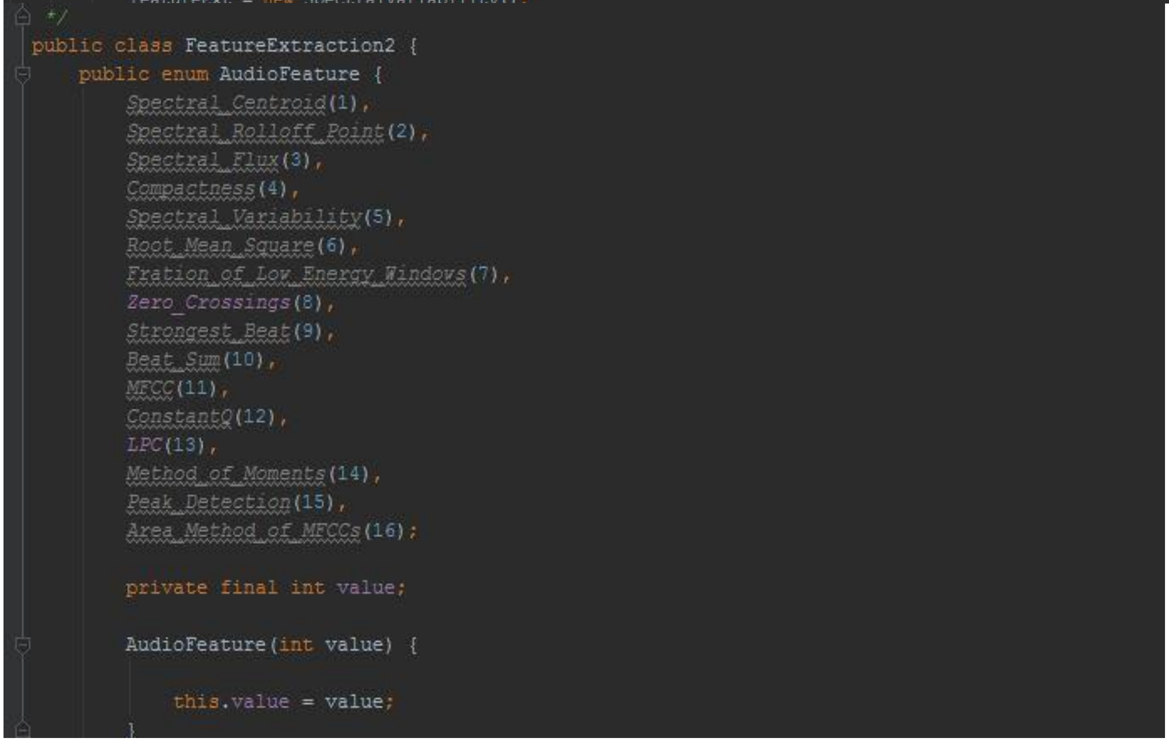
```java
    FeatureExtractor featureExt;
    double[] samples = audio.getSamplesMixedDown();
    double sampleRate = audio.getSamplingRateAsDouble();
    double[][] otherFeatures = null;
    double[][] windowSample;
    switch (i.getValue()) {
        case 1:
            featureExt = new SpectralCentroid();
            return featureExt.extractFeature(samples, sampleRate, otherFeatures);

        case 2:
            featureExt = new PowerSpectrum();
            otherFeatures[0] = featureExt.extractFeature(samples, sampleRate, otherFeatures);
            featureExt = new SpectralRolloffPoint();
            return featureExt.extractFeature(samples, sampleRate, otherFeatures);

        case 3:
            windowSample = audio.getSampleWindowsMixedDown(2);
            featureExt = new MagnitudeSpectrum();
            otherFeatures[0] = featureExt.extractFeature(windowSample[0], sampleRate, otherFeatures);
            otherFeatures[1] = featureExt.extractFeature(windowSample[1], sampleRate, otherFeatures);
            featureExt = new SpectralFlux();
            return featureExt.extractFeature(samples, sampleRate, otherFeatures);

        case 4:
            featureExt = new MagnitudeSpectrum();
            otherFeatures[0] = featureExt.extractFeature(samples, sampleRate, otherFeatures);
            featureExt = new Compactness();
            return featureExt.extractFeature(samples, sampleRate, otherFeatures);

        case 5:
            featureExt = new MagnitudeSpectrum();
            otherFeatures[0] = featureExt.extractFeature(samples, sampleRate, otherFeatures);
            featureExt = new SpectralVariability();
```



```java
 */
public class FeatureExtraction2 {
    public enum AudioFeature {
        Spectral_Centroid(1),
        Spectral_Rolloff_Point(2),
        Spectral_Flux(3),
        Compactness(4),
        Spectral_Variability(5),
        Root_Mean_Square(6),
        Fration_of_Low_Energy_Windows(7),
        Zero_Crossings(8),
        Strongest_Beat(9),
        Beat_Sum(10),
        MFCC(11),
        ConstantQ(12),
        LPC(13),
        Method_of_Moments(14),
        Peak_Detection(15),
        Area_Method_of_MFCCs(16);

        private final int value;

        AudioFeature(int value) {

            this.value = value;
        }
```

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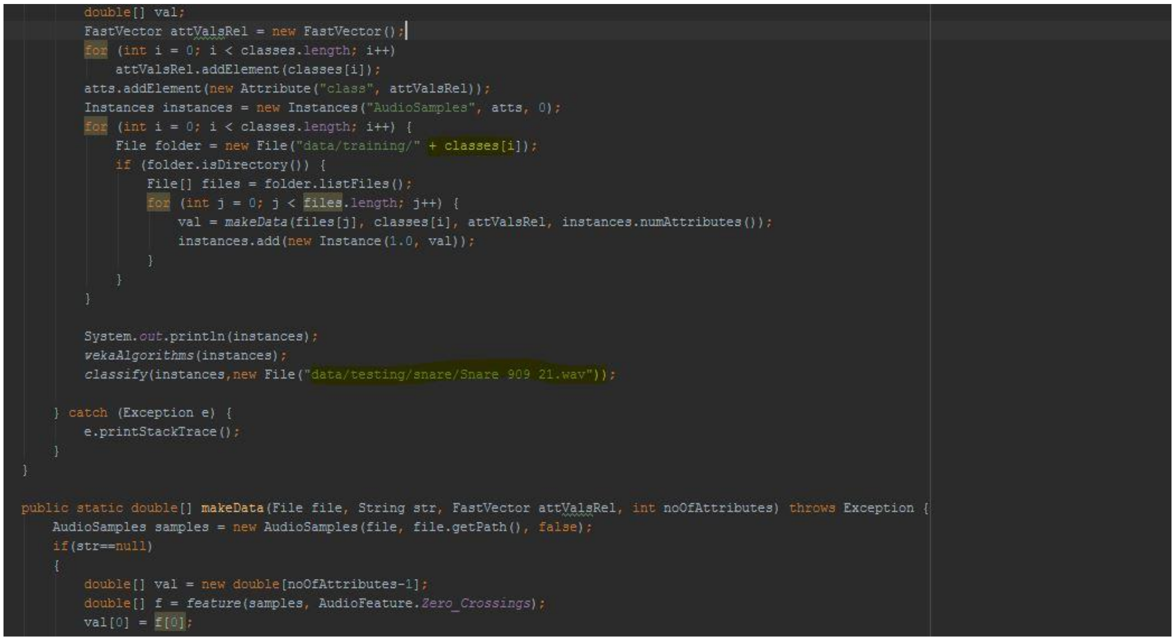
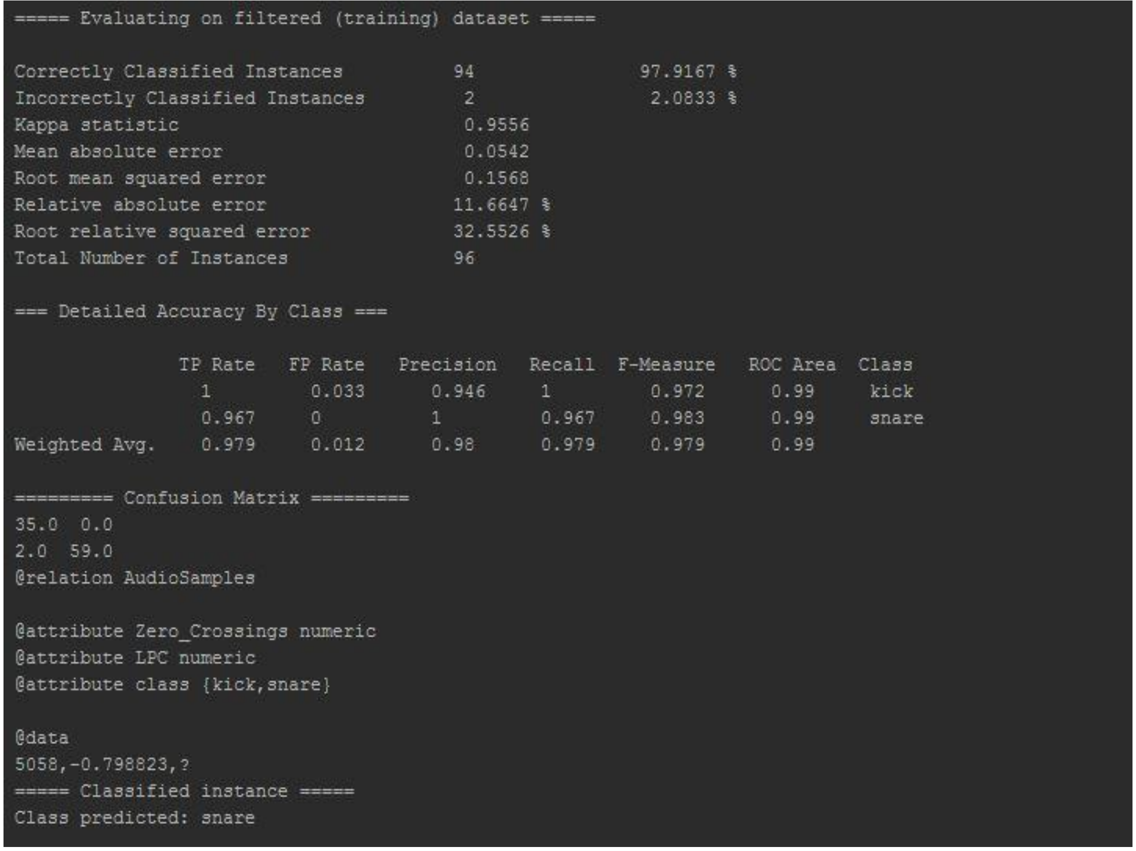


```
            double[] val;
            FastVector attValsRel = new FastVector();
            for (int i = 0; i < classes.length; i++)
                attValsRel.addElement(classes[i]);
            atts.addElement(new Attribute("class", attValsRel));
            Instances instances = new Instances("AudioSamples", atts, 0);
            for (int i = 0; i < classes.length; i++) {
                File folder = new File("data/training/" + classes[i]);
                if (folder.isDirectory()) {
                    File[] files = folder.listFiles();
                    for (int j = 0; j < files.length; j++) {
                        val = makeData(files[j], classes[i], attValsRel, instances.numAttributes());
                        instances.add(new Instance(1.0, val));
                    }
                }
            }

            System.out.println(instances);
            vekaAlgorithms(instances);
            classify(instances,new File("data/testing/snare/Snare 909 21.wav"));

        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    public static double[] makeData(File file, String str, FastVector attValsRel, int noOfAttributes) throws Exception {
        AudioSamples samples = new AudioSamples(file, file.getPath(), false);
        if(str==null)
        {
            double[] val = new double[noOfAttributes-1];
            double[] f = feature(samples, AudioFeature.Zero_Crossings);
            val[0] = f[0];
```



```
===== Evaluating on filtered (training) dataset =====

Correctly Classified Instances          94               97.9167 %
Incorrectly Classified Instances         2                2.0833 %
Kappa statistic                          0.9556
Mean absolute error                      0.0542
Root mean squared error                  0.1568
Relative absolute error                 11.6647 %
Root relative squared error             32.5526 %
Total Number of Instances               96

=== Detailed Accuracy By Class ===

               TP Rate   FP Rate   Precision   Recall  F-Measure   ROC Area  Class
                 1         0.033      0.946     1         0.972      0.99     kick
                 0.967     0          1         0.967     0.983      0.99     snare
Weighted Avg.    0.979     0.012      0.98      0.979     0.979      0.99

========= Confusion Matrix =========
35.0  0.0
2.0  59.0
@relation AudioSamples

@attribute Zero_Crossings numeric
@attribute LPC numeric
@attribute class {kick,snare}

@data
5058,-0.798823,?
===== Classified instance =====
Class predicted: snare
```

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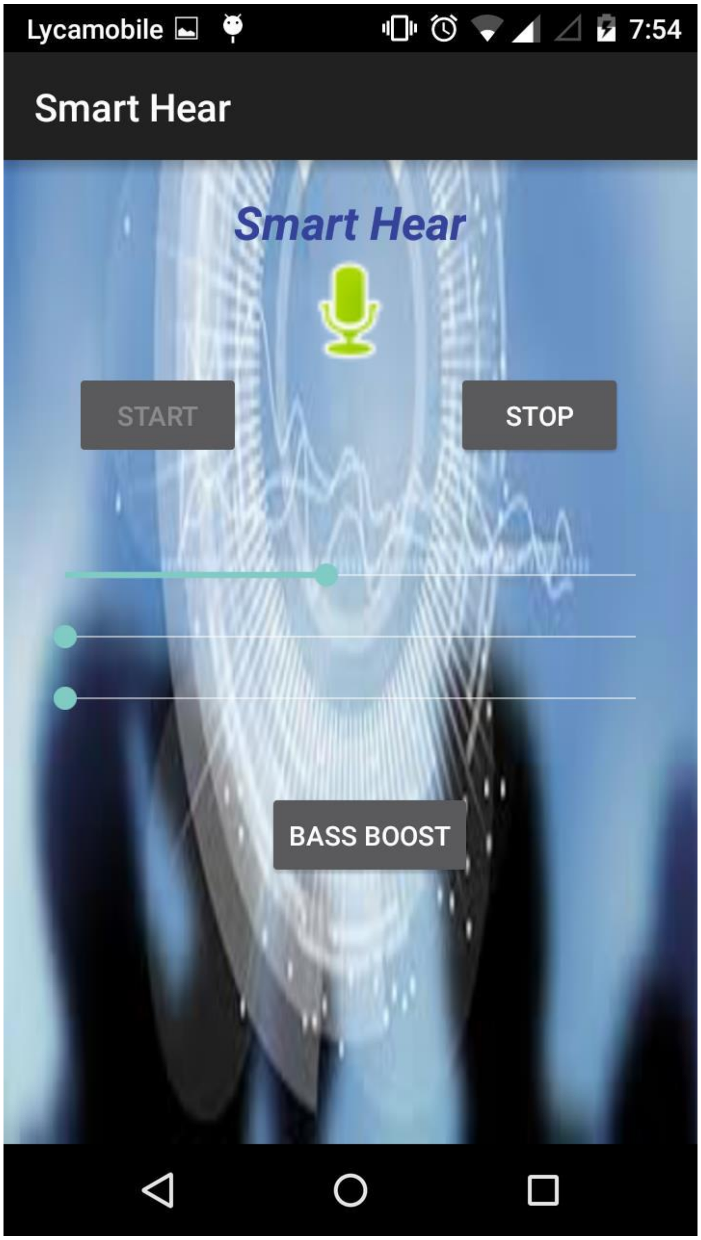

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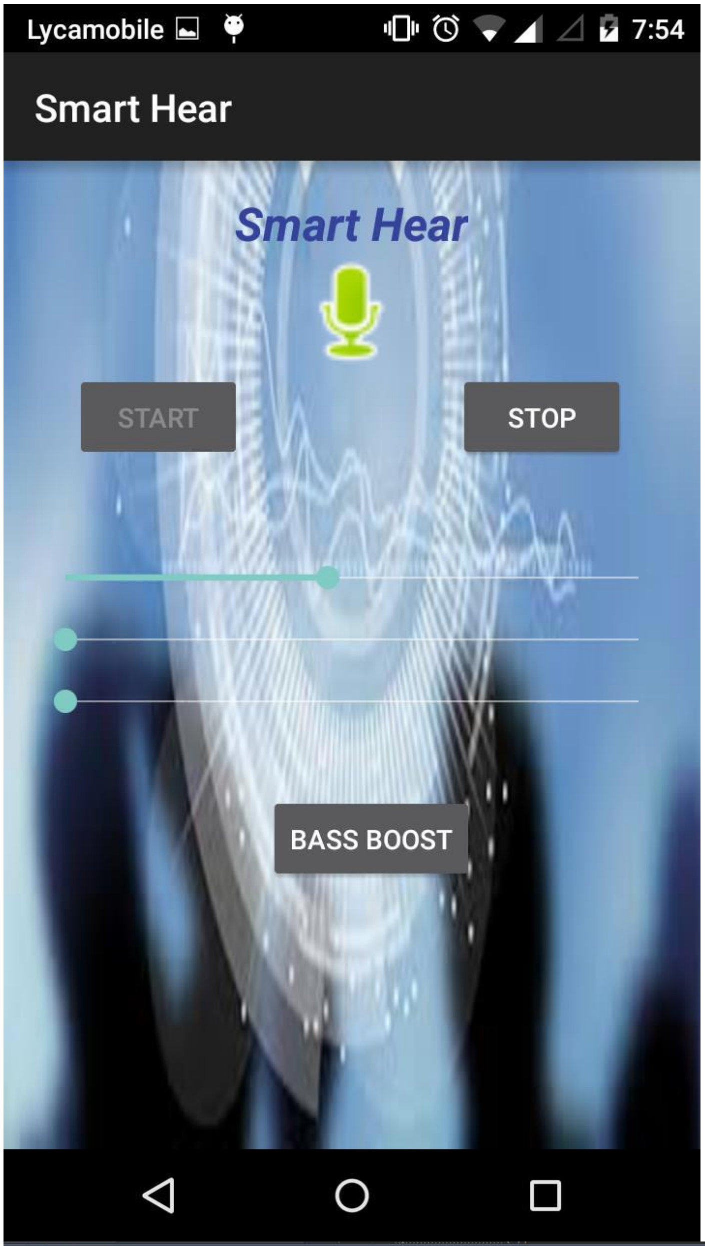

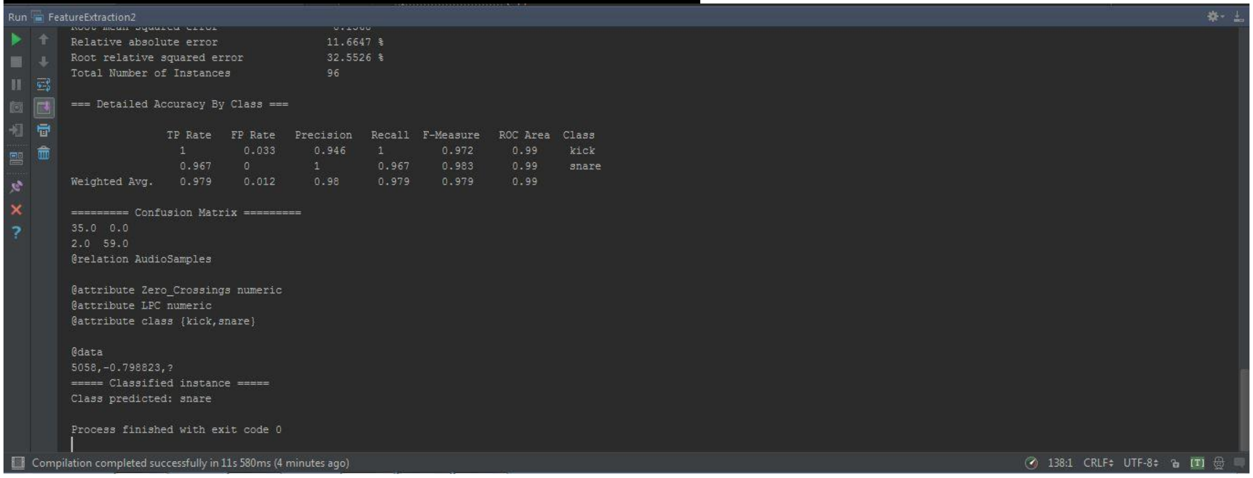

```
Relative absolute error                 11.6647 %
Root relative squared error             32.5526 %
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Process finished with exit code 0
```

Compilation completed successfully in 11s 580ms (4 minutes ago)