TBMI26 – Computer Assignment Reports  
Boosting

Deadline – March 15 2019

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In order to pass the assignment, you will need to answer the following questions and upload the document to LISAM. **You will also need to upload all code in .m-file format**. We will correct the reports continuously so feel free to send them as soon as possible. If you meet the deadline you will have the lab part of the course reported in LADOK together with the exam. If not, you’ll get the lab part reported during the re-exam period.

1. **Plot how the classification accuracy on training data and test data depend on the number of weak classifiers (in the same plot). Be sure to include the number of training data (non-faces + faces), test-data (non-faces + faces), and the number of Haar-Features.**

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Number of HaarFeatures = 25;

Number of TrainExamples of faces = 1000;

Number of TrainExamples of non-faces = 1000;

Number of TestExamples of faces = 2000;

Number of TestExamples of non-faces = 2000;

Number of Classifiers = 40;

1. **How many weak classifiers did you use when training? How many of them did you use for the final strong classifier? Why?**
   * We started with 40 classifiers when we initialized, and we ended up using only 20 for the final strong classifier, this is because adding more classifier decreases the accuracy.
2. **What is the accuracy on the test data after applying the optimized strong classifier?**
   * Our accuracy after applying strong classifiers is ~92% on the training set and 85% on the test case.
3. **Plot the Haar-features selected by your classifier (one for each weak classifier). If you have many weak classifiers, select some representative subset.**
4. **Plot some of the misclassified faces and non-faces that seem hard to classify correctly. Why do you think they are difficult to classify?**
   * Shown below are the incorrectly identified faces, one of the reasons that I think our classifier got them wrong is the fact that some of them are wearing glasses, they are under exposed images and the orientation of the faces are such that most of our Haar-filters don’t identify them as faces.
   * Regarding the non-faces identified as the face, this is the case where our Haar-filters detect a match and they identify spots which match the features found on a human face.

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1. **Defend your results. Are they reasonable?**
   * Our model does well with simple images, it’s the places where Haar-filters start throwing too many false positive is where we tend to do bad.
2. **Can we expect perfect results? Motivate your answer.**
   * An accuracy of ~85% is not very impressive but none the less with a simple method of using Haar-filters and low training time is certainly good. We could use CNN and other deep learning algorithms (YOLO) and obtain a much better accuracy however it would be at the cost of increased training time and resources.