Mobile Application for Cough Classification
Jonathan Cheng, Daniel Eckels, Brice Howard, and Christina Parry
{jac647, dce32, bdh60, cmp277}@scarletmail.rutgers.edu
Advisor: Prof. Mehdi Javanmard, Rutgers/ECE

Goals

- Create a mobile application that will record a cough and provide an in-depth analysis based on the cough waveform.
- Use feature extraction and machine learning to determine the type of cough recorded by the user and its severity.

Motivations and Objectives

- People who travel frequently or those who are new parents may not be able to visit their regular doctor.
- Physicians have many appointments with patients who may not have a severe ailment.
- Those who do not have insurance may not be able to afford a visit to the doctor.

Method

- Android application records user cough and sends it to MATLAB-based TCP/IP server in .wav format.
- MATLAB instance on computer processes the raw data and obtains Mel Frequency Cepstral Coefficients (MFCC).
- Coefficients are sent through a K-Nearest Neighbors algorithm to determine type of cough.
- Three major types of cough: Dry, Wheezing, and Productive.
- Results are sent back to the user.

Results

- IRB approval allowed for acquisition of clinical samples.
- Improvements: identify more training samples and evaluate alternative learning algorithms.
- Tests using the Urban Sound Dataset[7] resulted in accuracies of about 70%.
- Additional training data will allow for more accurate classification.

Acknowledgement

We would like to thank our advisor, Prof. Mehdi Javanmard for his continued time and effort. We would also like to thank Dr. Naresh Nagella (RWIMS), the PI for our clinical research study, Dr. Kathy Black (EOHSI), our Study Coordinator, as well as Dr. Connie Chuang (EOHSI), and Dr. Anthony Scardella (RWIMS), the Co-PI’s for our clinical research study. Without all of their assistance, we would not have been able to obtain the clinical samples necessary for this project. Additional thanks to Alexi Varughese for the initial project idea during the Fall 2016 semester.

References