**Goal**

- To create an Android Application to alert distracted users of incoming traffic
- To make it safer for pedestrians to listen to music or to use their mobile phones while walking outside

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**Motivations and Objectives**

**Motivations**
- Modern technology has become very distracting
- According to the CDC, 4,280 pedestrians were killed in traffic accidents in 2010 and 70,000 more were injured

**Objectives**
- Correctly classify samples from a microphone as incoming traffic
- Provide the user with useful feedback to alert them that a car is approaching

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**Methodology**

- Android device microphone is always recording
- Features are extracted from each frame
- Energy and zero crossing rate in time domain
- Spectral roll-off, centroid, entropy, and flux in frequency domain
- Classes are represented by dictionaries learned in MATLAB and transferred to the phone
- Residual for each class is calculated using KOMP and used to classify each input
- Higher level classifier decides when to alert

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**Research Challenges**

- Selection of a kernel function that offers increased performance and robustness
- Deciding on parameters: Audio frame length, Sparsity level, and the size of each dictionary
- Implementation of the KOMP algorithm and higher level classifier in Android

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**Results**

- App performance was tested on Hoes Lane West with a sample of 21 cars
- The following results were obtained
  - 20 detections
  - 1 miss
  - 8 false detections
- Due to the critical safety risks involved, we preferred a false positive to a false negative

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**References**