Real-time machine learning-based user authentication via daily activities using wireless signals

Advisor: Prof. Yingying Chen

Hello!

Name: Bhargav Singaraju

Major: Electrical Engineering

Fun Fact: My favorite candy is Kit Kat.

Hello!

Name: Rishika Sakhuja

Major: Computer Engineering

Fun Fact: I have collected over 100 keychains from all of the places I have travelled to.

Hello!

Name: Sachin Mathew

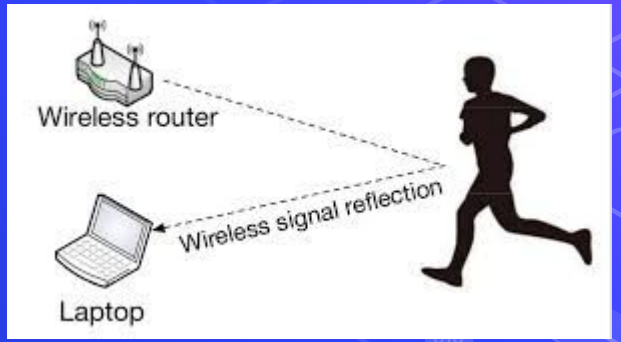
Major: Computer Engineering and Computer Science

Fun Fact: In high school I ate gallon of sorbet in under an hour and I my body will never be the same.

Objective

Building an Activity Recognition System

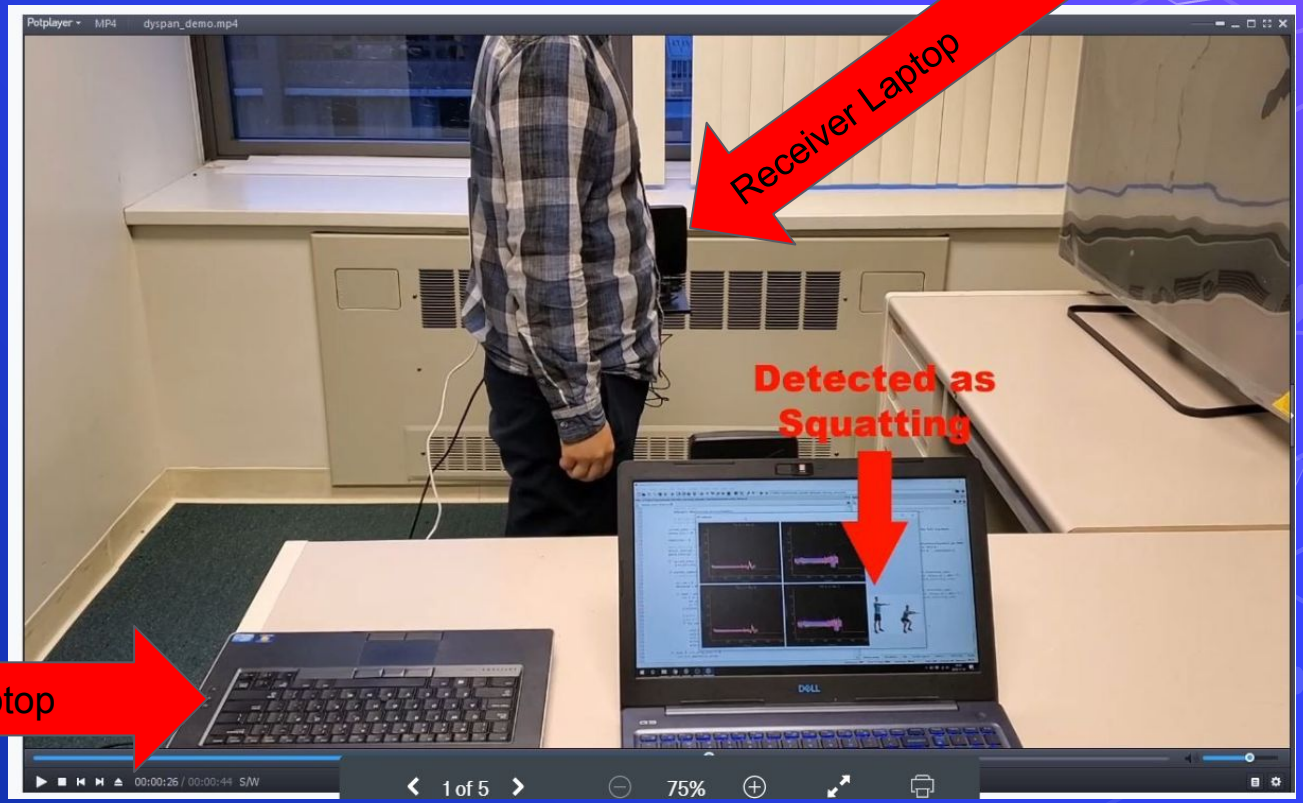
1. Collect Wireless Signals (Channel State Information)
2. Perform Data Processing
3. Recognize User Activities



Activity Segmentation

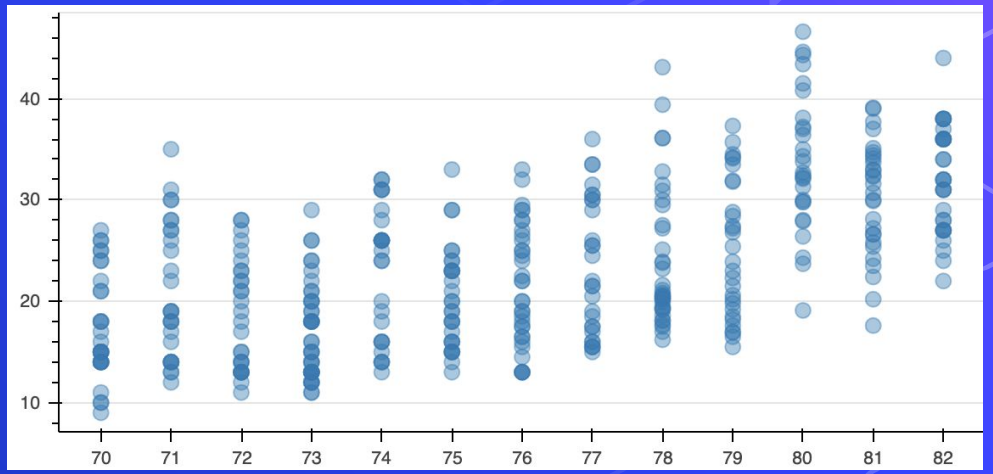
- Take continuous csi input and segment it into individual repetitions of an action
- Generates a discrete input space
- Can be done by providing neural network information on how many reps are in each test or by pre-segmenting the data through noise reduction and valley finding

CSI Collection Setup



Visualization Tool

- Bokeh- display real time CSI data
- Two Figures
  - Real time CSI plot
  - Activity detection



Next Steps

- Load real-time CSI to TensorFlow models
- Use TensorFlow to implement real-time data segmentation mechanism
- Continue developing visualization tool
- Collect CSI data for various activities

Questions ?