User Physical Activity Recognition using Android-based Smartphones

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Introduction
- Smartphones came into existence with great sensing capabilities
  - Processing, Storage, Sensors, Interfaces (Wi-Fi, Bluetooth)
- Due to open and programming nature, Android and smartphones are gaining importance in the field of sensing
- User daily activities can be recognized by considering multiple sensors in smartphones
- Activity recognition used to understand the user’s context

Motivation
- Our lifestyle choices have a deep impact on our personal health – e.g., our sleep, socialization and exercise patterns
- Leading to health problems
  - e.g., high-blood pressure, stress, anxiety, and depression
- Personalized sensing in a non-intrusive way
  - To reduce these problems (suggesting the user to exercise)

Activity Recognition Process
- Acceleration values of X, Y, Z - axis are captured
- Compute and store the frequency points and corresponding amplitudes for each axis
- Extract the feature and provide to the activity classification stage
- The classifier generates a label that indicates user’s current activity (walking, stationary, running, etc.)

Activity Recognition Stages
- Data collection
- Feature extraction
- Classification
- Recognition of activity

Results – Activity Recognition Accuracy
Activity Performed: Walking, Running
Duration: 45 Minutes (from 6:45 to 7:30 pm)

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<td>2.3</td>
<td>2.3</td>
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Conclusions and Next steps
- Inferred the user actions automatically
- Accuracy of activity dependent of sampling rate
  - Impacting resource utilisation
- Next step to recognize daily pattern of user activity

Acknowledgement
This work has been developed in the context of the CitySense project
http://copelabs.ulusofona.pt/~citysense/