Mobile-Computing Laboratory

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1. Overview

2. Data-Analysis and Signal-Processing

3. Demo

Overview

- Option 1
- **Activities**: Body-strenght exercises
  - Periodic motions
  - Quite unambiguous trajectory-profile
  - $\Rightarrow$ Precise activity-classification possible even with simple algorithms (e.g. *kNN*)
- Used Sensors:
  - Accelerometer
  - Gyroscope

Overview cont.

- : **Used Phone**: LG Q6
  - **Android-version:** 8.1.0
  - **Processor:** Qualcomm MS8940 (Octa-Core ARM Cortex A53)
  - **RAM:** 2 GB (only)

LG Q6

Current App-state

What is working

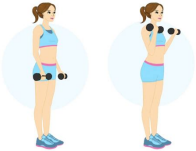
- Data-Capturing
- Classification itself
- Switching between (Android-)Activities

What is not working

- Interaction between Data-Capturing and Classification (Multi-threading issue)
- A ”nice” UI

A closer look on the Activities

Crunches



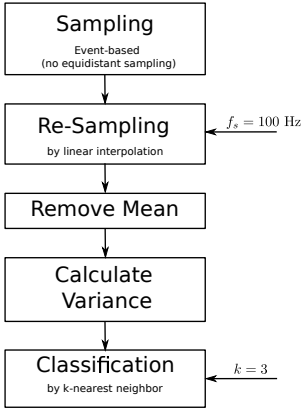
Bizeps Curls

Triceps Curls

Russian-Twist

Activity-Characterization

- Timeframes of 10 seconds length
- Resampling to fixed sample-rate
- *kNN*-classification by variance sensor-channels
  - Currently $k = 3$
  - $\Rightarrow$ 6 features ($x-$, $y-$ and $z-$ signal of each sensor)



Features vs. Labels

- $\approx$ 15 samples for each activity in the 'training-set'
  - Total timeframe used for variance calulation
  - $\Rightarrow$ Noise-reduction
- Test-Set:
  - 3 samples per activity
  - Between 2 and 3 10 seconds-timeframes per sample
  - 32 test-set samples

Demo-Time

Thank you for your attention.