

Considerations for Android Tap Detection App

Gesture vocabulary

- Tap on back
- Doubletap on back
- Sidetap
- Pick up and drop

Recognition

Pipeline: Accelerometer -> Smoothing -> Collector -> Envelope curve -> Quantization -> Detector

Smoothing

Smoothing with low-pass filter

Values on Z-Axis: Values on X/Y-Axis:

Collection

Collection of 128 samples in circular fifo queue

Envelope curve

... (specifics about the algorithm)

Quantization

3 categories:

- nothing: $\leq a$
- peak: $> a, \leq b$
- strong peak: $> b, \leq c$
- very strong peak: $> c$

Gesture detection

- State machine for each gesture
- Tap
 1. nothing
 2. nothing in X/Y axis and peak or strong peak ($< 20\text{ms}$) in Z axis
 3. nothing
- Doubletap
 1. Tap
 2. nothing ($> 20\text{ms}, < 100\text{ms}$)

3. Tap
- Sidetap
 1. nothing
 2. peak on X and Y axis ($< 50\text{ms}$)
 3. nothing
 - Pick up and drop
 1. nothing
 2. strong peak on Z axis ($> 20\text{ms}$)
 3. very strong peak on Z axis ($< 10\text{ms}$)
 4. nothing