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Universiteit Antwerpen

6-IoT Low Power

Project: Smart Dumbbell

Yves De Boeck
Mohammad Amir
Wouter Jacobin
Gauthier de Borrekens

Universiteit Antwerpen

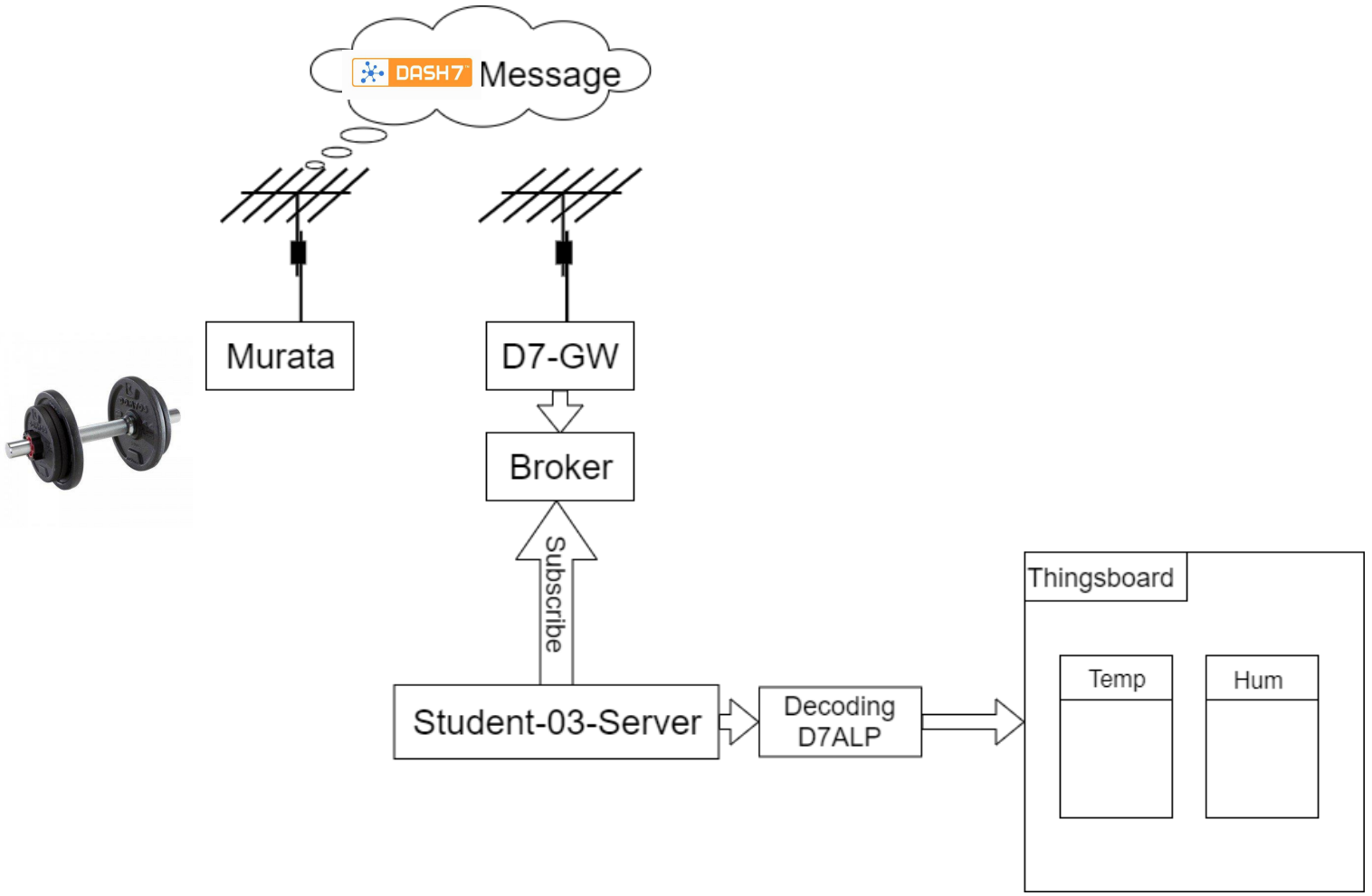
Concept

Keep track of reps

DASH7™

- Alert if people don’t put their dumbbell back

Concept


DASH7
Message
Murata
D7-GW
Broker
Subscribe
Student-03-Server
Decoding
D7ALP
Thingsboard
Temp
Hum

Repmode & Idlemode

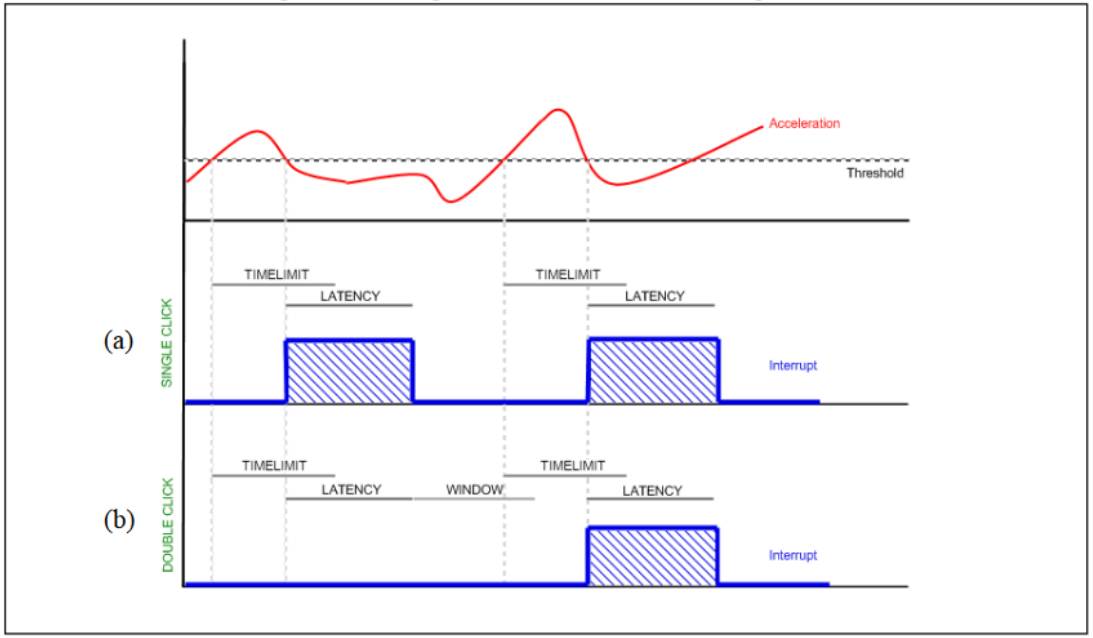
- Idle-Mode

- Rep-mode:

Repmode & Idlemode

- Idle-mode: Sensitive accelerometer interrupts
- Upon button interrupt → Change mode
- Rep-mode: Register reps using “double click”

Figure 18. Single and double-click recognition



Source: LSM303AGR Application Notes (ST-Electronics)

Sleep and Wake-up

- Idle-mode → Sensitive accelerometer interrupts
- Go to sleep after no interrupt for 1 minute
- EnterSTOPMode() → Wait for interrupt
- Vcore clocks disabled.

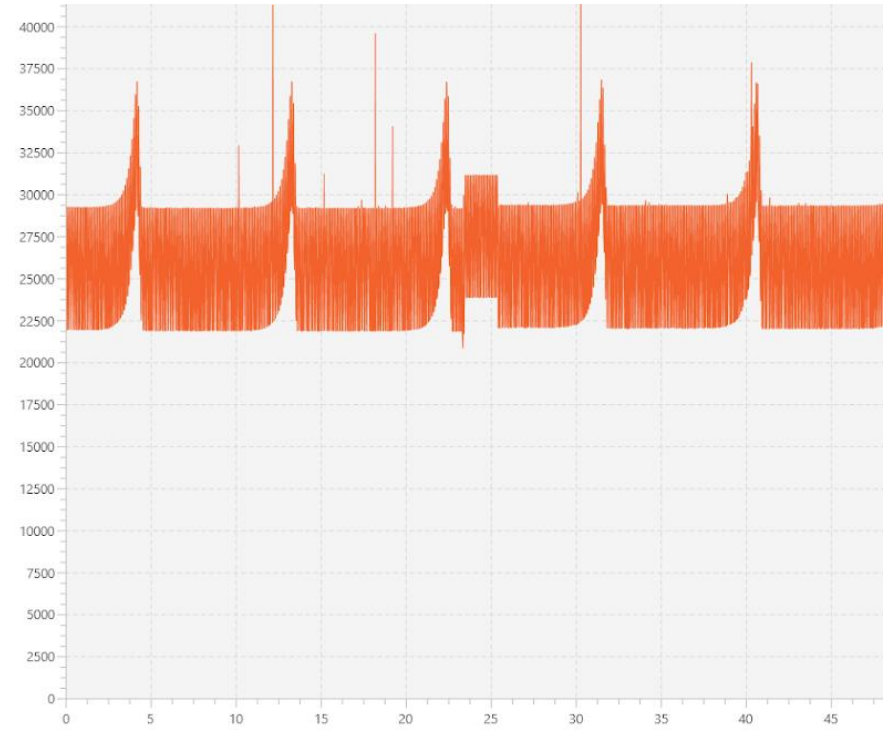
Power Usage

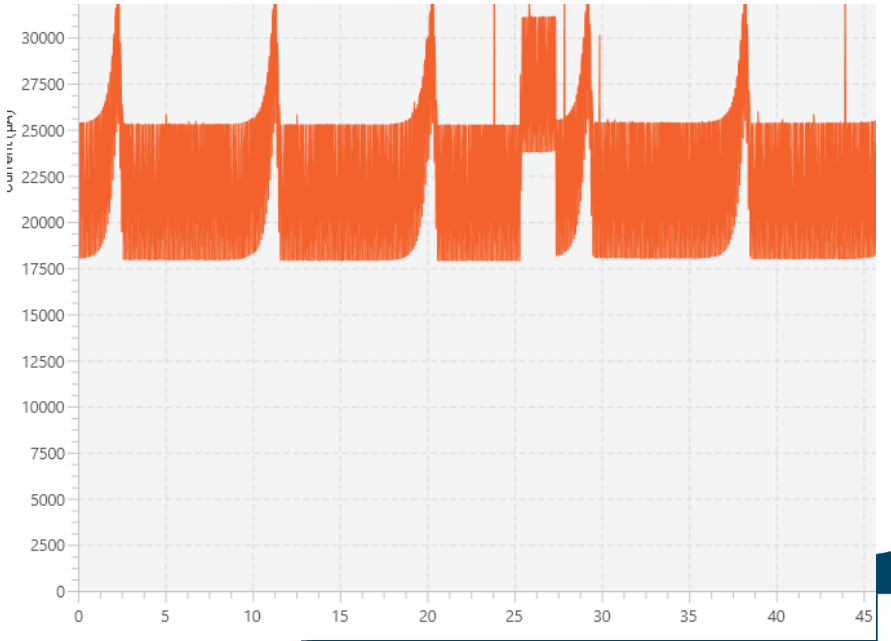
- Empty loop:

  22,5 – 29 mA

- Sleepmode:

  18 – 25,5 mA





Sending schedule

- When awake
  - Every minute: Hum & Temp + Localise
  - Start repping: Hum & Temp + BLE + Localise
  - Stop repping: Hum & Temp + BLE + Reps + Localise

- Upon waking up or going to sleep
  - Hum & Temp + Localise

No Dash7 reception

- 3 Consecutive D7 failures → Switch to LoRa
- Using error-flag in murata.c

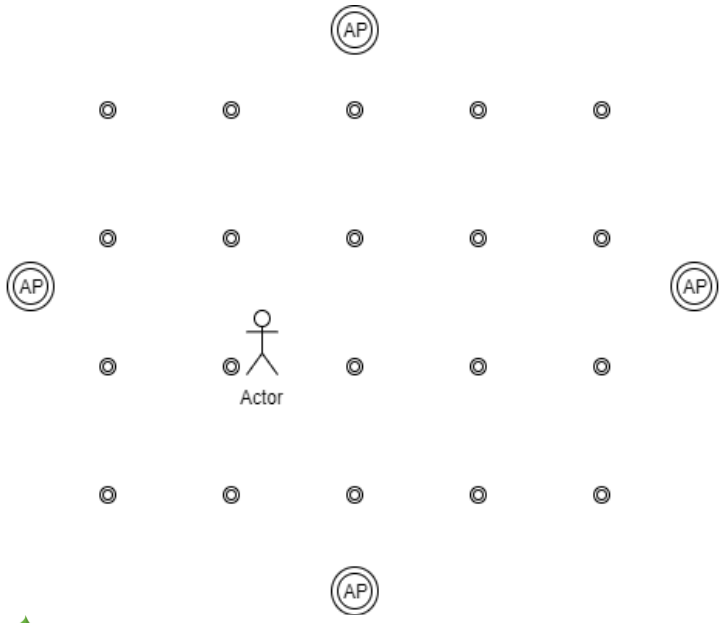
- INSERT FOTO VAN D7 → LoRa SWITCH

Communication

- Done
  - ✓ Subscribing to Message broker
  - ✓ Implementing D7ALP decoder on server
  - ✓ Sending information to thingsboard
  - ✓ Visualizing Data on Thingsboard
- To do
  - Implementation + visualization entire payload
  - LoRaWAN thethingsnetwork to thingsboard

Localisation

- Done:
  - ✓ Algorithm for KNN-localisation
  - ✓ MongoDB
- To do:
  - Creating trained dataset
  - Integrating failed connection
  - Implementing on server



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