Spotter

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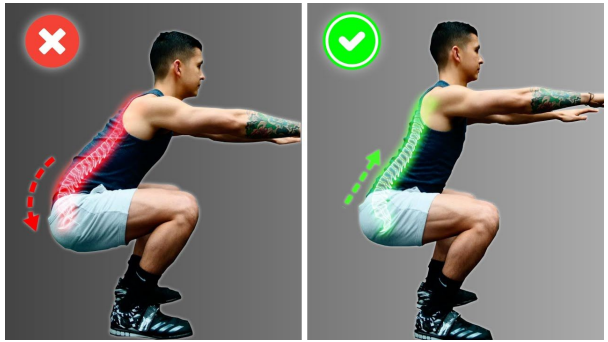
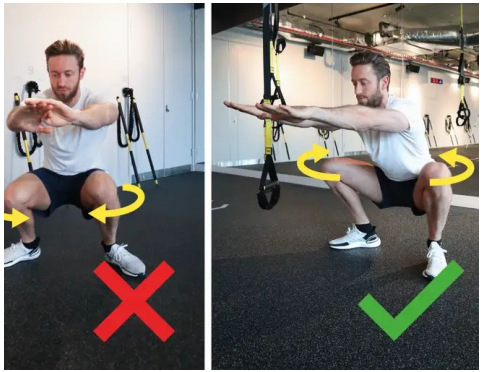
Customers

- Beginners of the gym (users who just started)
- Veterans of the gym (athletes)
- Coaches
- Kinesiologists / Sports medicine

Value of Spotter

- Help you feel more confident when working out
- Keeps the user motivated
- Prevent injuries
- Get the most out of the exercises (muscle strengthening)
- Help user develop good posture for everyday life



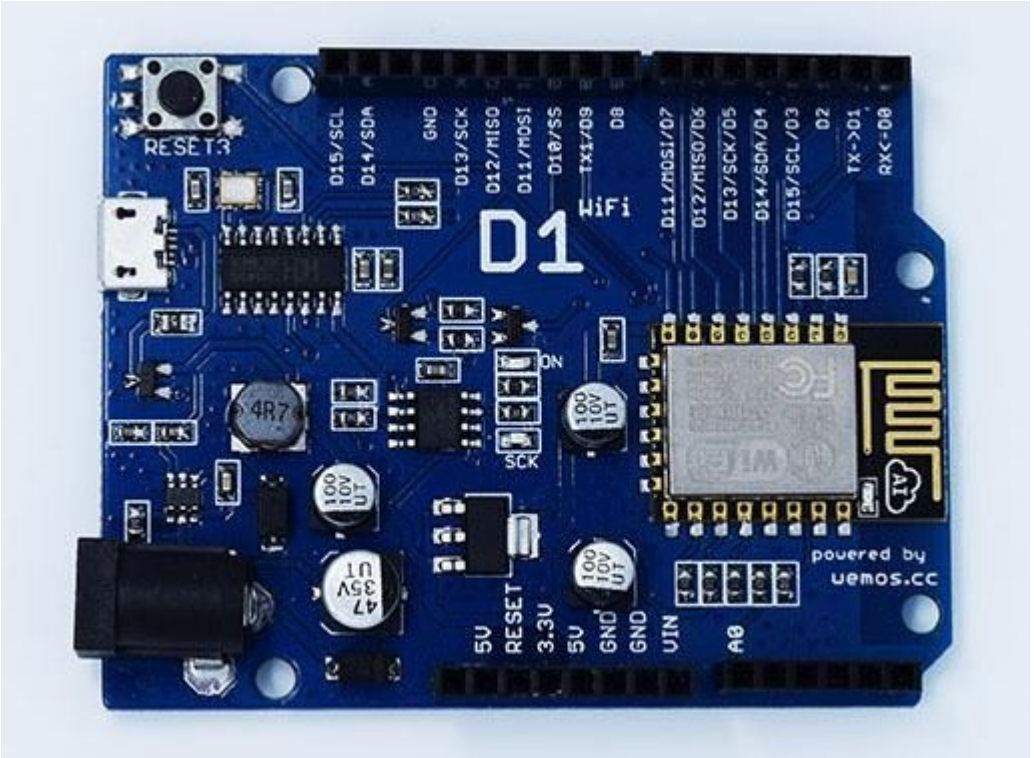


Hardware Setup

Arduino D1 R1:

Using

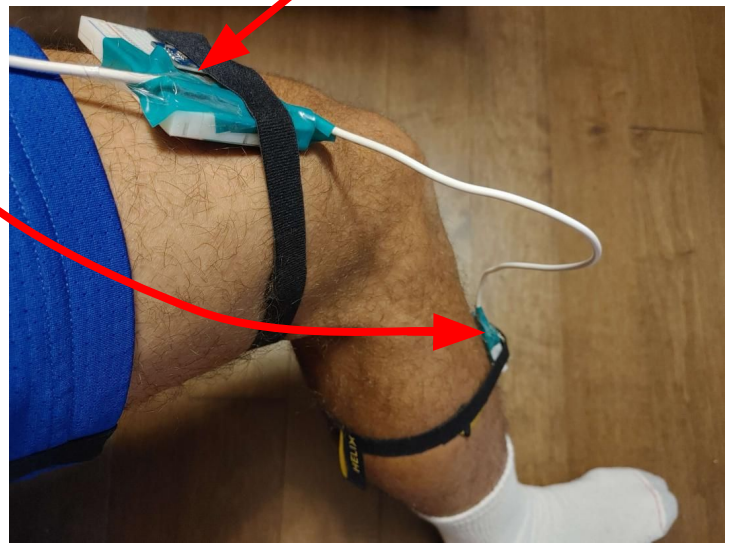
- ESP8266 Wifi chip for communication with database
- SCL and SDA ports for I2C communication with two IMU’s
- A0 port for analog read of flex sensor
- 3.3V and GND to power the sensors

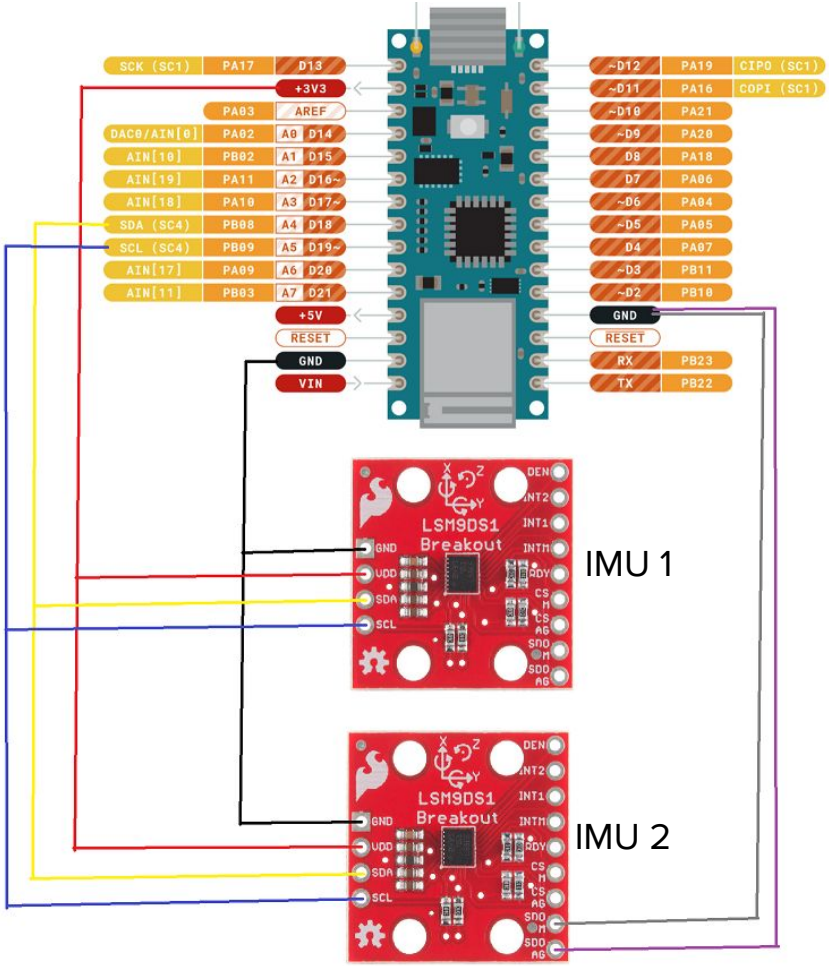


IMU Sensors Connection

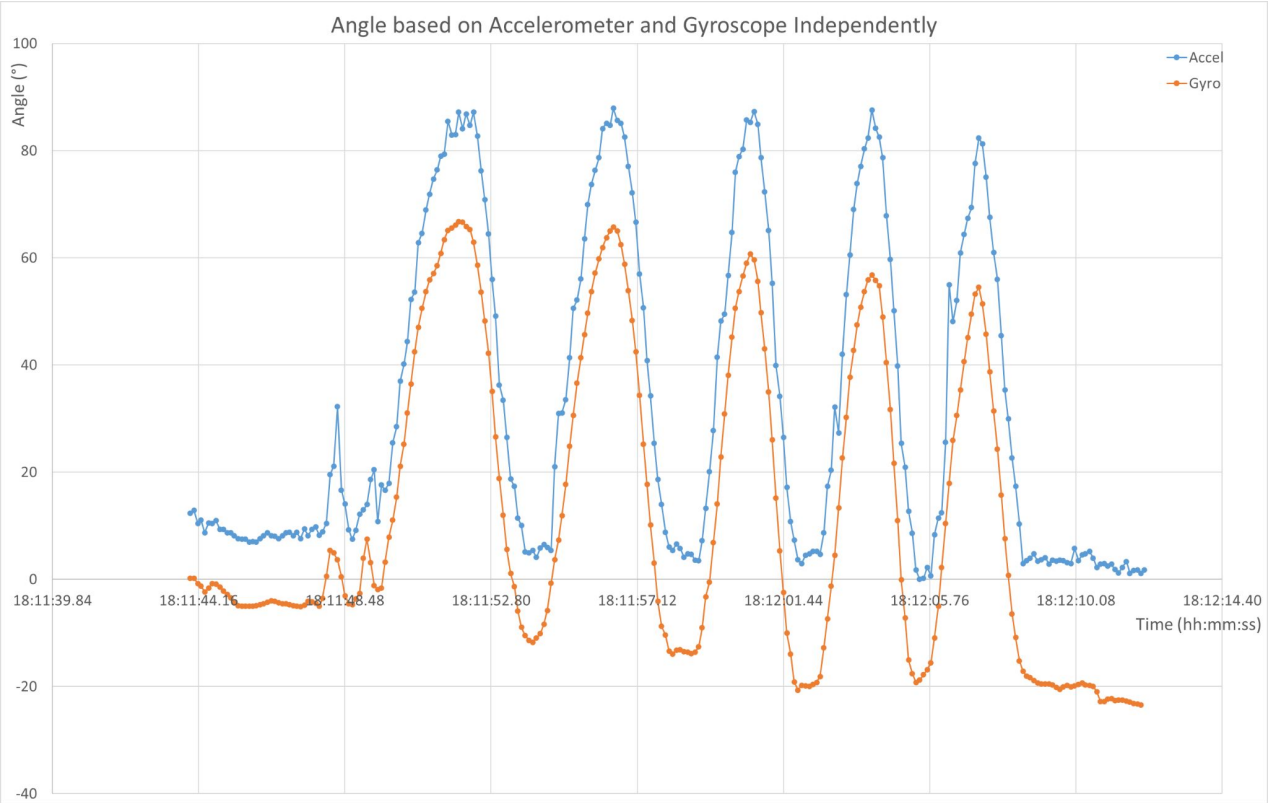
IMU 1 Placement: Below the knee

IMU 2 Placement: Above the knee

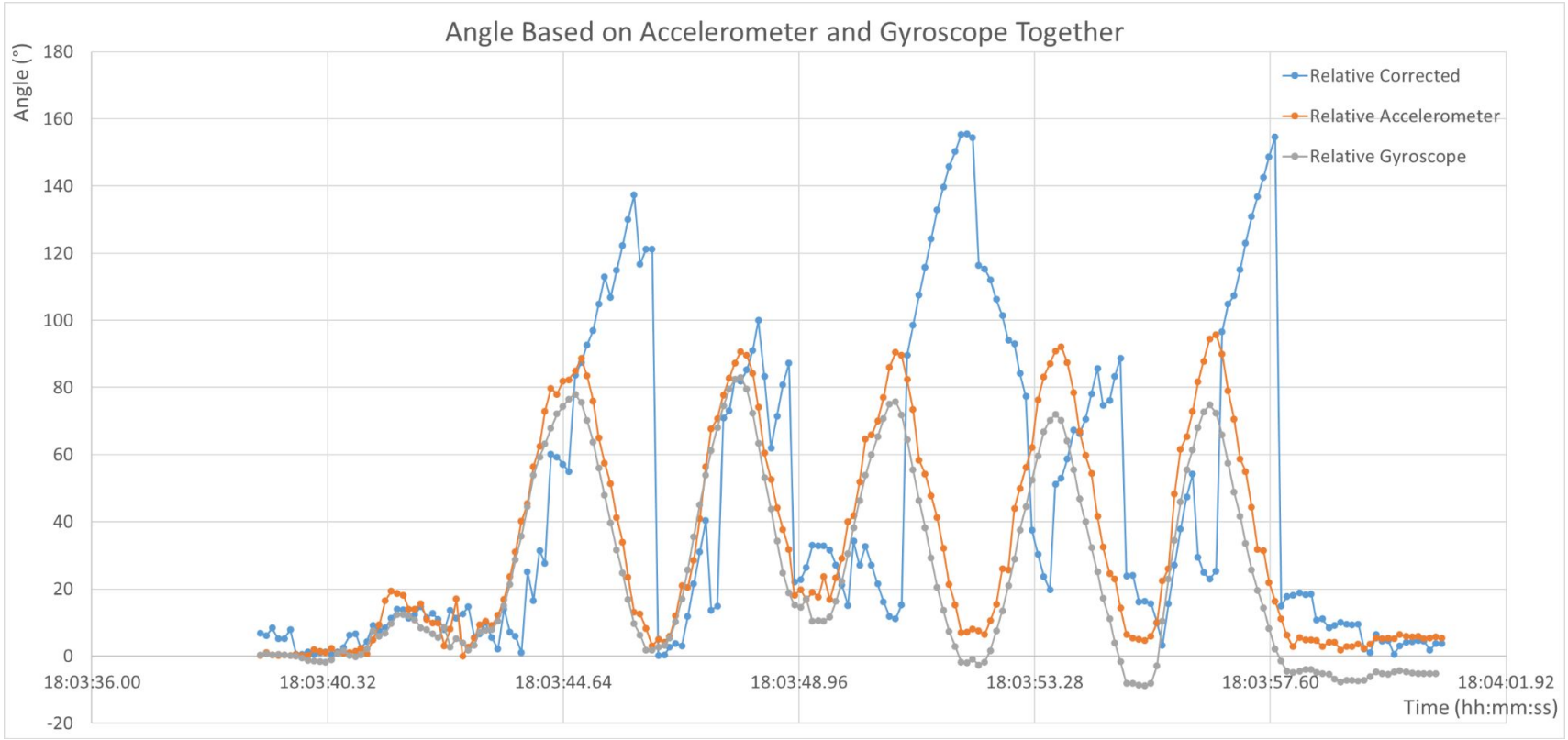




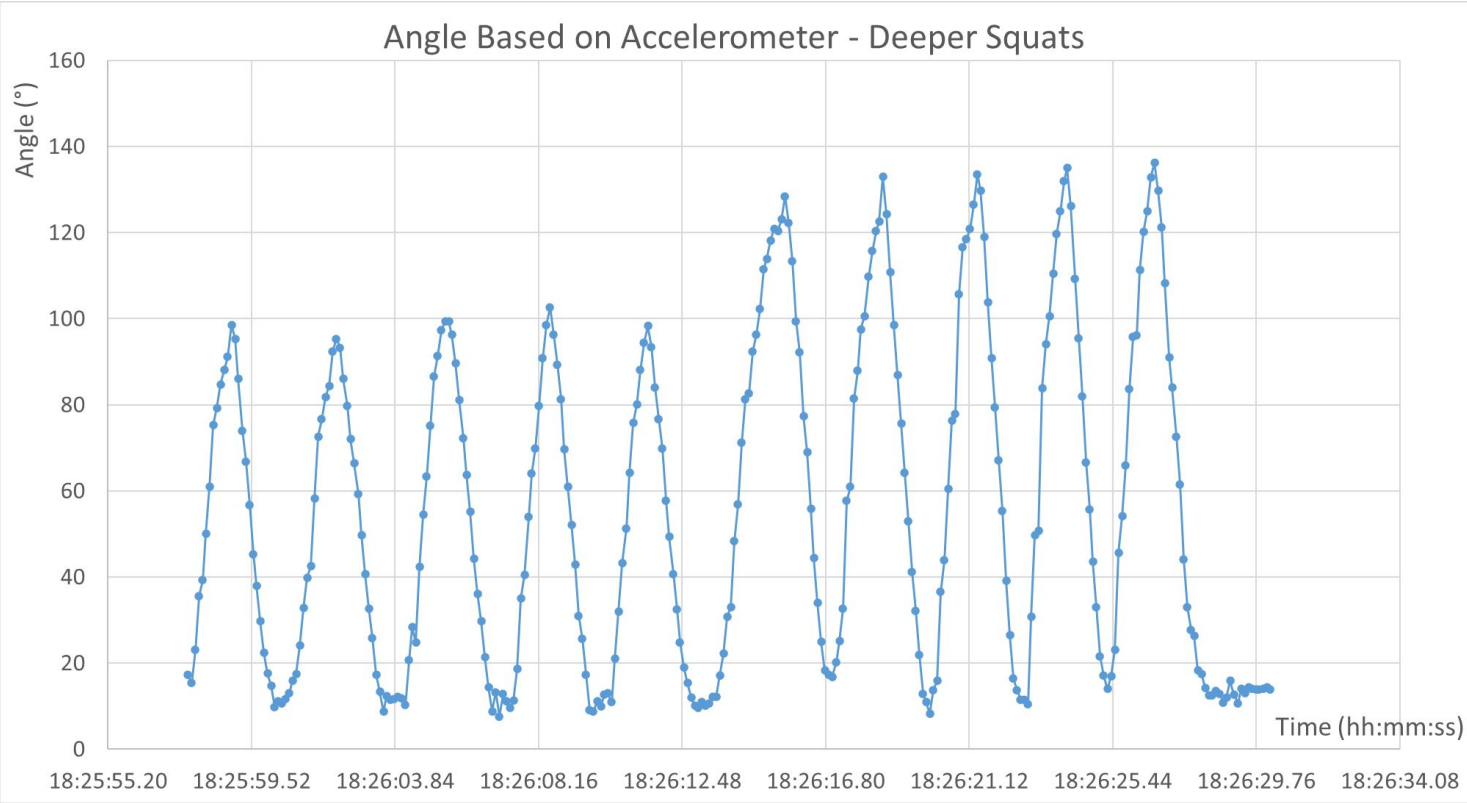
IMU Simulations - Initial Situation



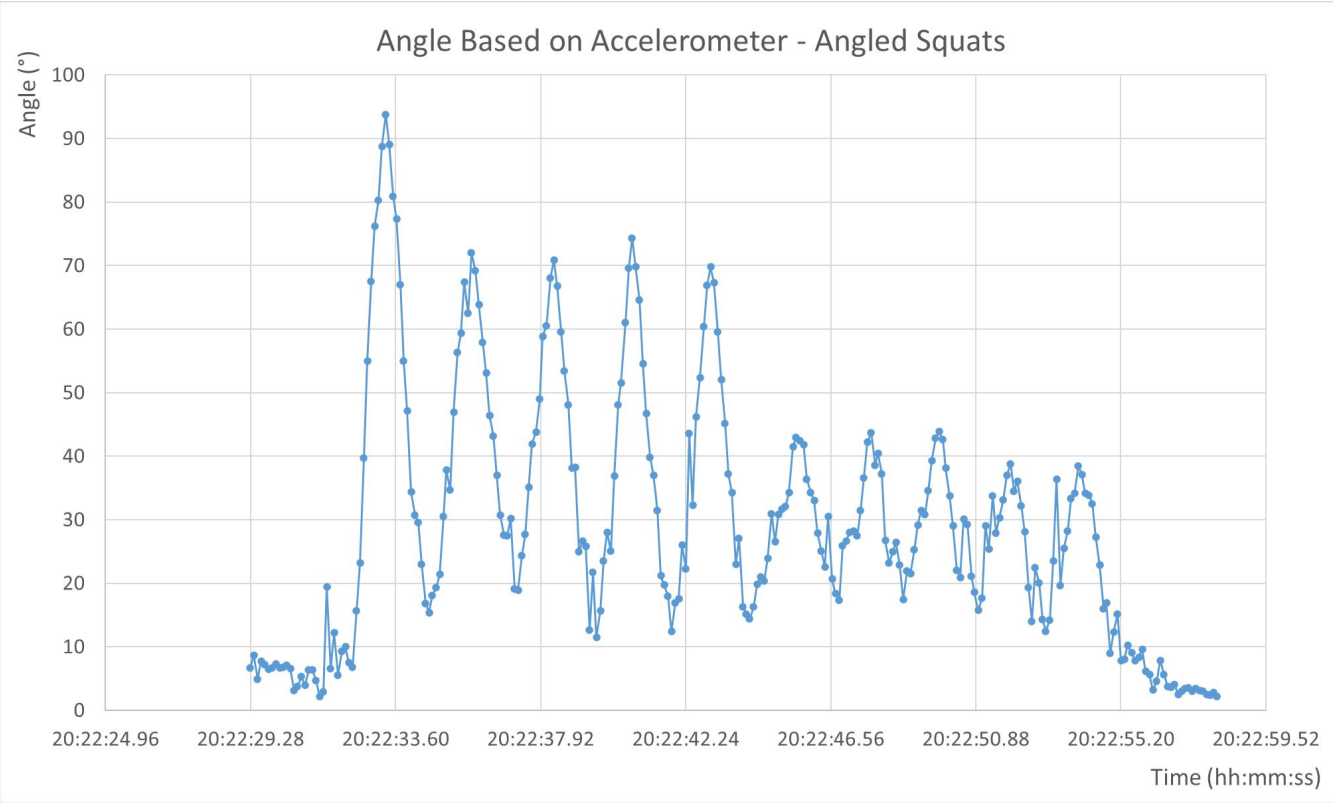
IMU Simulations - Initial Solution



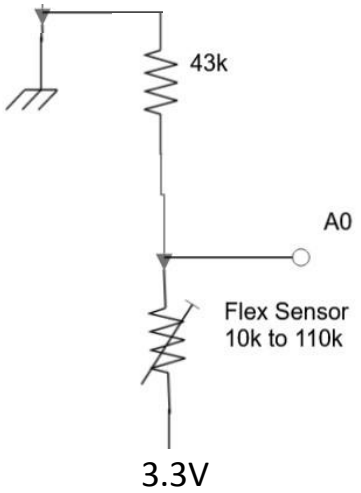
IMU Simulations - Final Result 1



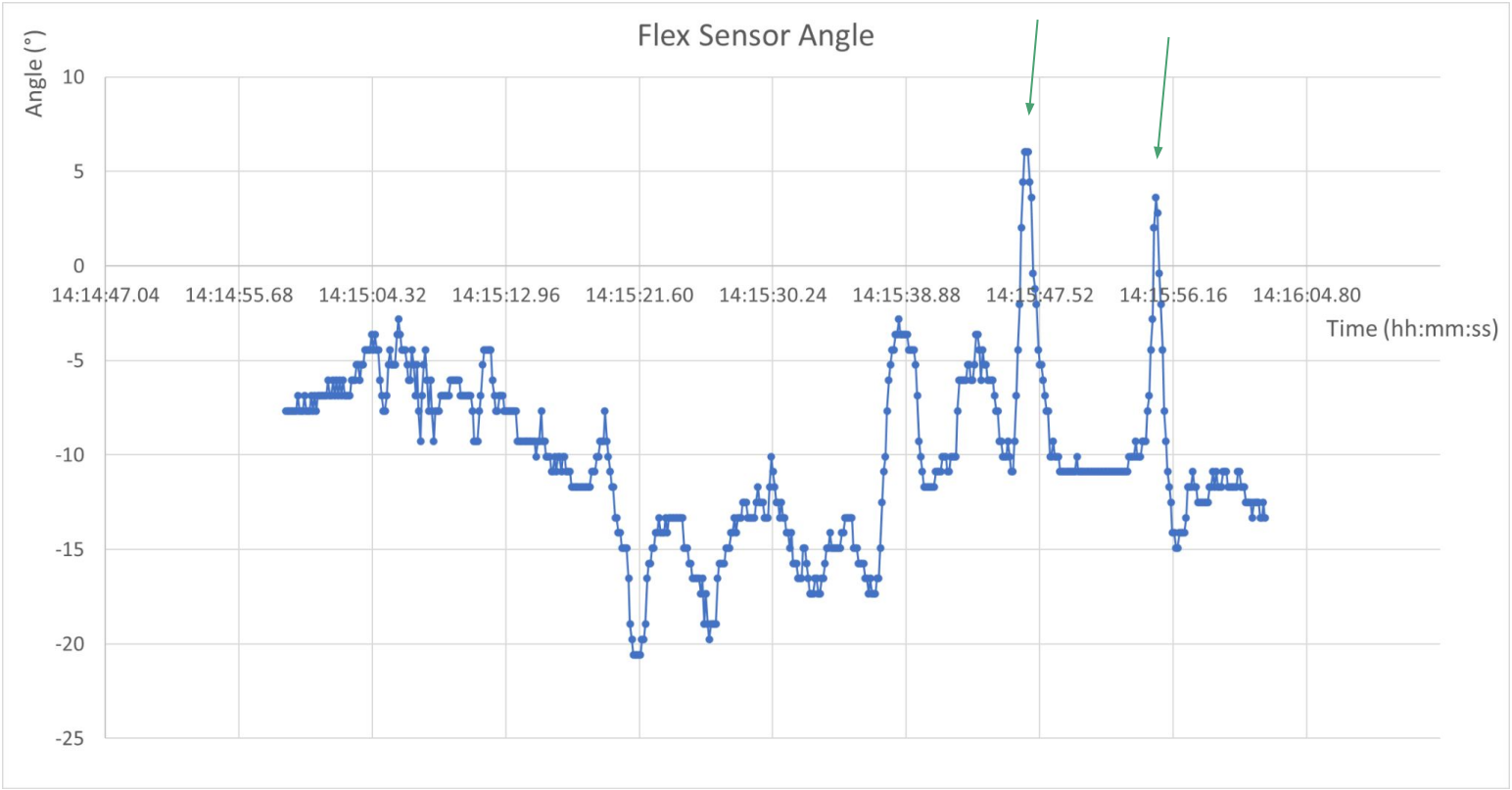
IMU Simulations - Final Result 2



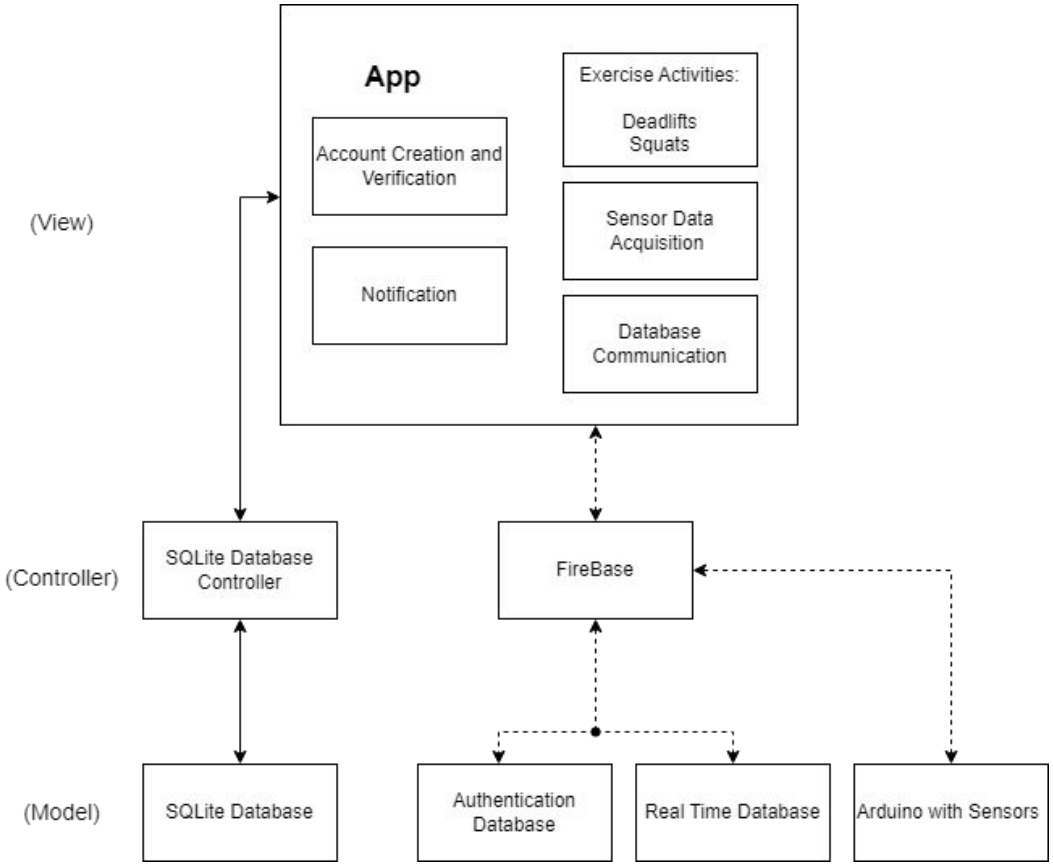
Flex Sensor



Flex Sensor Simulations



System Structure



Firebase

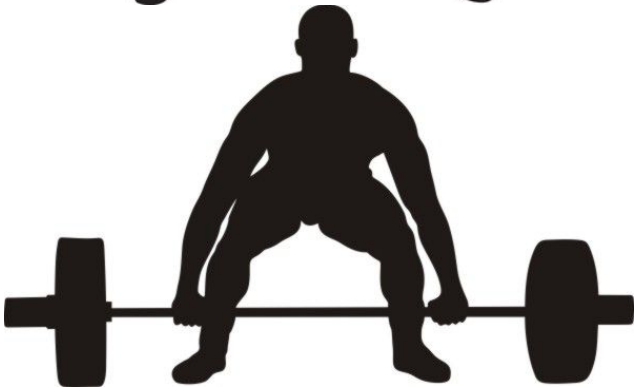
- Cloud based platform hosted by google
- Android app implementation
- Authentication database
- Realtime database
- Intermediary between app and Arduino

- Stores sensor data
- Communicates with whole app
- Unique activity tables
- Plots with integrated charts

Range of Values for Squats and Deadlifts

- Knee angle
  - Good: Between 80° and 100°
  - Not bending enough: Below 80°
  - Bending slightly too much: Between 100° and 110°
  - Bending too much: Over 110°

- Back angle
  - Good: Below 5°
  - Slightly bent: Between 5° and 15°
  - Too bent: Over 15°



Conclusion

- Customers novice to expert level
- Simple design : 3 sensors
- Sensors Set-up
- Data ➜ Wifi access through Firebase