

EE523: Smart Alignment

Project Update

Smart Alignment Device

Objective is to create an open-source alternative to Uprightpose. For comparison, Uprightpose is shown on the right and the Smart Alignment device is on the left. Portable power source and necklace will be in the next iteration. Current design doesn't leave space for battery supply. Makerfocus provides several [batteries](#) that can be adapted to meet the necessary form factor. Most batteries range from 1000-10,000 mAh.

Libraries for design are provided in table.

Component	Library
I2C OLED Display Module	Adafruit_SSD1306
Bluetooth Low Energy (BLE)	ArduinoBLE
Arduino Nano IMU	LSM9DS1

Smart Alignment



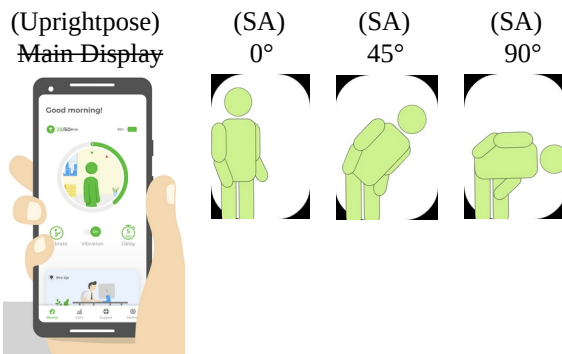
Uprightpose



App

Main display will no longer consist of person and spine curvature dial. Some sample images are provided. Platform [sketch.io](#) is free and speeds up image creation. *Images don't currently display curving of the spine. Posture indicator information is not as valuable as metric displays.

Priority is to display accumulated metrics and timeline views. The second assignment will provide experience for necessary graphs. See health trackers section.



Timeline

TODO	Date
Display IMU on OLED	Aug 07, 2021
Configure app Bluetooth and storage	Aug 07, 2021
Display IMU on app (no visuals)	Aug 14, 2021
Create metric screens	Aug 20, 2021

Completed	Date
Purchased all components	July 07, 2021
Layout OLED pin connection	July 09, 2021
Tested OLED functionality	July 31, 2021
Tested SimpleAccelerometer/SimpleGyro	July 31, 2021

Challenges and Obstacles

- 1) ~~Determine power source that balances form factor and longevity. Must provide 3.3V input to Arduino Nano.~~ Prototype will run from micro USB. *Make sure cable is long enough for demo. Next iteration will remove screen and include portable power source.
- 2) ~~Determine necklace design. The position of the device is critical for accurate measurements.~~ Included in next iteration.
- 3) Compare different health trackers. Provide graphs/visuals for tracking goals. *See health trackers section.
- 4) Accumulate data strategically to not waste storage. Also determine maximum number of days to store. Choose design pattern to store one sensor or actuator value per characteristic, in ASCII encoded values. *Only care about one motion angle.
- 5) Determine notification frequency/ summary reports.

Health Trackers

