

Wavy

The Manhattan Project



Writing in thin air

Objective at Hand

- Create a motion-based handwriting recognition system
- Eliminate the need for a writing platform

Two step process

Obtaining an image

Move a rod with sensors as if you are writing on a 2D plane

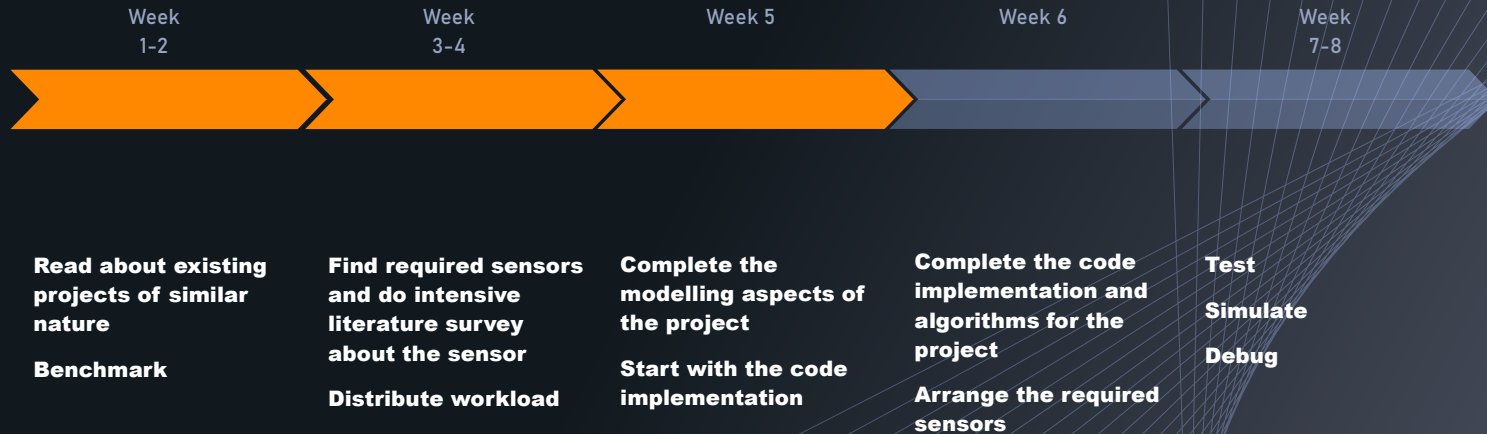
Use the readings from the sensors to form an image of the wavy hand motion

Extracting the character

Using neural networks, find the character traced out

Display the result

Approach towards solving



Work Distribution

Sensor Modelling

Read different papers and find sensors to our need

Create models to do estimation, remove noise and generate readings

Feature Extraction

Create a 2D image from the obtained data

Use NN to find what is written

Work Done

Read about similar projects and sensors

Implemented a NN algorithm on Python

Training the code with images

Benchmarking of sensors

Converted position points to an image which would be fed into NN

Made models for feature extraction and sensor modeling

Difficulties Faced

Most reference papers implemented a 3D version

Training NN was manually intensive

FPGA vs Microcontroller

Wired vs Wireless

- We scrapped our initial idea due to hardware testing constraints
- Found MNIST data set. We have switched to this

Thanks!

Any questions?

References

- http://cs229.stanford.edu/proj2019aut/data/assignment_308832_raw/26623152.pdf
- <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6020787>
- https://www.researchgate.net/publication/224586403_Pattern_Recognition-based_Real-time_End_Point_Detection_Specialized_for_Accelerometer_Signal/link/54e31adf0cf2d90c1d9bea32/download
- <https://www.w3.org/TR/motion-sensors/>