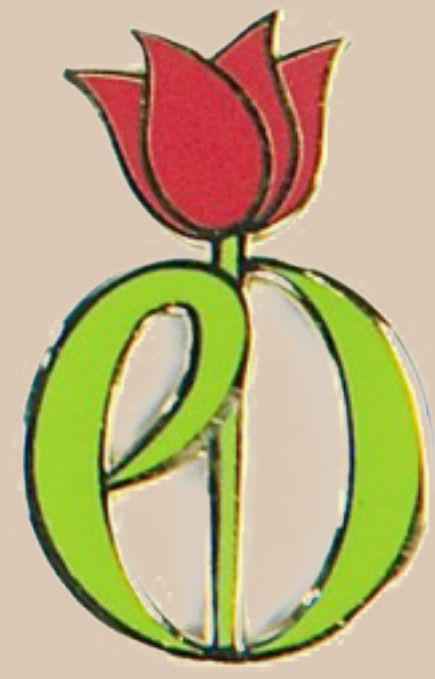


Brief Background



Parkinson's Disease:

- Progressive nervous system disorder.
- Major Symptom is 3-7Hz tremors.
- Affecting over 7 million people worldwide.

- Proper pharmaceutical treatment requires frequent tracking of tremor severity
- Objective tremor measurement via visual inspection which is subjective and often unreliable
 - Intrusive and their weight can mask tremor symptoms.

Previous Works



- Senior Design Project at EECS, Washington State University.
- Used Microsoft Kinect V2.
- Implemented a pipe-and-filter architecture.
- Using OpenCV and a FFT module.
 - Not real-time due to the complexity of the code.
 - Lot of constraints and some bugs.



- Matthew J. Johnson, W. University in St. Louis "Detection of Parkinson Disease Rest Tremor"

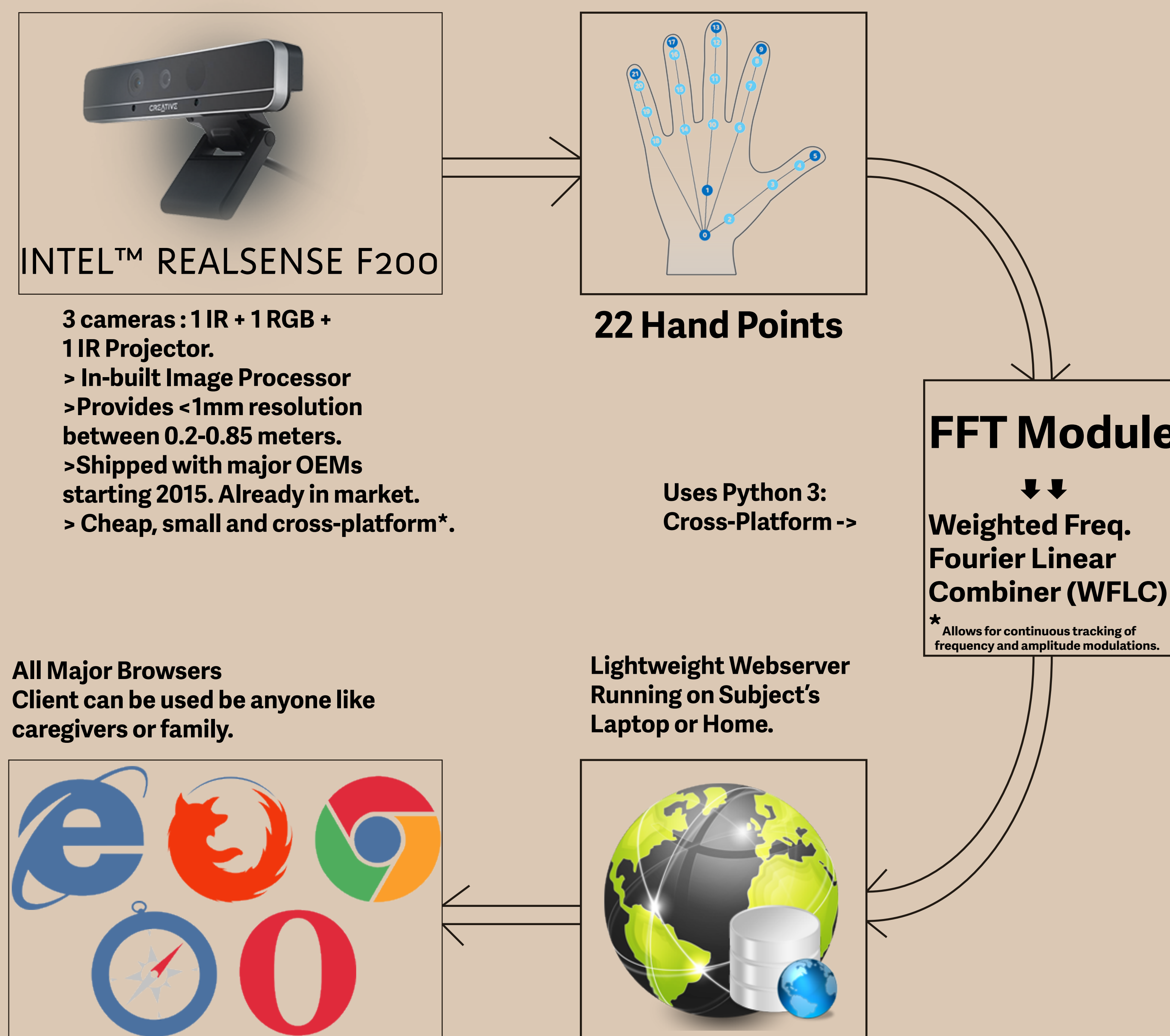
Glossary

OpenCV: Open Computer Vision
FFT: Fast Fourier Transform
F200: Intel Camera Frontal Series 200

Project Goals

1. Find an affordable and mobile vision system for analysis of hand tremors.
2. Implement a cross-platform web-based interface for viewing live and historical hand movement data.
3. Validate the data obtained from vision processing with traditional accelerometer with clinical metrics.

Project Design



Implementation / Tech Stack



1. Python3 Powered: WFLC Module => RabbitMQ
2. Flask Web Framework: Werkzeug Server (WSGI: PEP 3333) Jinja 2 Templates
3. Socket.IO For Websockets and fallback bi-directional comm.

Validation Tools/Devs

- Shimmer Sensing V3 : Accelerometer
- > Low-Noise 2G Output
 - > Bluetooth Low-Energy
 - > Light weight.



Results

- 1 Realsense F200 Driver
- 2 RabbitMQ Exchange
- 3 Postgres DB for storage
- 4 Shimmer V3 Data to RMQ
- 5 Webserver setup
- 6 Data Collection (initial)
- 7 Data Analysis



- ♦ The measurements are now almost real-time.
- ♦ Works on all major browsers.
- ♦ Graphs are generated on the fly.
- ♦ Live Demo can be viewed at ntg-reu.eecs.wsu.edu now.

Special Thanks

Diane Cook, Aaron Crandall, Quinn B., Declan E.

Presentation/References

www.ntg-reu.eecs.wsu.edu/bd