Sign Language Educator – Vision Aided Sensor Glove

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Introduction

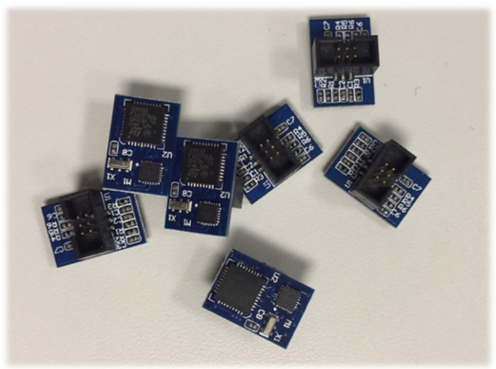
This project uses an AHRS (Altitude Heading Reference System) sensor module network to accurately calculate the movement angles of the human hand in order to achieve sign language education and uses in other potential applications.

Motivation

- Develop an interactive sign language education system to solve the issue of insufficient resources in sign language education.
- Using the sensor glove technology to achieve hand gesture tracking, control, and numerous other purposes.

Innovativeness

- Low-cost Inertial Measurement Unit (IMU) sensors to accurately capture and detect finger-joint angles.
- Combination of camera and sensors compensates for errors that result from only using a single data source.
- Incorporating facial expression recognition into the sign language education system.



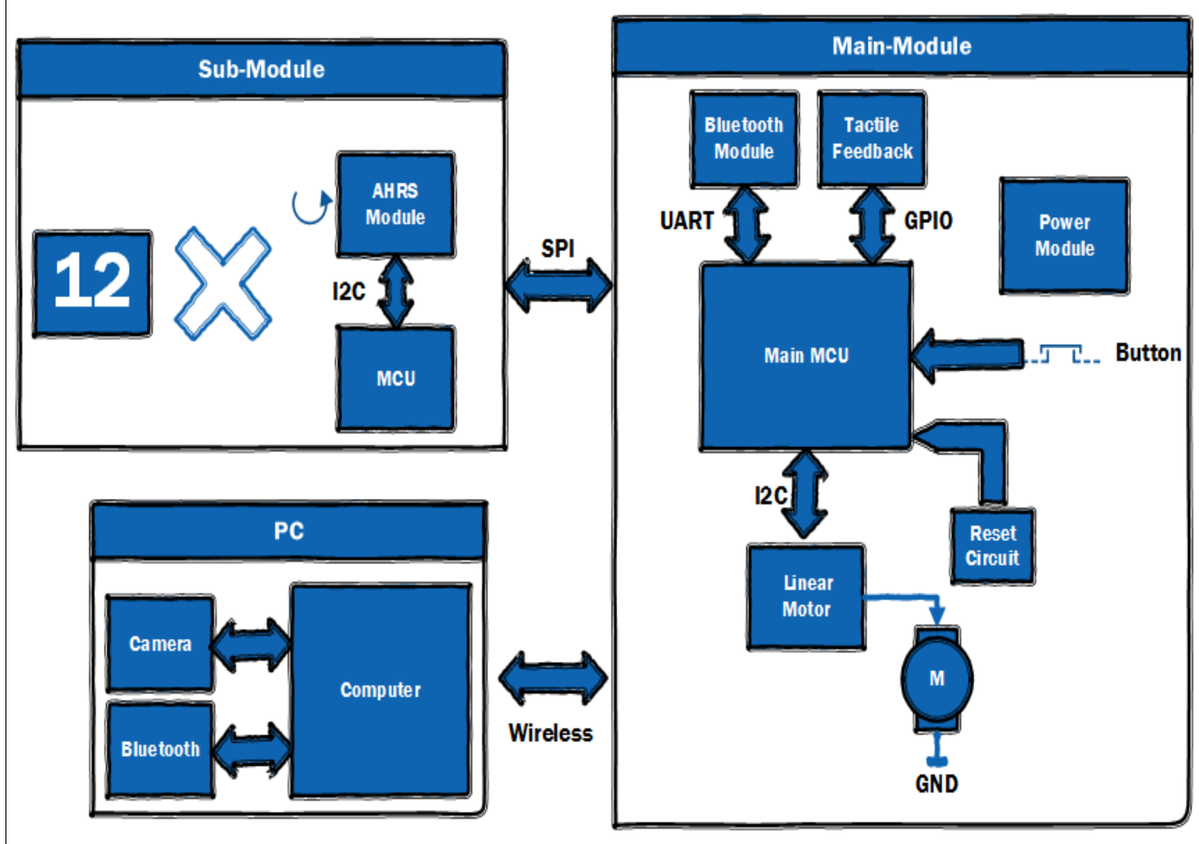
IMU sensors

Facial feature points

Awards

2015 Huawei Cup University Students Intelligence Design Contest – *Champion*
2015 The "Challenge Cup" HK University Students Extra-curriculum Technology Contest – *First Prize Winner*
2015 Prof. Charles K. Kao Student Creativity Awards – *First Runner-up*

Methods



Hardware

- Sensor network
- AHRS data fusion
- Bluetooth telecommunication
- 3D printing

Software

- Machine Learning (SVM)
- Capturing feature points
- 3D modelling

Applications

Sign Language Education & Translation

Telerobotics

Virtual Reality & Gaming

Individual Contribution

Contribution of each team member is as listed:

- Lai Jintao: Electrical
- Zhong Zhuowei: Software
- Chin Bowen: Mechanical

Acknowledgements

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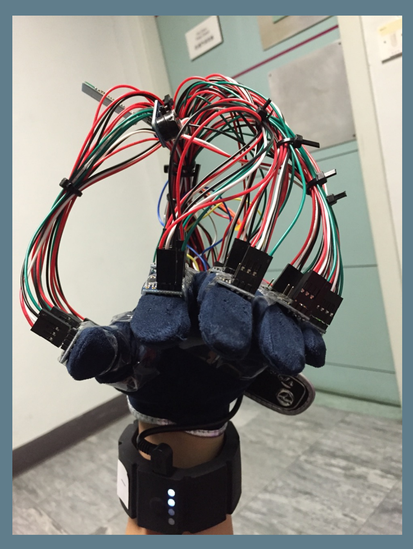
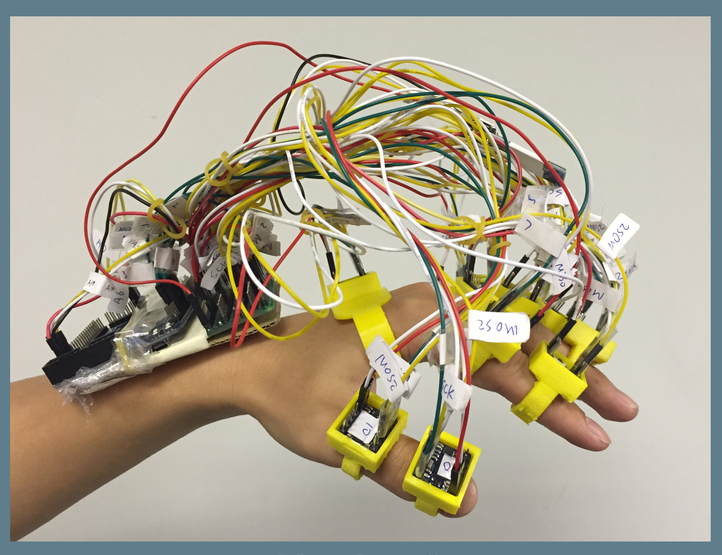


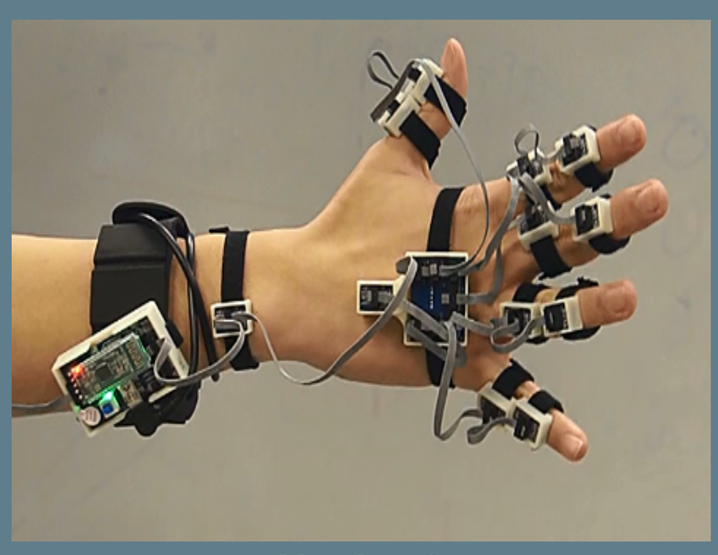
Version 1

- Optimized data fusion algorithm
- Improved glove design and ergonomics



Version 2

- Redesigned PCB for a smaller profile
- Extended to other applications, such as VR and robot control



Version 3