Low-Cost Glove-based Intuitive Computer Input Device

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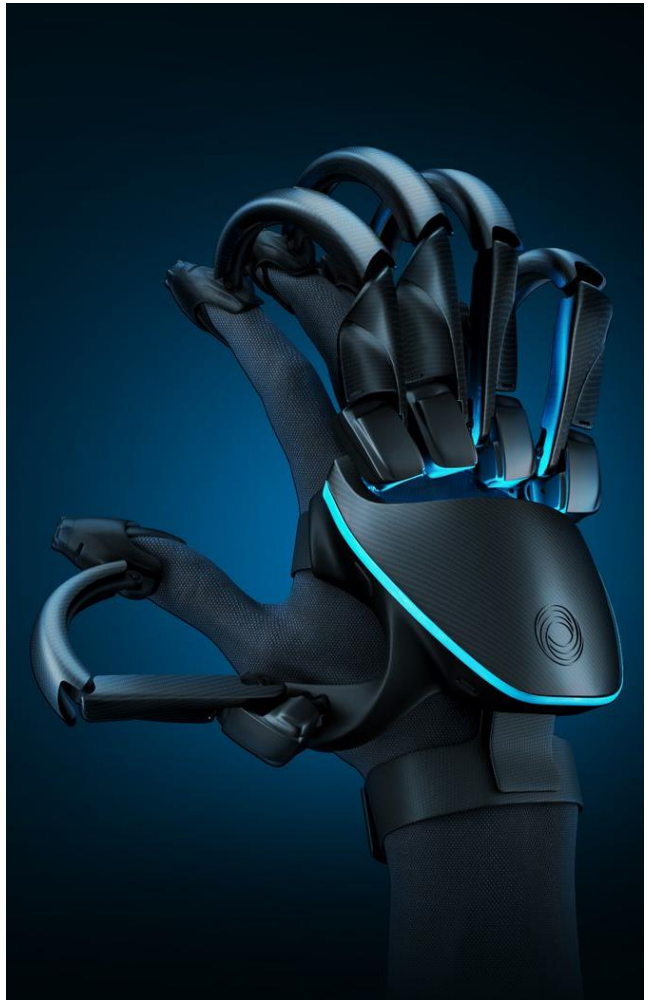
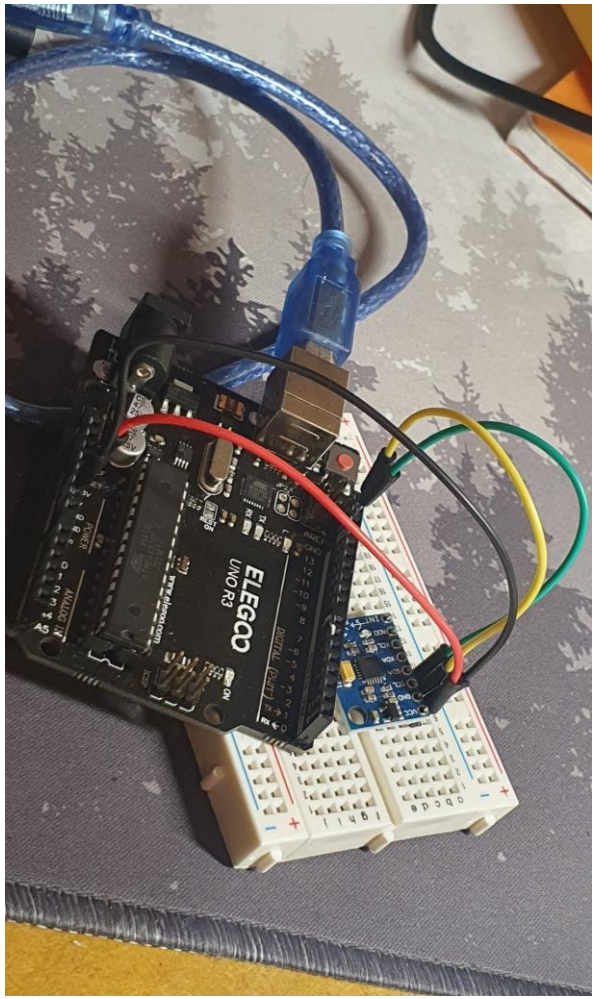
Overview – 20 secs



TESLASUIT GLOVE
https://teslasuit.io



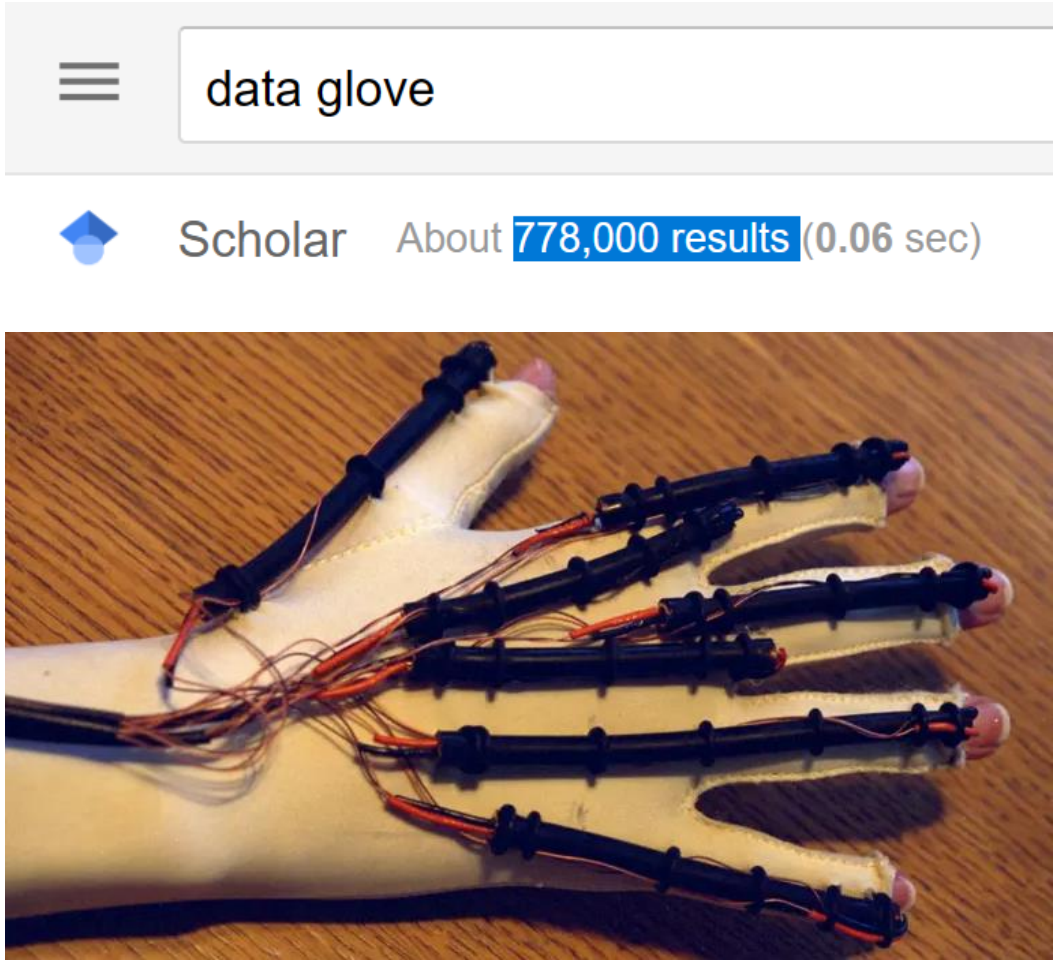
What it isn't

- ££££
- For high precision VR

What it will be

- Within the £100 IP Budget
- For 2D computer input
- Controls based on current common input devices

History

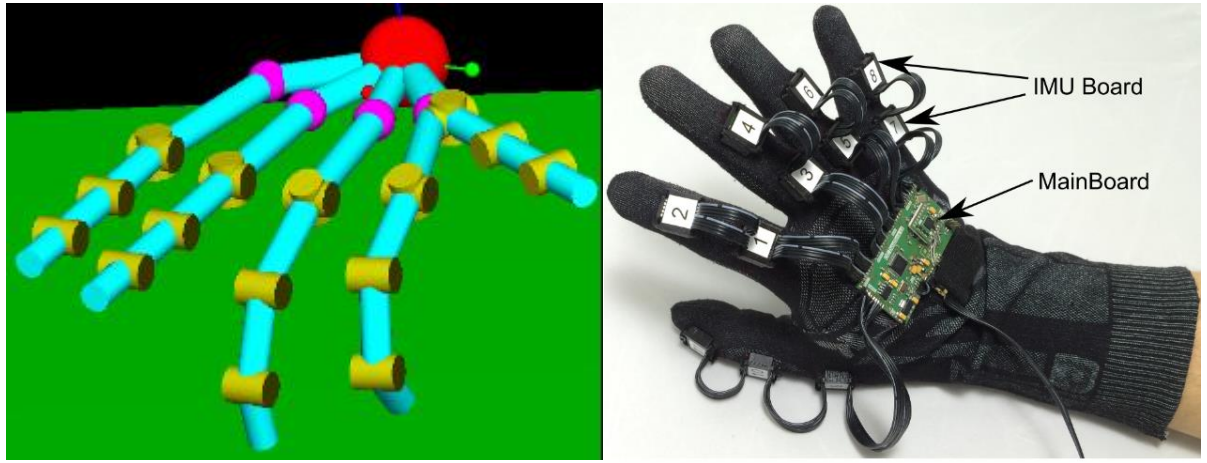


DeFanti, T., Sandin, D. J., Sayre Glove Final Project Report, *US NEA R60-34-163 Final Project Report*, November 10th, 1977.

- Data gloves seen in many forms since 1977
- Early devices wired and "light tubed" based
- Limited output

- Precise outputs achievable seen on modern gloves through accumulative electronics advancements and research

Motion Input Studies



CIE-DataGlove http://dx.doi.org/10.1007/978-3-319-54042-9_24

- Full featured consumer hardware is VR focused
- Light 12x IMU based £300/glove finger tracking

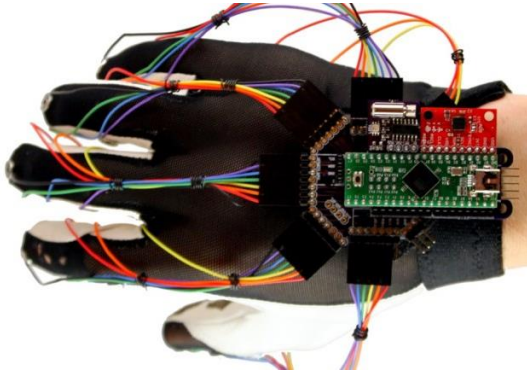
A glove-based gesture interface for wearable computing applications

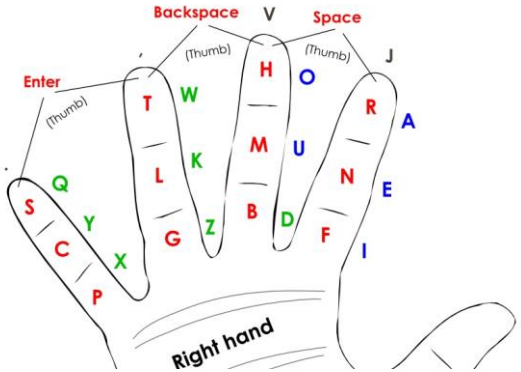
- Single 3D accelerometer gesture controls
- Intuitive linear robot controls
- Unwanted gesture inputs

Keyboard Input Studies

The Chording Glove: A Glove-Based Text Input Device

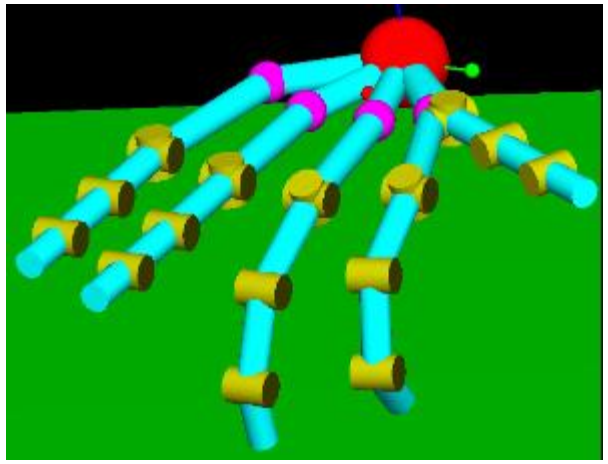
- Single hand finger pressure input
- Input character determined by pressed finger combination
- 17 WPM + 17% new user error
- 20 WPM + 13% for QWERTY





https://keyglove.net/

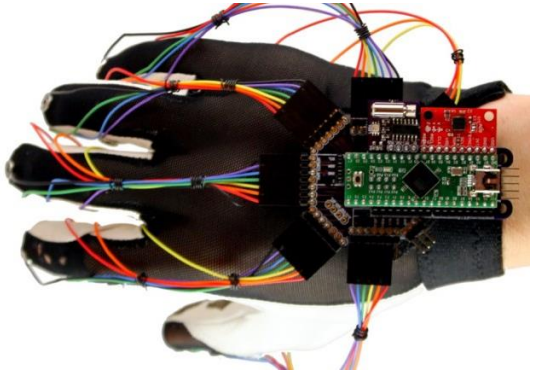
- Mouse, gesture and keyboard
- Keyboard input based on electrical contacts between a specific finger and thumb



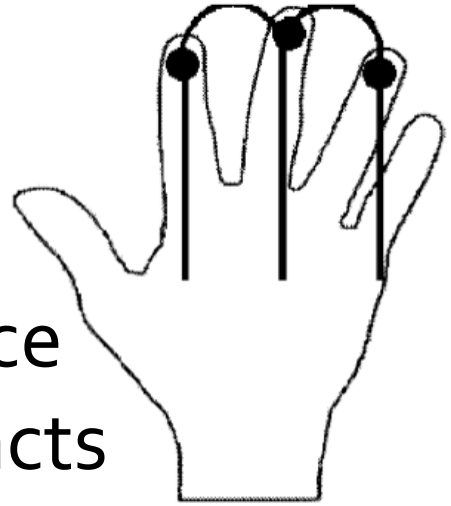
Basic Finger
Positional
Tracking

Low Cost &
Ergonomic

Aim



Keyboard + Mouse
+ Gesture Input



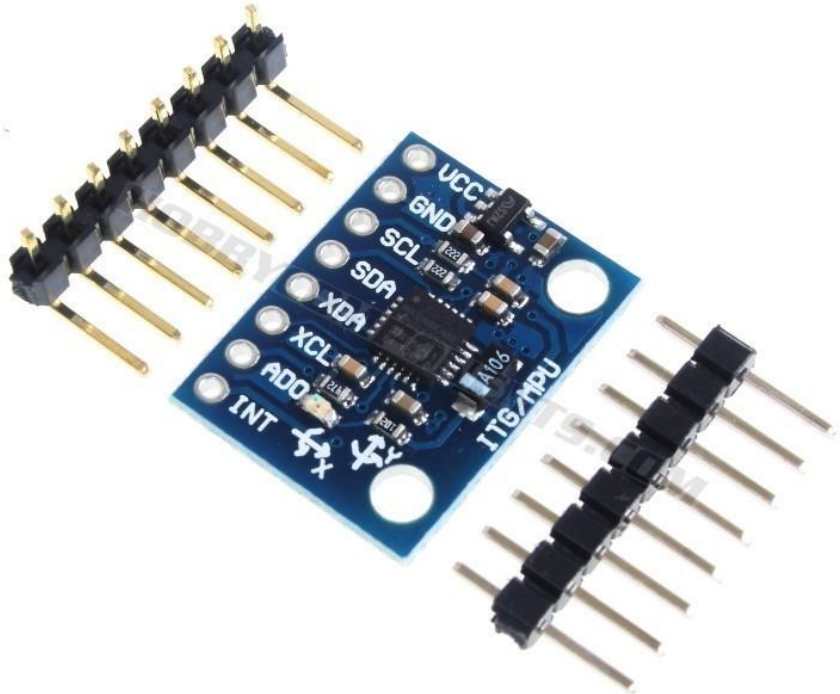
Surface
Contacts

1st Major Objective

To find out if a highly intuitive data-glove can supplement or even replace common PC peripherals

- Inputs based on common input devices such as KB+M and trackpads
- High accuracy & input throughput for experienced users
- Ergonomic & comfortable during wearing sessions

2nd Major Objective



Glove(s) and software development fit within the £100 IP budget and timeframe

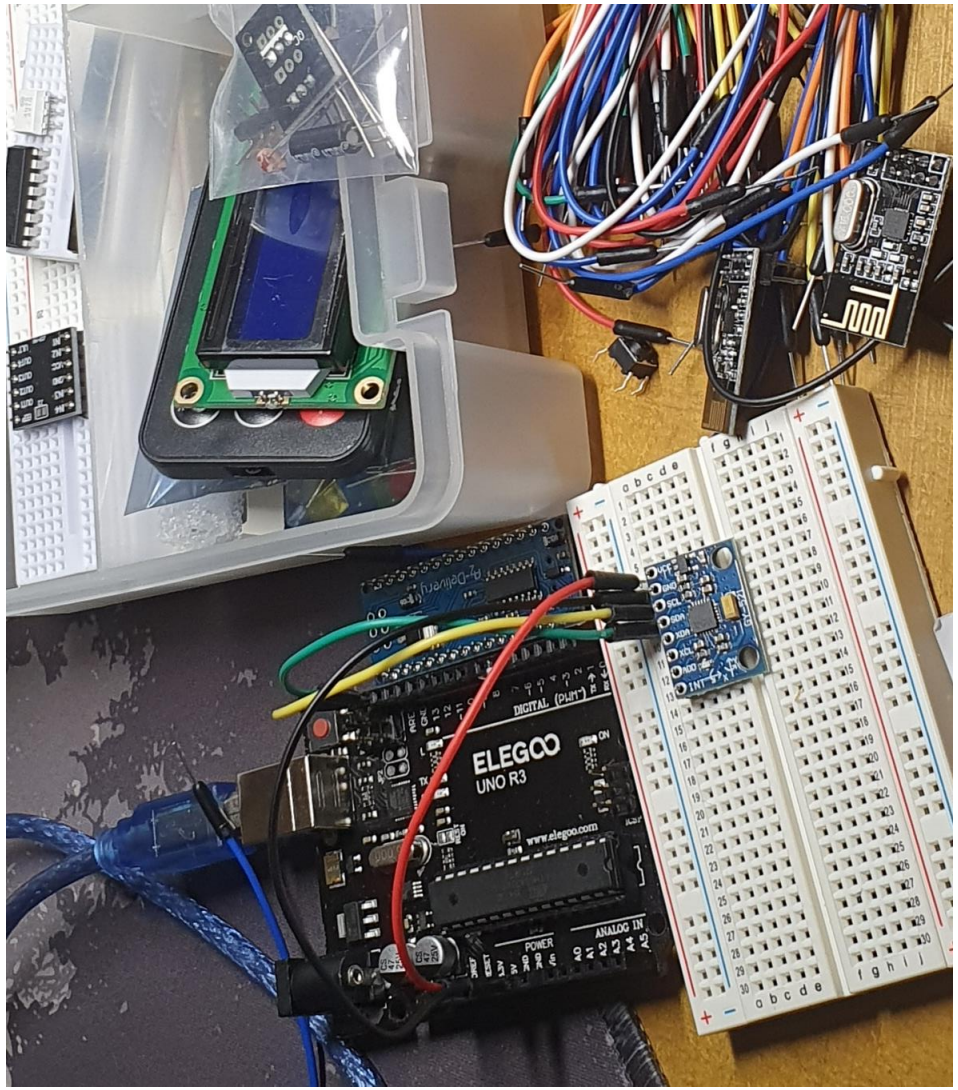
- Low number of IMU + Force sensors per hand
  - Tactile feedback omitted
- Arduino-based components for faster development
- Time needs to be allocated to gauge success of objective 1 through user trails

Execution

- Large gesture inputs handled by accelerometer data

- Mouse & Keyboard inputs (not simultaneously) determined IMU positional tracking but only executed when a Force sensor is activated
  - Prevents unwanted outputs
  - QWERTY based keyboard for intuitive learning
  - Tactility

Timeframe



1. 1x6DOF + buttons
2. 1x6DOF + Pressure sensors
3. Glove design phase
4. Gestures Implementation
5. 5x6DOF + 5x Pressure sensors (one per finger)
6. IMU Position tracking development
7. Trackpad functionality
8. Half Keyboard functionality
9. Second glove
10. Full Keyboard

User trails

Questions?