

Back to Sense

Project Overview Document

One Page

The metrics:

This is a connected glove for gesture translation to text for deaf people.

Origins:

Deaf people still have communication difficulties nowadays, even if affordable technologies permits to assist them.

An assistive technology is a device that helps a person with hearing loss or a voice, speech, or language disorder to communicate.

With the development of digital and wireless technologies, more and more devices are becoming available to help people with hearing, voice, speech, and language disorders communicate more meaningfully and participate more fully in their daily lives.

Our CRI Lab Summer School team, "les INCAPTABLES" has decided to create a prototype of a connected glove in order to recognize gesture from hands signs language and to translate it to pictures on a smart watch.

Emily, Malèke, Julien are using their skills in Arduino, Android, Movuino project (from CRI), flexsensors in order to make this glove a reality.

Our first version of glove, "Back to the Senses" is able to recognize 4 signs, and transmit them by Bluetooth, and display them on a smart watch or a smart phone.

End-user problems :

Deaf problem : communication



Objectives:

- Short term:
 - Identify one deaf gesture

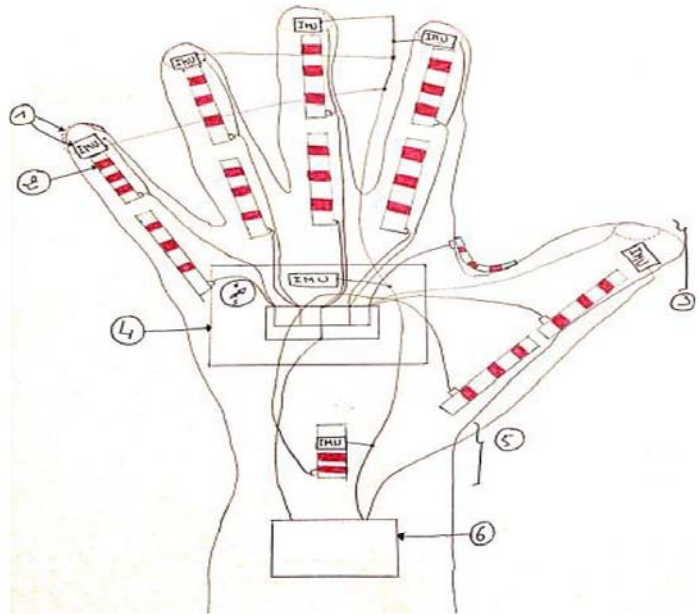
- Medium term:
 - Identify 4 deaf gestures

- Long term:
 - Identify all deaf gestures

List of all assets to develop for long term glove :

Mathematics algorithms
Caldman Filters
K Nearest Neighbours (KNN)
Linear Discriminant Analysis Classifier (LDAC)
Support Vector Machines (SVM) with a linear kernel
Logistic Regression (LR)
Random Forest
Hierarchical Hidden Markov Model

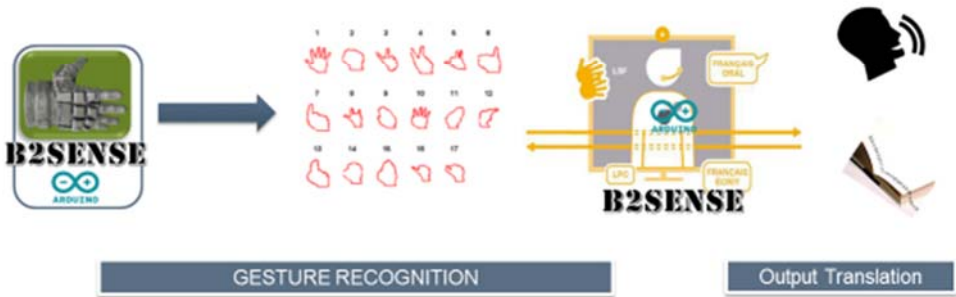
Sensors types
MEMS
accelerometer
gyroscope (micromachined)
magnetometer
flex sensors / bending sensors (pressure resistance sensor)
optical fiber sensor
pressure sensor



System description:

What is B2SENSE ?

Data gloves system based on FOSS GLOVER (ANDIV)



Mechanic: normal glove + flexsensors + IMU (accelerometer + gyroscope) + battery

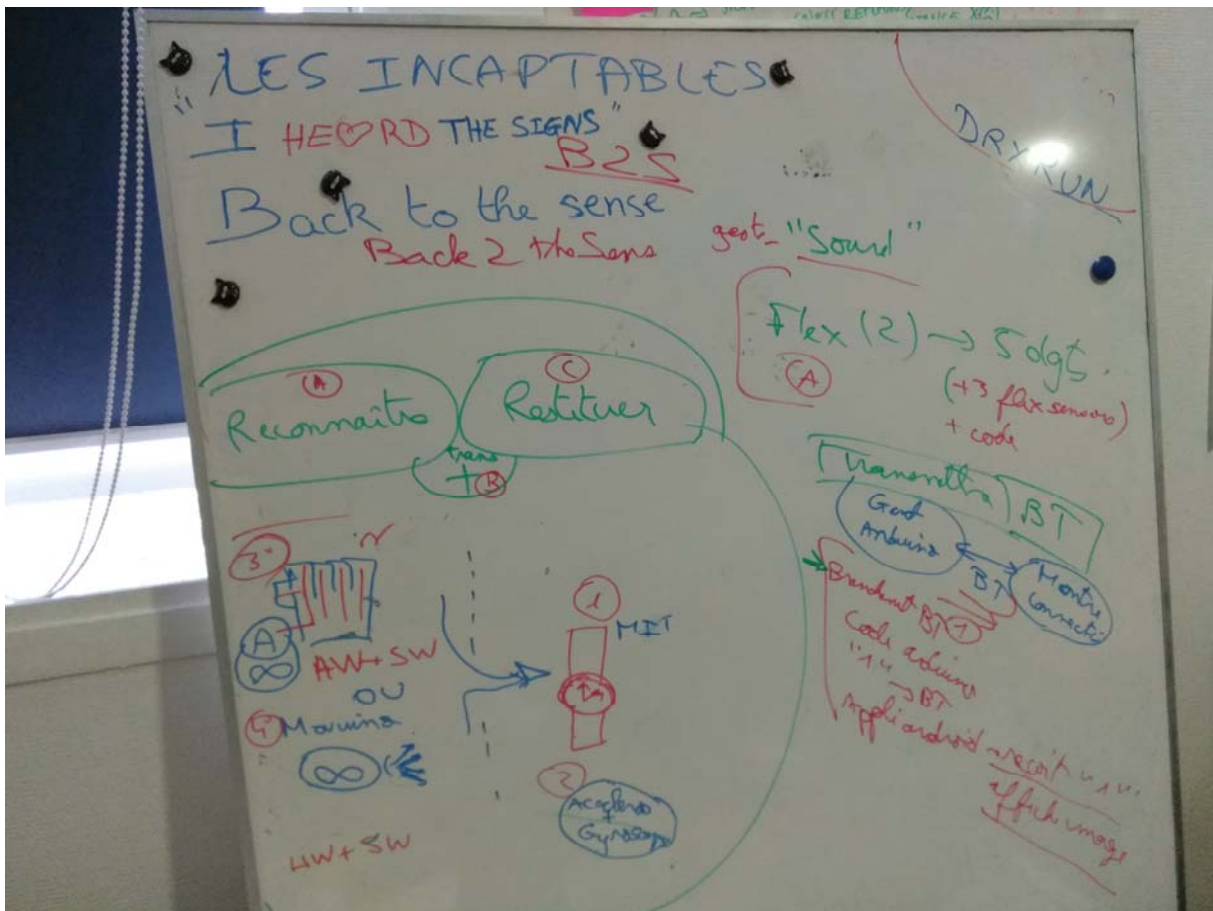
Deaf Action:

- Move the glove to create a sign

Feedback:

- Display on a smart watch

Steps for development :



Workshop : gesture recognition

1. create an identification prototype v0 : flexsensors + arduino
2. create a prototype v1 : flexsensors + arduino + bluetooth
3. create a prototype v2 : flexsensors + arduino + bluetooth
4. create a prototype v2 : flexsensors + arduino + IMU + bluetooth

Workshop : gesture display (appInventor2)

1. create an identification prototype v0 : android
2. create a prototype v1 : arduino + bluetooth

Workshop : deaf demo

1. define deaf gestures and create playset for “gesture recognition” prototype
2. integrate “gesture recognition” prototype with “gesture display prototype”
3. dry run for deaf demo
4. demo for public 😊

Learning Gesture Loop

