# SLaTE8 (Sign Language To English) Presentation

**Group members: Vanessa Galani, Michelle Warren, Rouzbeh Asghari, Delaney Ramalho, Ashley Williams, Anphernee Wilson**

# Background

- Over 5 percent of the world's population — 360 million people — are deaf.
- 28 million with significant hearing impairment in the U.S.A

**Estimates range from 500,000 to two million ASL speakers in the U.S. alone.**

- Language barriers

# Customer & Needs

- **Customer:**
  - The hearing impaired community
  - The mute community
  - Those needing to communicate with ASL speakers

- **Needs:**
  - Speed
  - Accuracy
  - Adaptability
  - Portability
  - Affordability
  - Weight

# Problem Statement

Our project is to build a portable device that converts ASL gestures to text and uses speech-to-text technology for successful communication between users and non-users of American Sign Language.

# Design Requirements

- Portability (less than 0.25lbs)
- Cheap individual products (less than $10)
- Fast computation speed (in the order of milliseconds)
- Precision of 1
- Recall > 0.95
- F1 score of at least 0.97
- 30 frames per second of image input

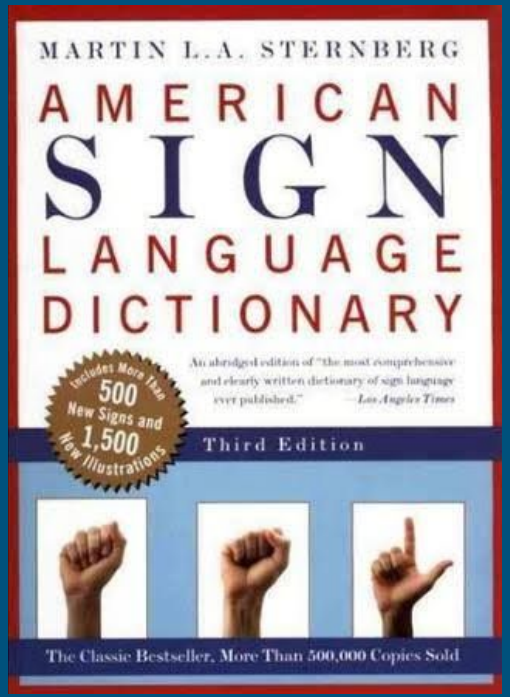
# Current Status of Art


University of Houston


Microsoft Kinect

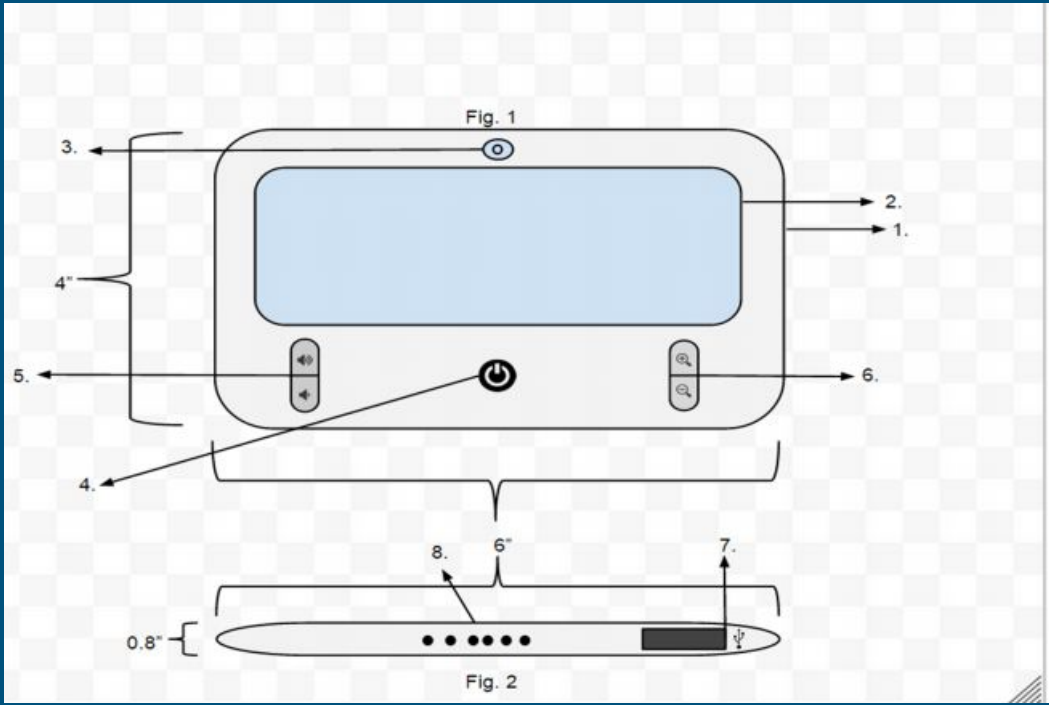
Texas A&M

# Current Status of Art




ASL Translator App

# Last year’s approach




| Parts |
| --- |
| 1 – Protective Case |
| 2 - Screen |
| 3 - Camera |
| 4 – Power Button |
| 5 – Volume Control |
| 6 – Zoom Control |
| 7- USB Port |
| 8-Speakers |

# Our Team Design Concept

**2)** Computation done on the server.

**1)** Camera on phone to receive input.


**3)** Text translation is sent to phone app.

**4)** Speech-to-text is used for response.

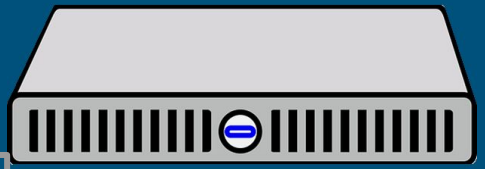
Phone Application

# Our Team Design Concept (cont.)

The inclusion of wearable accessories.

**1)** Accesories communicate with the app.

**2)** The app communicates with the server.

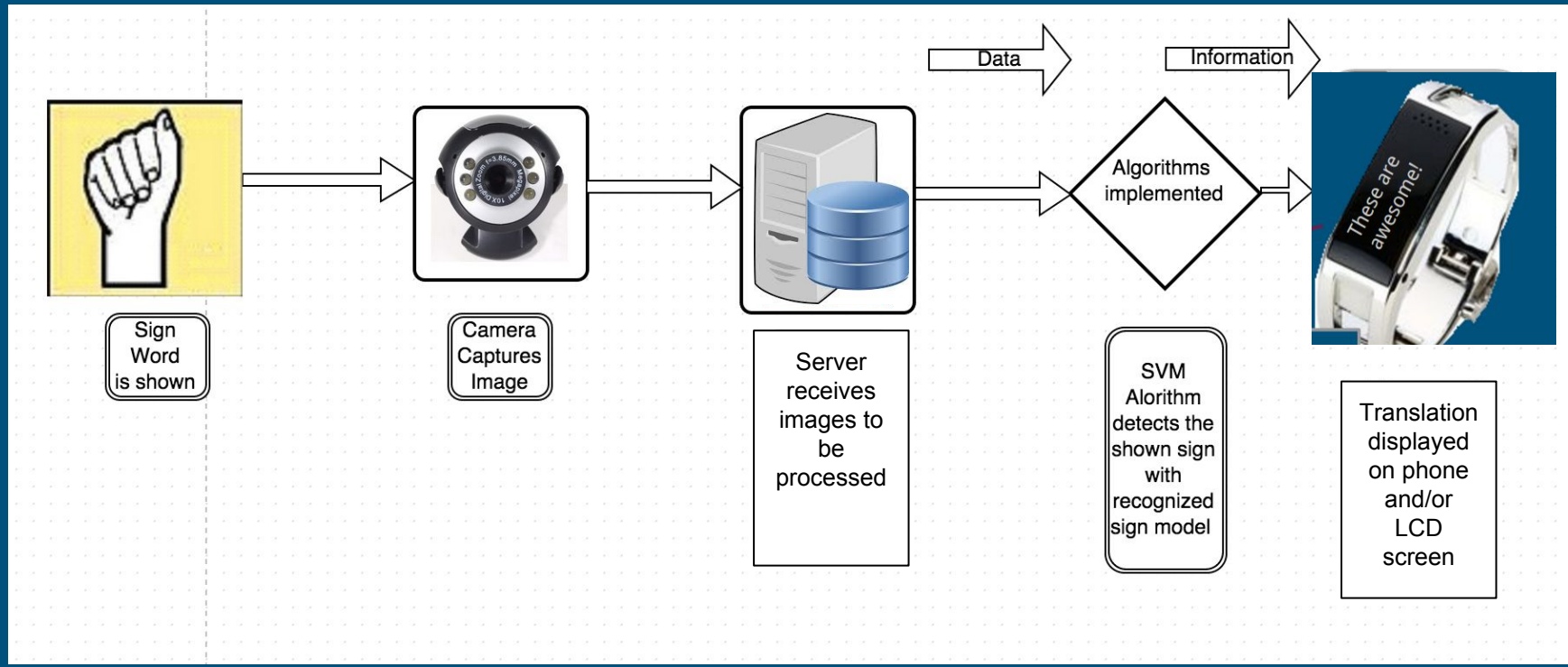






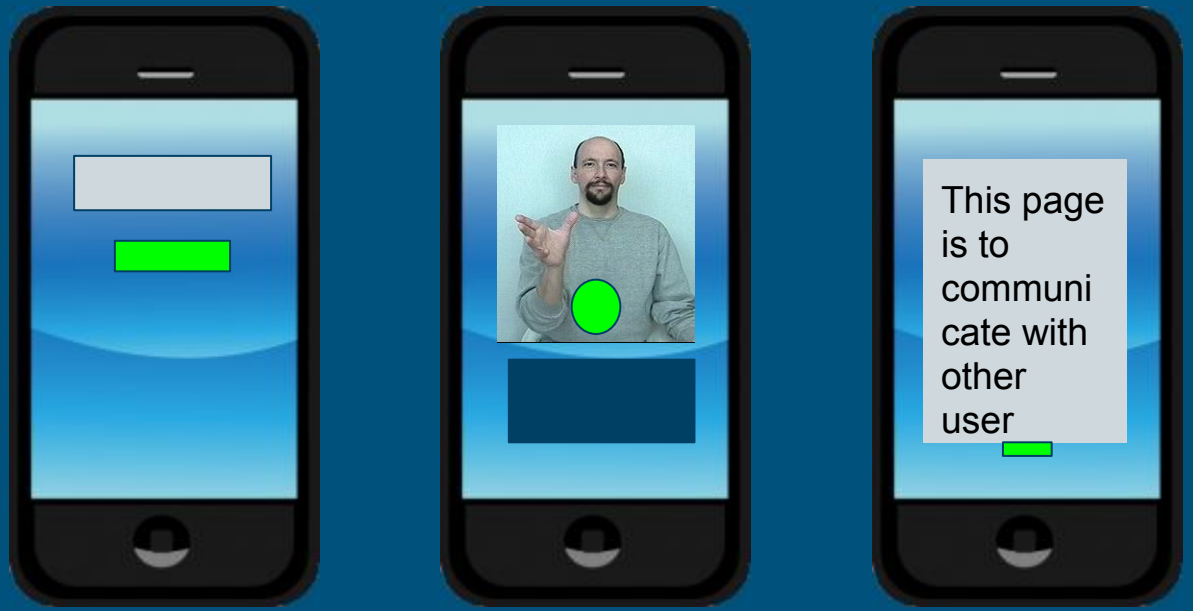

**1)** Accesories communicate with the app.

# Solution Approach



# Final Design / Top Design

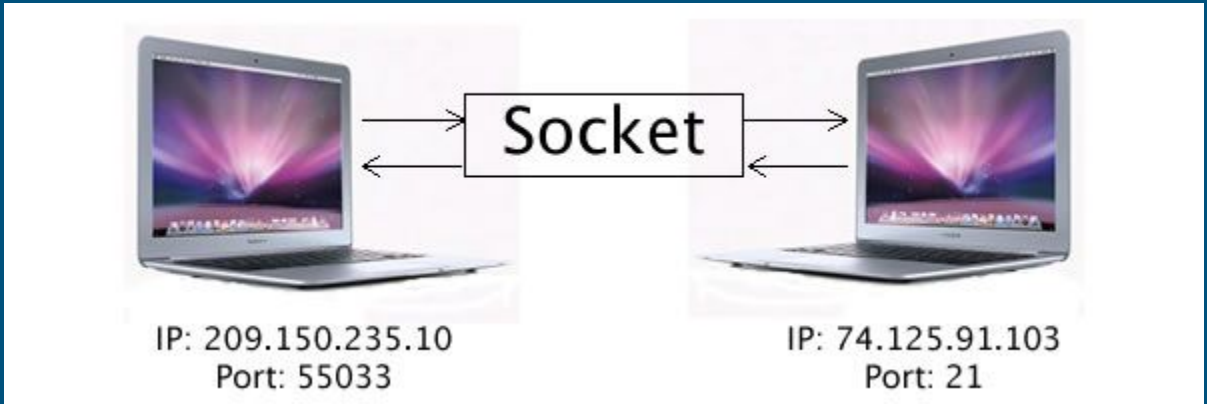
Three main pages



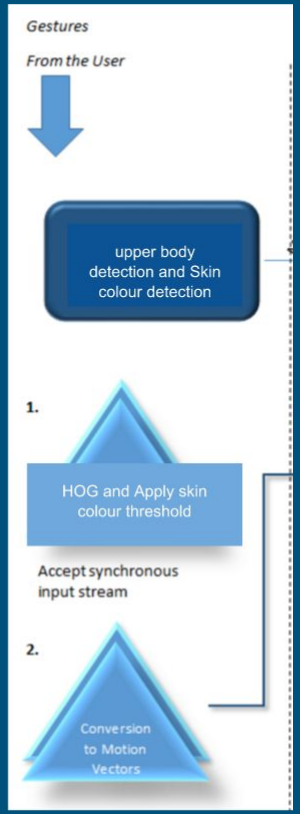

*joinChat* *translationView* *chatView*

# Final Design / Top Design (continued)

Socket based Server and Application



# Final Design / Top Design



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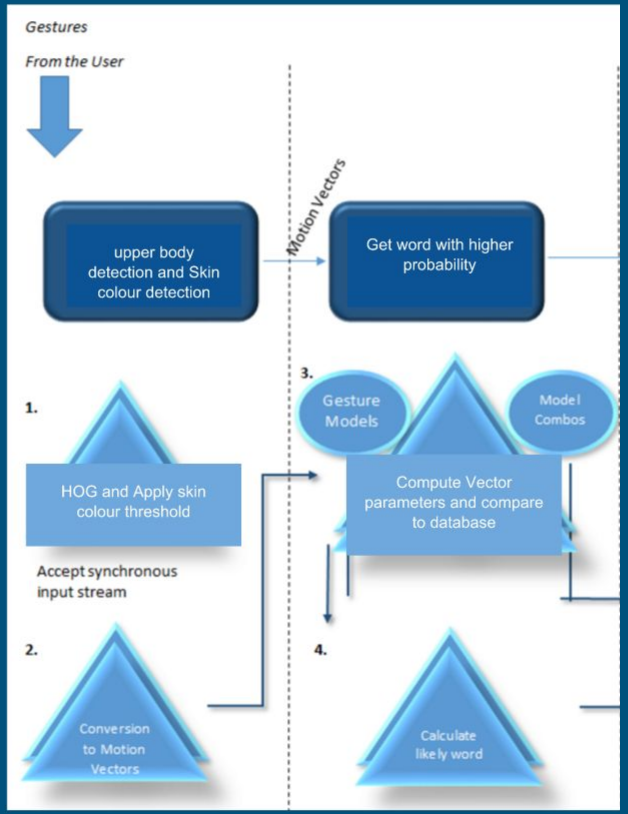
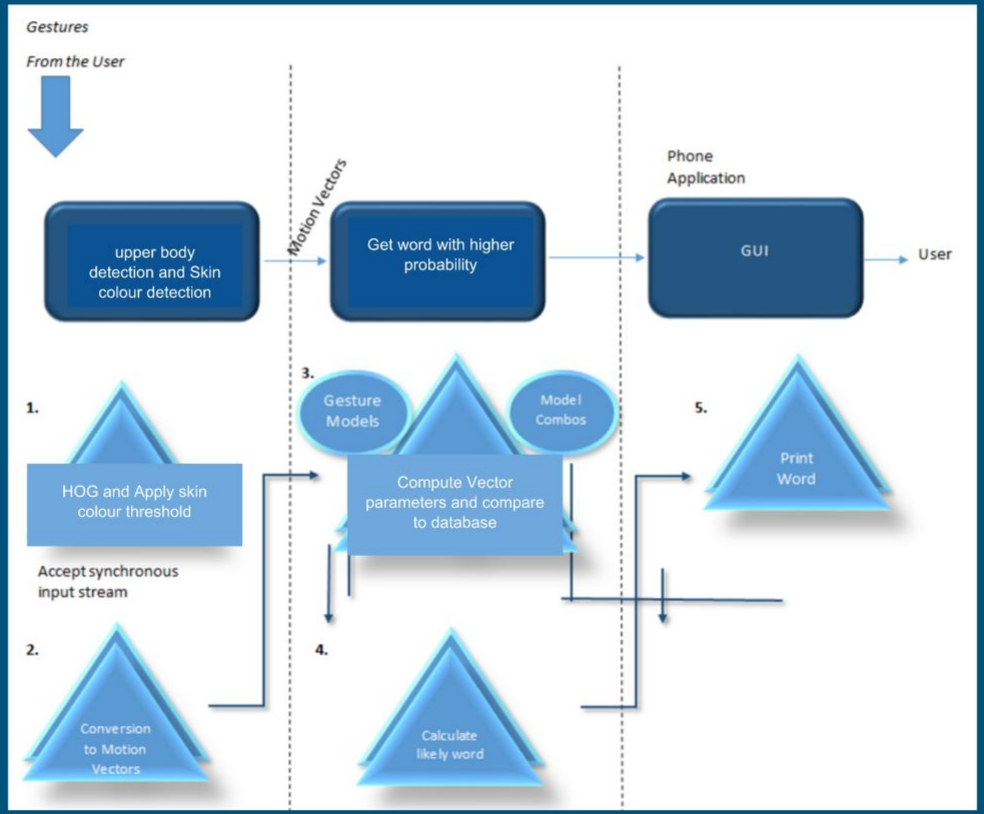


# Final Design / Top Design



# App features

- Sign to text
- Speech to text
- Text to voice
- Chat based application
- Storage

# Resources and Budget

**Budget**

- Application - $99

**Resources**

- Algorithm
  - Python
  - OpenCV
  - NumPy
- iPhone Application
  - Xcode
- Server
  - Twisted
  - Python

# Target End Goals and Deliverables

Semester (May 2016):

- Working algorithm and application
- Server, algorithm, and application all in communication

Final (May 2017):

- Optimized Algorithm
- More data add to the server’s data set
- Fully functioning optional accessories
- Application in the app store

# Conclusion and Future Works

We were able to come up with a new approach to translating sign language to text and learn how to build iOS applications.

What's next?

- Train the data set
- Optimize application to give real-time results
- Partner with Howard's Computer Science Department and students at Gallaudet

# Questions?