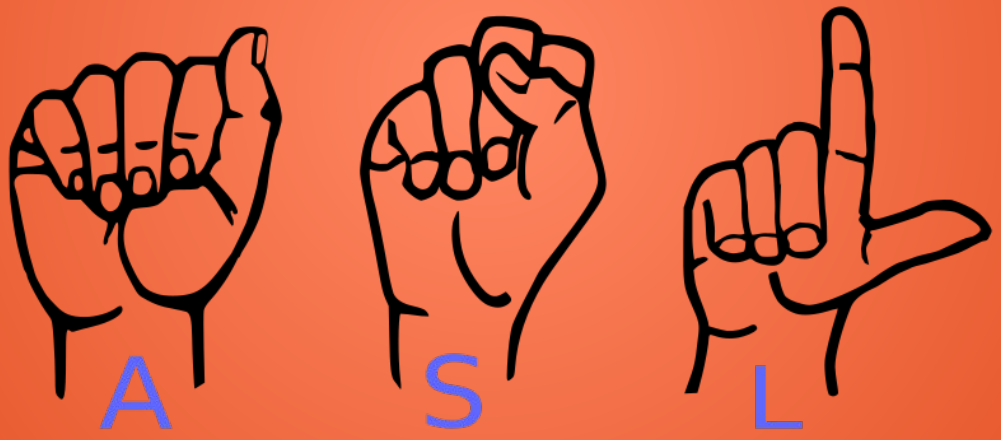
SignText

Hunter College - CS499 - Major Capstone Spring 2020 - MVP Demo



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Product Definition

- Problem: Deaf & Hard of Hearing people lack technological tools that allow them to communicate with a native interface (without text or speech).
- Vision: To make technology more accessible.
- Strategy: Create a web application that translates ASL into written text, built from a machine learning model.
- Goal: Having a functional & accurate interface.
- Currently, our project is composed of:
  - A functional UI that is split with the webcam & text box sections.
  - A working machine learning model that makes correct predictions about 90% of the time.

Demo

Remaining Work:

Putting It All Together

- **Integration:**
  - Integrate our React front-end and Python back-end through Flask.
  - Be able to send captured webcam frames from the front-end to our back-end server.
  - Be able to receive a prediction quickly.
  - Display the prediction in the Text Translation box.
- **Additional:**
  - Creating a timer countdown (with a 3-second reset) on the front-end.
  - Isolating the user's hand from background when they sign.
  - Ensuring smooth translation with translation/punctuation/deletion.

Tools, Technologies & Sources

Machine Learning

Web Framework

Dataset & ML Model from Kaggle

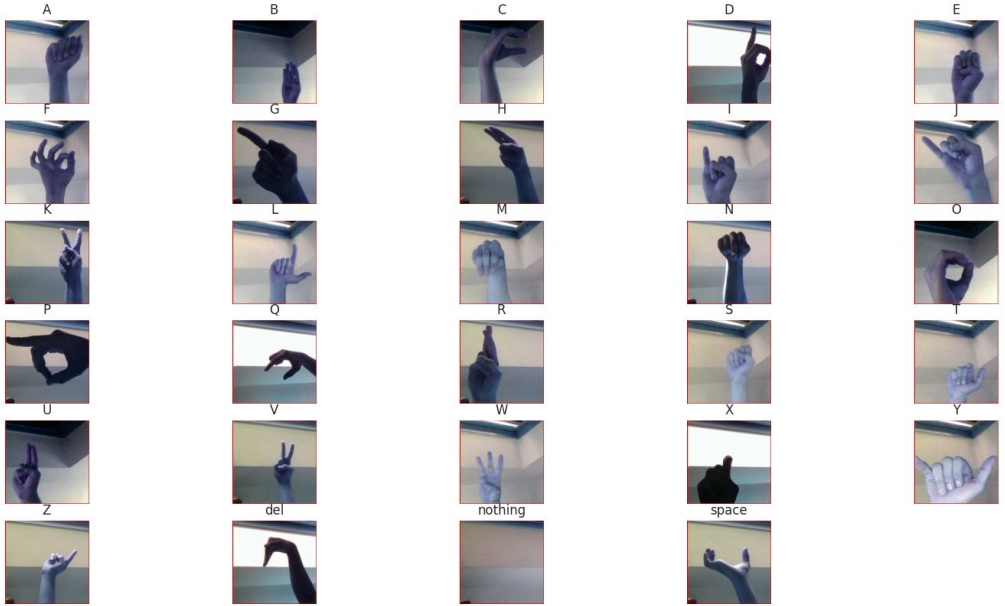
Front-End: User Interface

Technical Details

Our ML Model & Data

- Our Dataset & ML Model came from Kaggle
  - *"Classifying Images of the ASL Alphabet using Keras"* by Dan Rasband
- Dataset contains **87,000** total images
  - 29 classes: 26 are for the letters A-Z, and then 3 more for 'SPACE', 'DELETE', and 'NOTHING'
  - 3,000 images per class
  - The images have differing lighting and backgrounds.
  - Sample of each:

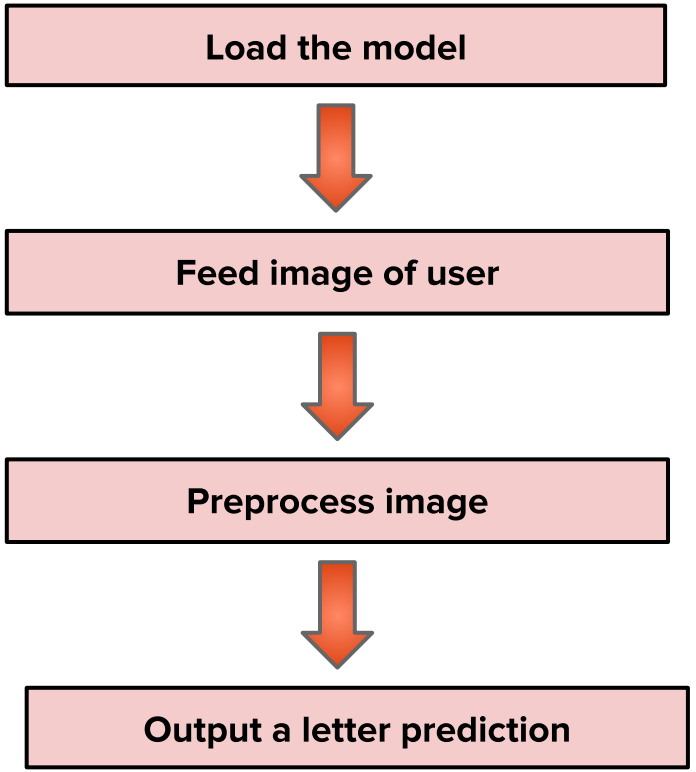
Plotted Sample of Each Class



Technical Details

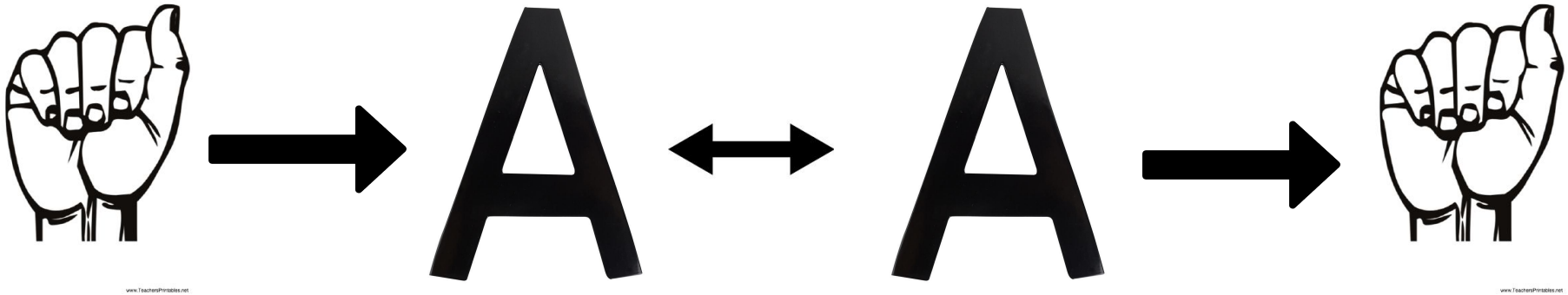
Our ML Model & Prediction Script

- Our ML model was trained on the dataset and has about 90% prediction accuracy.
- We have a script that:
  - Loads the model
  - Intakes an image (will be retrieved from webcam capture)
  - Preprocesses the image ➔ resizing & color tuning
  - Outputs a prediction with the letter it most closely resembles.



Future Development Ideas

- Search Bar
  - An ASL symbol lookup function for those users who may be new to the language.
- Two-Way Functionality
  - Enter an English character and output the ASL equivalent



Questions?