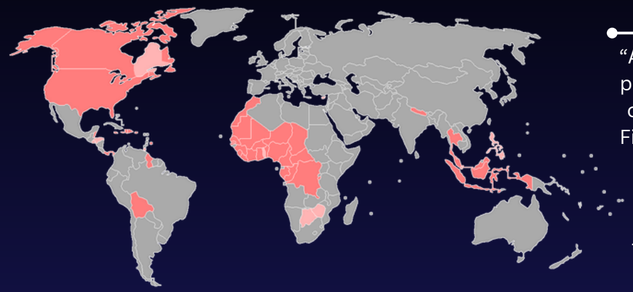
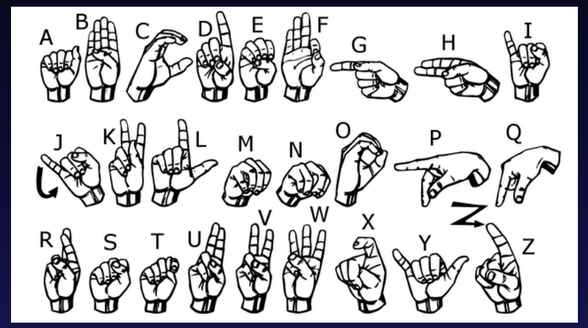
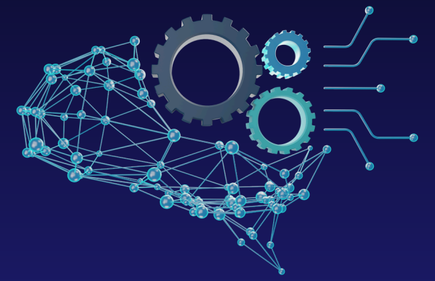
Signify: Real-time ASL Detection Application

CSE 676 B: Deep Learning
Manasi Jadhav (mjadhav)
Sneha Singh (singh43)
Sneha Yadav (snehayad)



"Approximately more than a half-million people throughout the US (1) use ASL to communicate as their native language. First appeared in 1800s, ASL is the third most commonly used language in the United States, after English and Spanish."
-Commission on the Deaf and Hard of Hearing





Several applications designed for real-time translation of American Sign Language (ASL) to English:

- **SignAll - expensive and bulky**
- **ProDeaf Translator - no visual sign detection, spoken and written Portuguese to Brazillian SL and ASL**
- **AVA (Accessible Video ASL) - no visual sign detection, only spoken words to text or text input to signs**
- **Signly - sign is an output using AR but not input.**

The signs will be detected in real-time and their landmarks will be passed to our customized CNN model for classification using OpenCV and Mediapipe.
The application uses HTML5, CSS3 and JavaScript for the frontend and Python and Flask for server-side logic, handling API requests, and serving the web pages.
The predicted result is then reflected back on the application which is deployed using AWS to ensure scalability and high availability.

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 128)	5,504
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 64)	8,256
dropout_1 (Dropout)	(None, 64)	0
dense_2 (Dense)	(None, 24)	1,560

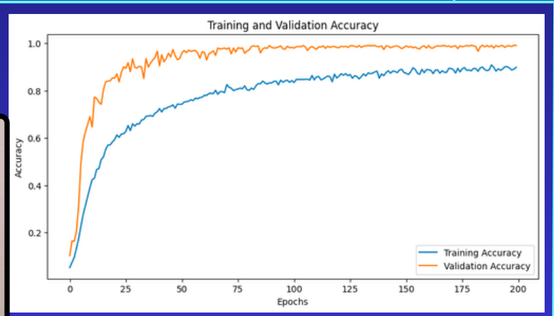
Horizontal scaling - Just American Sign Language? We can incorporate other sign languages such as German Sign Language, British Sign Language, French Sign Language, etc.

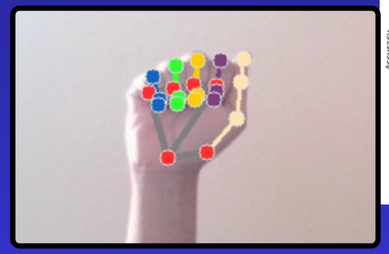
Vertical scaling - Why restrict ourselves just to letters! We can move towards detection of words and then phrases

What's next?

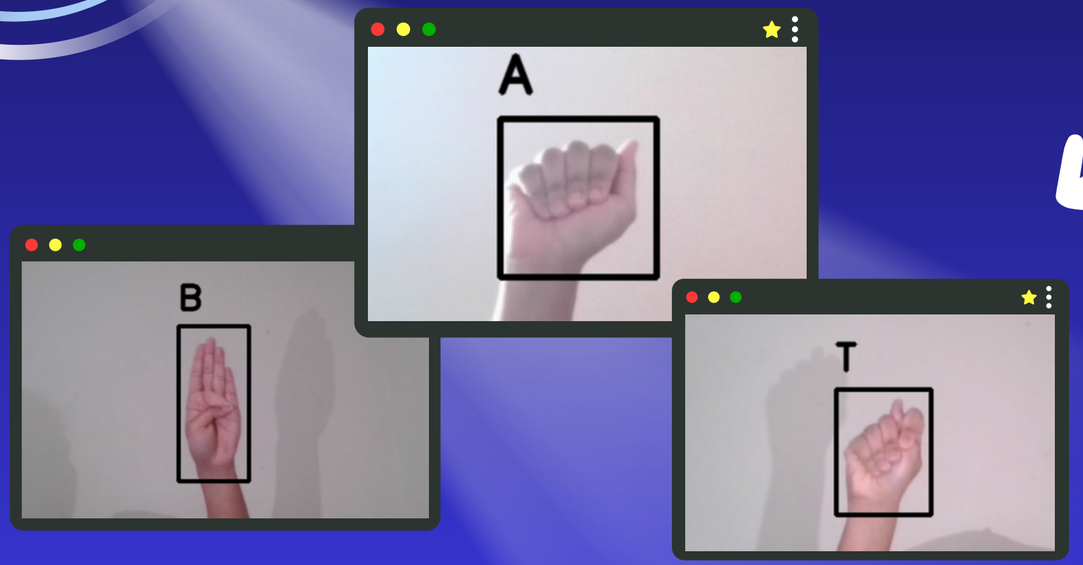
Scan this QR to test out our application and sign it yourself !

Training





The collected images are marked with hand landmarks which are then fed to our CNN model for training



Our prediction result obtained in the application