



# Team E5: ASLearn

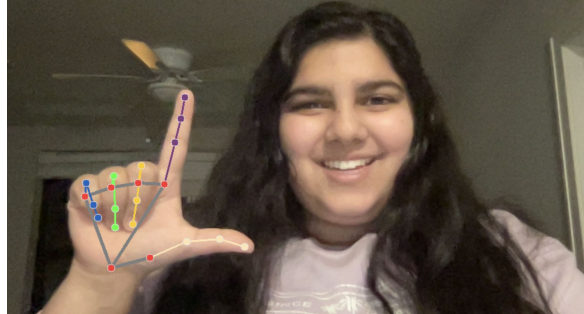
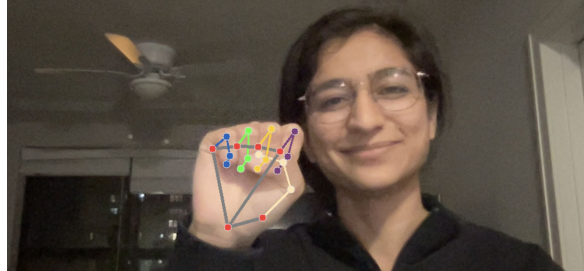
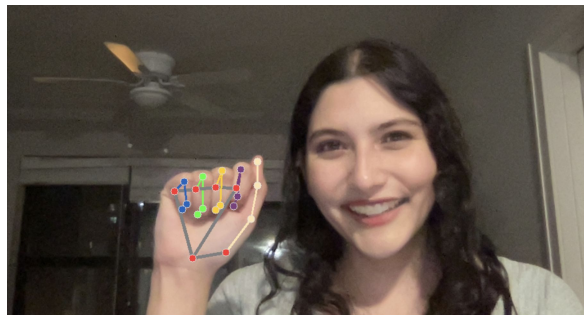
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Link To Google Slides for gifs:

[https://docs.google.com/presentation/d/1hmziJ6vSEYa8lqYOiZRzgxNCvW3x8mIYG\\_w5i9rFRjQ/edit?usp=sharing](https://docs.google.com/presentation/d/1hmziJ6vSEYa8lqYOiZRzgxNCvW3x8mIYG_w5i9rFRjQ/edit?usp=sharing)

# Creating ASLearn: an ASL Learning Platform

- Facilitate ASL remote learning
- Users able to learn signs and test their knowledge
  - Signing into a camera
  - Getting immediate feedback on sign correctness
  - Flexibility in learning pace and schedule

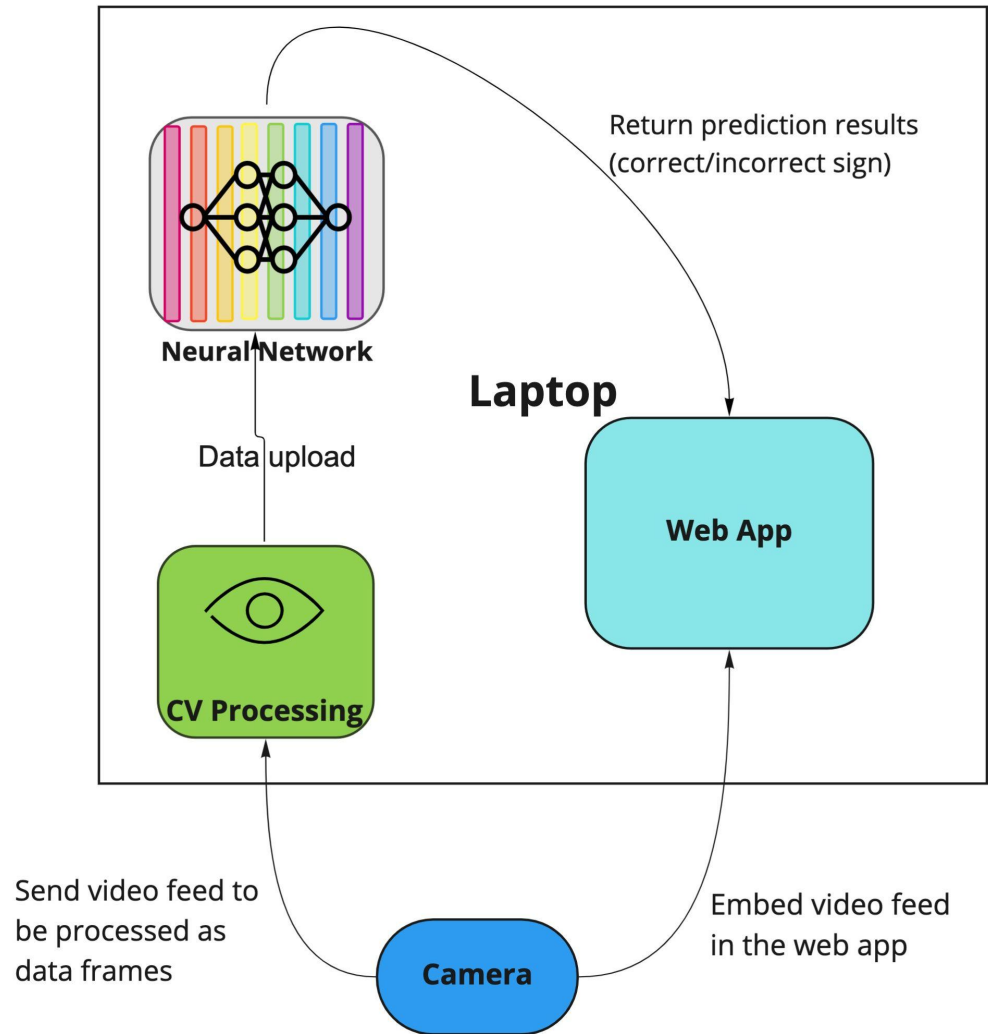


# Use-Case Requirements

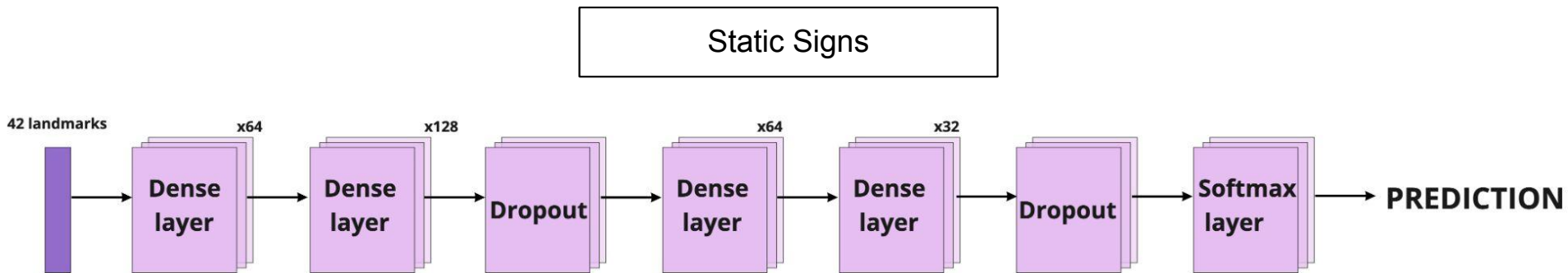
<u>Requirement</u>	<u>Metric</u>
Use computer vision to recognize when user is making ASL signs	<b>15</b> communicative signs + <b>26</b> alphabet letters + <b>10</b> digits = <b>51</b> total signs
Model continues detecting user signs at a reasonable distance	Within <b>2 feet or less</b> facing camera head on
Feedback is given in a timely manner	Within <b>2 seconds</b> of visual input being received
Feedback on sign correctness is accurate to ASL standard	<b>97%</b> accuracy based on model evaluation with test data
Easy to navigate course page	<b>90%</b> user satisfaction based on user survey
Easy to understand feedback of signage	<b>90%</b> user satisfaction based on user survey

# Solution Approach

- Video Input
- Computer Vision
- Machine Learning/Neural Network
- Web Application



# Model Training: Neural Networks

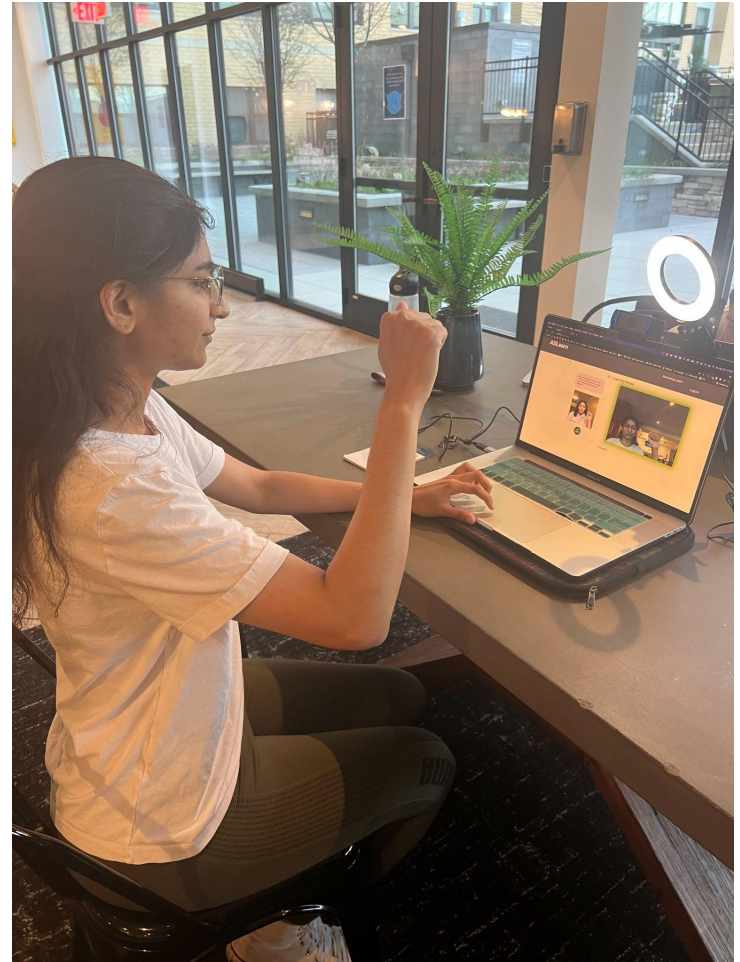


## Training data sources:

Dynamic Signs: [WASL](#)  
[Letters j.z](#) [Alphabet](#) [Numbers](#) [ASLLVD](#)

# Complete Solution

- Convert user input through MediaPipe to get landmarks
- ML models that are trained with sign language data created by ourselves and by outside sources
- ML models that detect static and dynamic signs
- Fully functional web application that contains lesson plans for four topics
- External camera and ring light for higher quality user video feed
- Instructional videos for all signs
- Text explanation for all signs

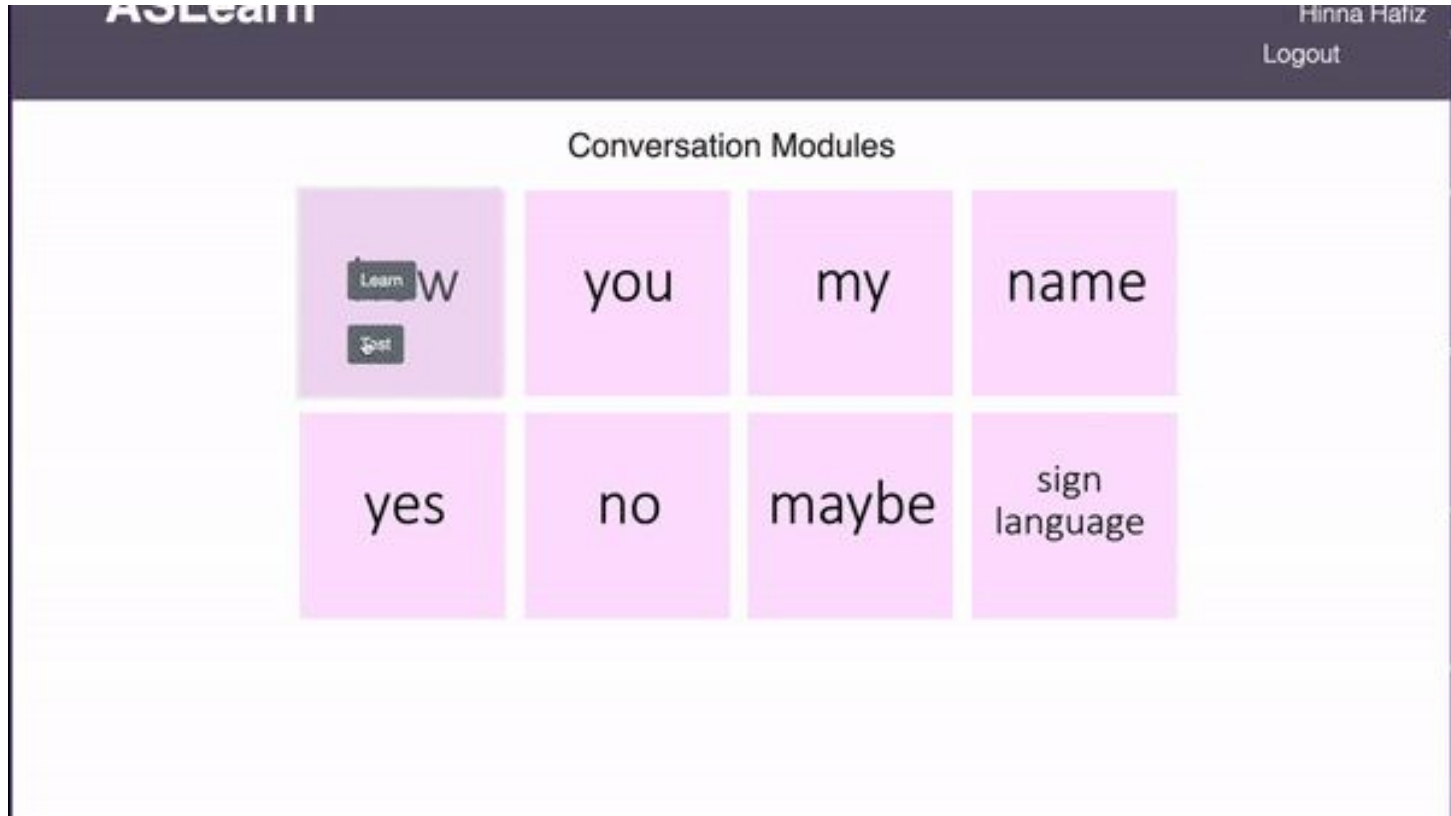


# Complete Solution → Learning Mode

The screenshot displays the ASLearn application interface. At the top, the header includes the logo 'ASLearn' on the left and the user name 'Hinna Hatiz' with a 'Logout' link on the right. The main content area is titled 'Alphabet Modules' and features a 3x4 grid of module cards. The first card in the top-left corner is highlighted in a darker purple and contains two buttons: 'Learn' with a hand cursor icon and 'Test'. The remaining cards are light purple and labeled with letters B through L. The grid is as follows:

Alphabet Modules			
Learn Test	B	C	D
E	F	G	H
I	J	K	L

# Complete Solution → Testing Mode (Single Sign)





# Complete Solution → Testing Module

ASLearn

Aishwarya Joshi

[Logout](#)

Results: 71%

1

3

0

7

2

Word

Help

Ask

Class

School

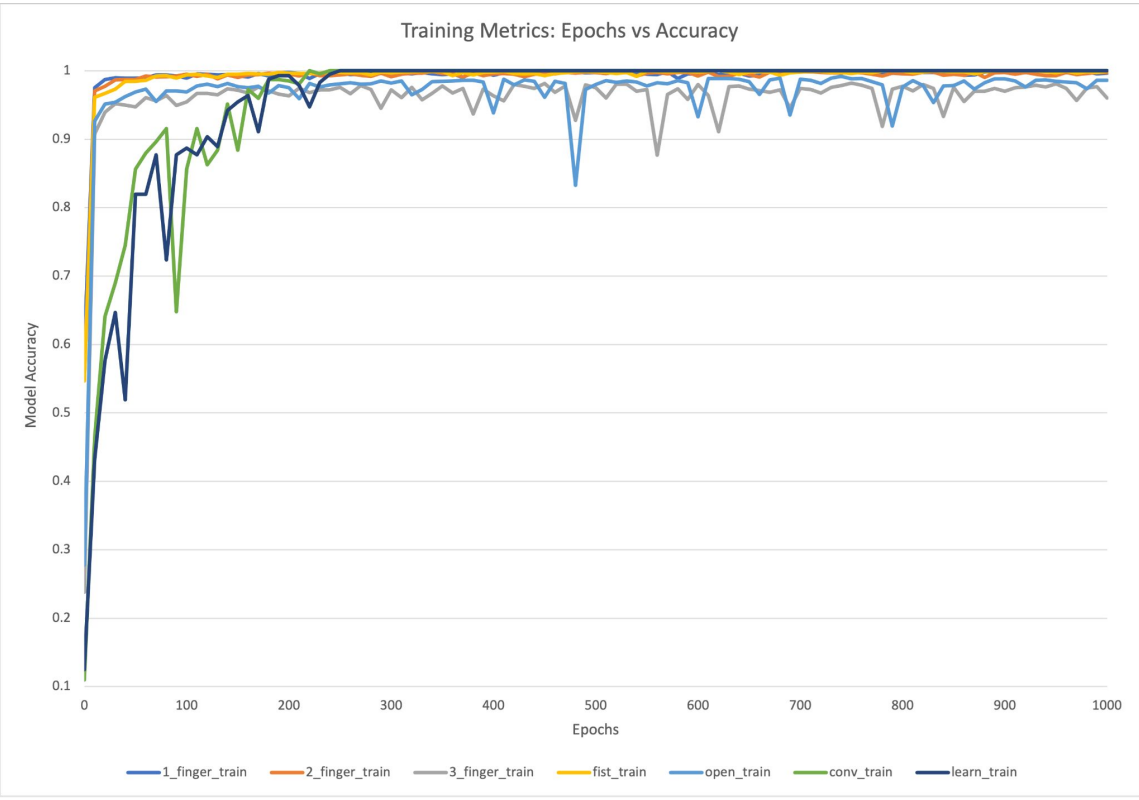
[Back to Home Page](#)

# Testing, Verification, Metrics

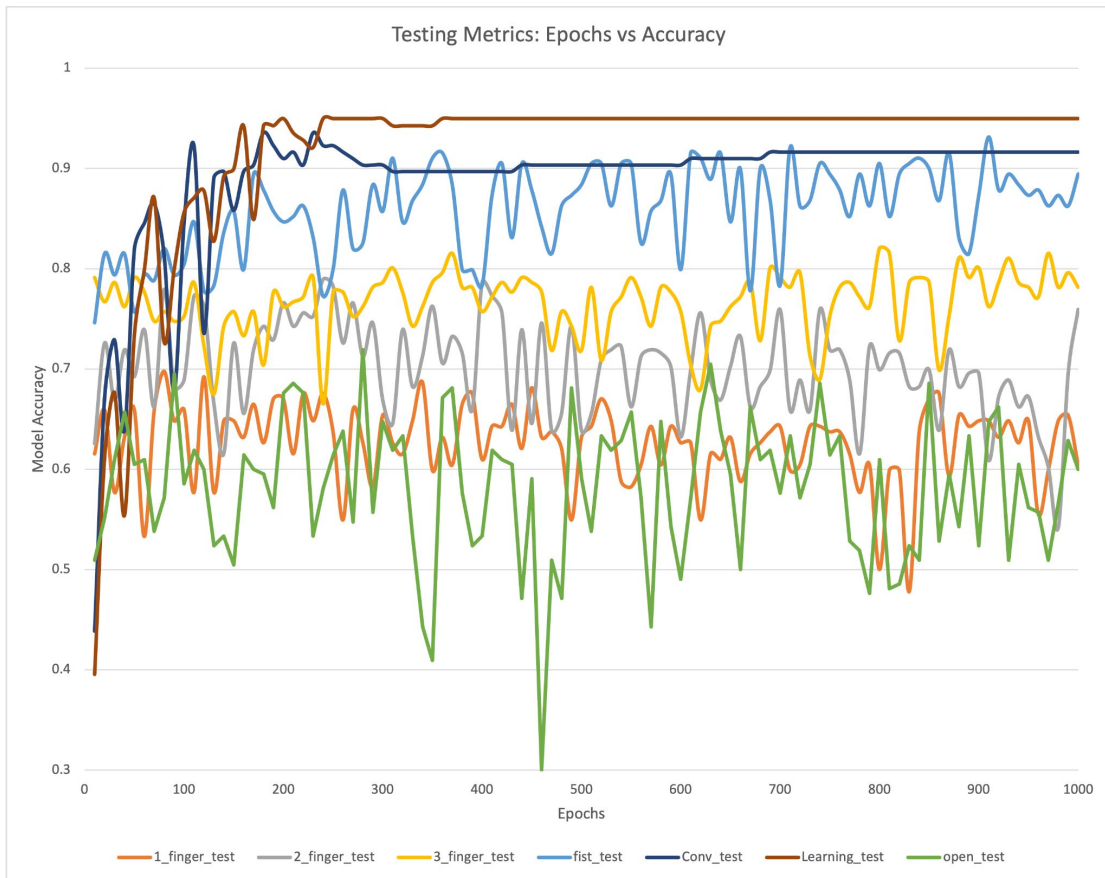
<u>Requirement</u>	<u>How We Will test</u>	<u>Passing Metrics</u>
Distance from camera	Do signs at varying distances from camera (up to 2 feet)	Sign recognition should be 97% accurate within <b>2 feet</b>
Platform latency	Have users sign in platform and record feedback time	Feedback will be given to user within <b>2 seconds</b>
Webapp User Interface	Conduct user tests & surveys (~10 users)	<b>90%</b> overall user satisfaction from survey
Accuracy	Test with various user impediments (i.e. jewelry)	Sign recognition should be <b>97% accurate</b> regardless of impediments
Left/Right hand dominance	Test platform with right and left handed users	Sign recognition should be <b>97% accurate</b> in both cases

# Trade-offs → Training

	Accuracy	Epochs
Fist	100	620
1-finger	99.92	930
2-finger	99.89	340
3-finger	98.20	750
Open	99.21	740
Conv.	100	220
Learn	100	250



# Trade-offs → Testing



	Accuracy	Epochs
Fist	93.12	910
1-finger	85.25	130
2-finger	78.93	240
3-finger	82.04	800
Open	79.52	770
Conv.	93.55	180
Learn	94.96	200

**Other Trade-offs:**  
Model Latency < 0.18 s  
Webapp Latency < 0.5 s

