Group 3

American Sign Language

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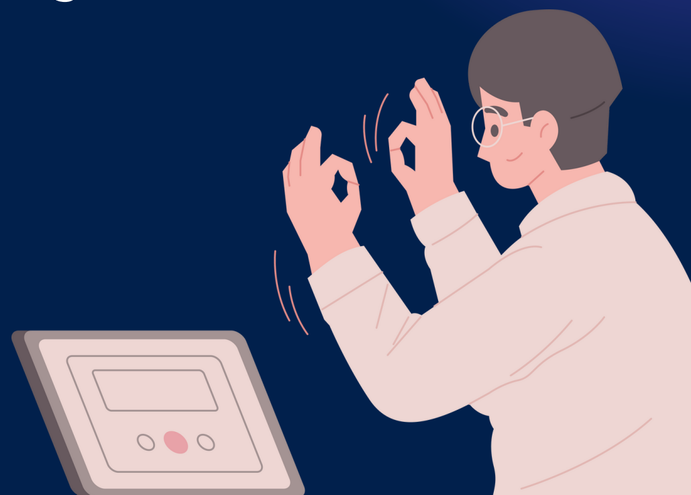
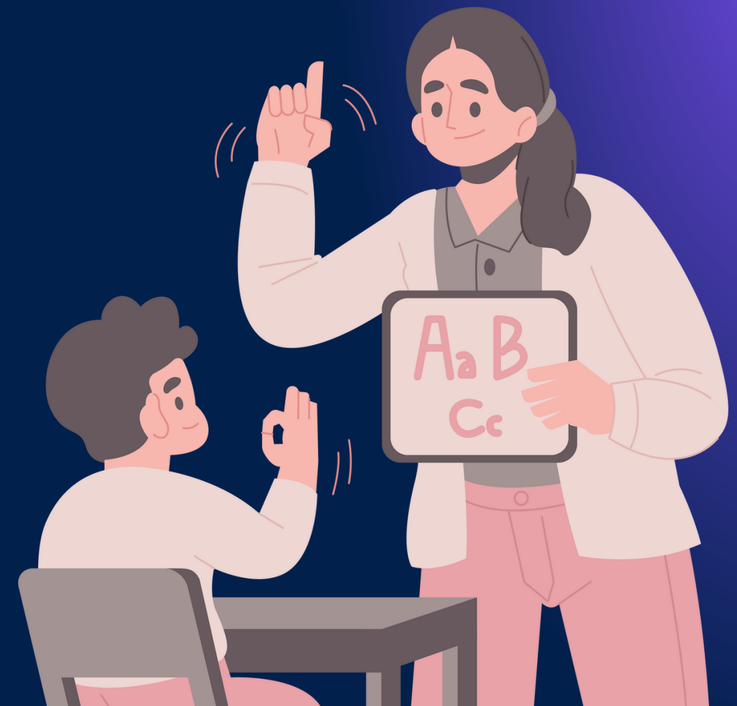


Purpose

- Increase literacy rates amongst the hearing-impaired
- Increase communication and productivity

Overview

- Detect all 26 alphabets in the American Sign Language
- Fun and engaging game for young learners
- Compare different Neural Networks and datasets



Methodology

Data Collection

Preprocessing

Research

Training

Requirements

Testing

Process & Justification

Preprocessing

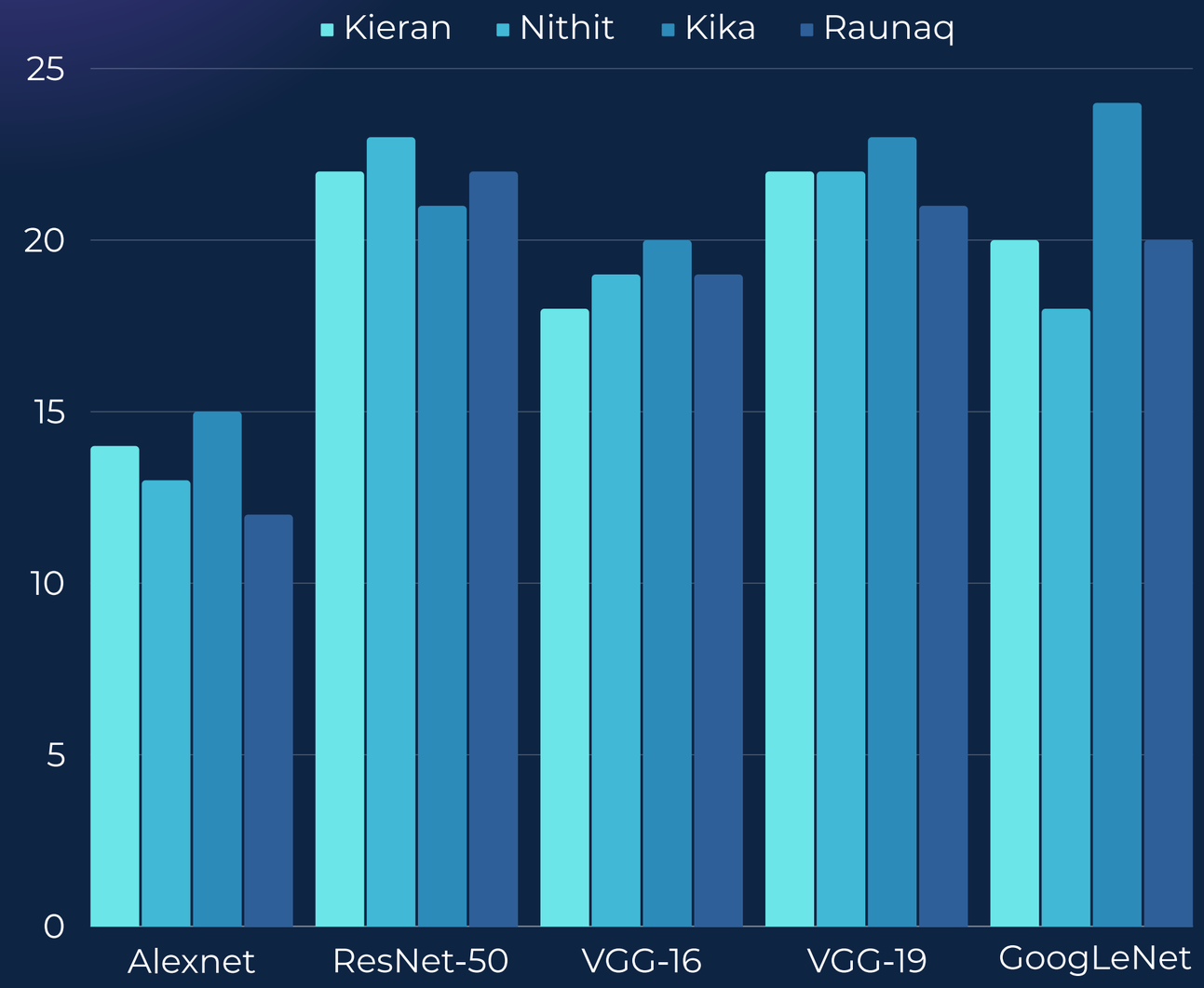
- Quality
- Quantity
- Orientation
- Zoom
- Contrast
- Blur
- Flip

Training

- Step size
- epoch number
- Loss
- Ratio of Test-Train-Validate
- K-fold cross validation

```
Training on single CPU.
Initializing input data normalization.
|=========================================================================|
|  Epoch  |  Iteration  |  Time Elapsed  |  Mini-batch  |  Mini-batch  |
|         |             |   (hh:mm:ss)   |   Accuracy   |     Loss     |
|=========================================================================|
|       1 |           1 |       00:02:17 |        1.56% |       3.6376 |
|       4 |          50 |       00:42:14 |       92.19% |       0.8800 |
|       7 |         100 |       01:15:44 |      100.00% |       0.2101 |
|      10 |         150 |       01:49:02 |      100.00% |       0.0748 |
|      14 |         200 |       02:22:43 |      100.00% |       0.0449 |
|      17 |         250 |       02:55:28 |      100.00% |       0.0353 |
|      20 |         300 |       03:29:14 |      100.00% |       0.0236 |
|      24 |         350 |       04:06:39 |      100.00% |       0.0183 |
|      27 |         400 |       04:38:52 |      100.00% |       0.0171 |
|      30 |         450 |       05:12:30 |      100.00% |       0.0132 |
|=========================================================================|
Training finished: Max epochs completed.
```

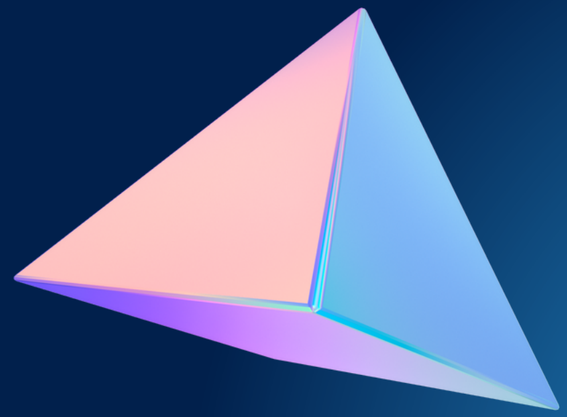
Performance Testing

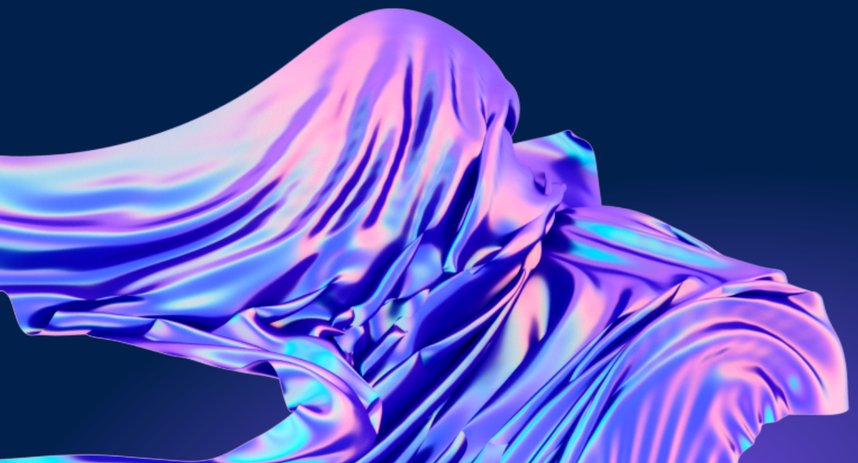


System Limitations

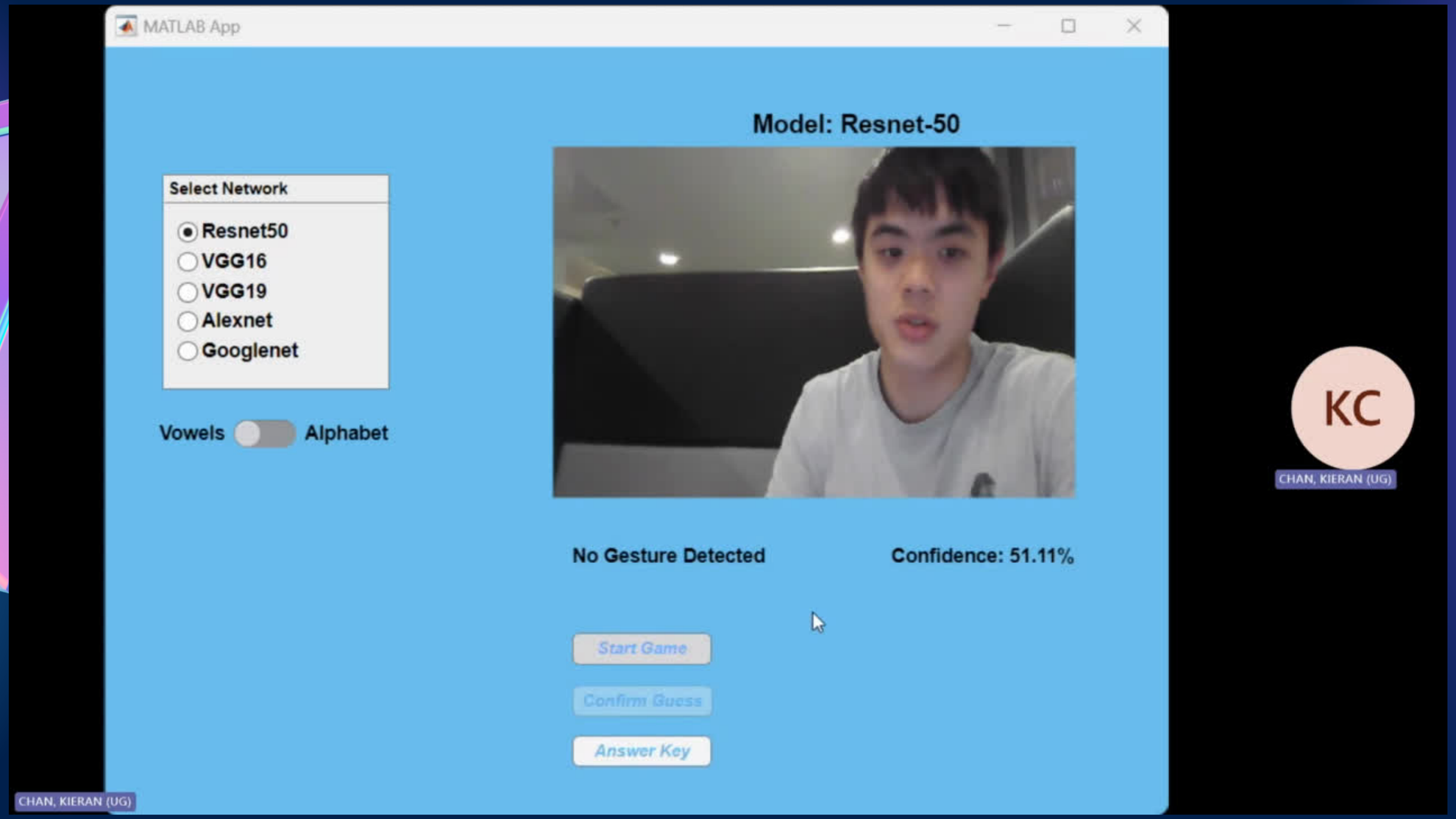
- Confusion Matrix vs Reality
- Performance different with every hand
- Differentiating similar features
- Background effects performance
- Overfitting due to limited dataset
- Computationally Intensive
- Relatively Small Dataset
- Game assumes that trained model works perfectly

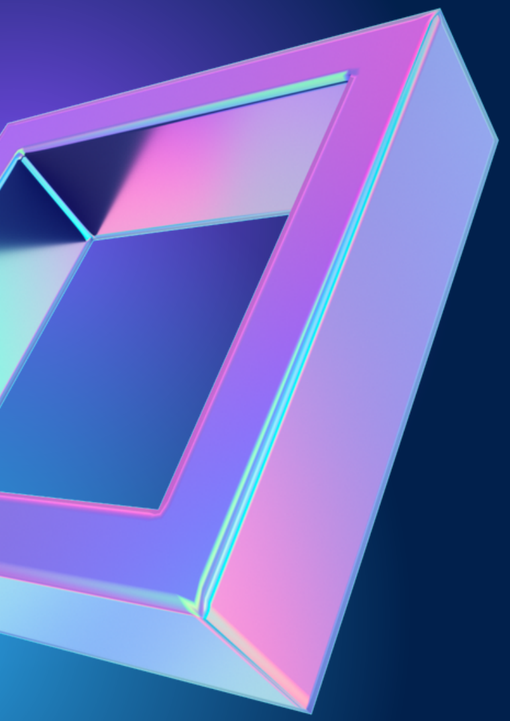
Live Demo





Video Recording





Thank You