



# American Sign Language Recognition using CNNs

This presentation outlines our approach to American Sign Language (ASL) recognition. We utilised Convolutional Neural Networks (CNNs). We aimed to build a model capable of translating hand gestures into text. Our project involved data collection, model training, and real-time detection.

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 Made with Gamma

# Project Methodology

## Data Preparation

- Images resized to 64×64 pixels.
- Normalization applied.
- Data augmentation techniques employed.

## Model Architecture

- CNN with Conv2D layers.
- Max Pooling layers for feature extraction.
- Dense layers for classification.

# Training and Detection

## 1 Training

The model was trained over 10 epochs. We utilized the Adam optimizer.

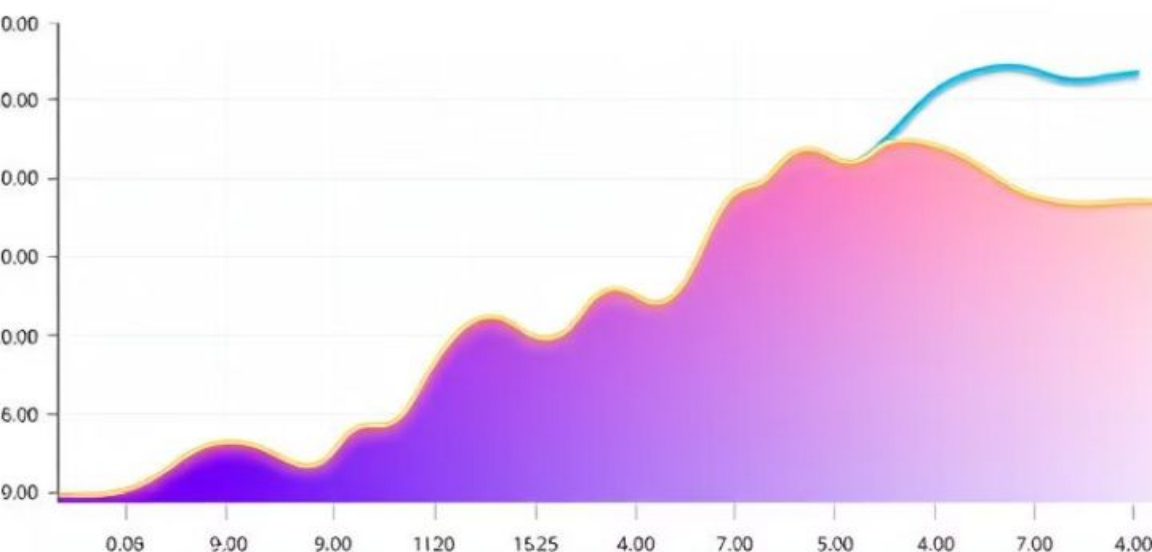
## 2 Dataset

ASL Alphabet dataset (~3000 images per letter A-Z) was used.

## 3 Detection

The test dataset was sourced from

- `/content/asl_dataset/archive/asl_alphabet_test/asl_alphabet_test`.



# Key Results



**Training Accuracy**  
Achieved approximately 89.97%.



**Validation Accuracy**  
Reached around 78.73%.

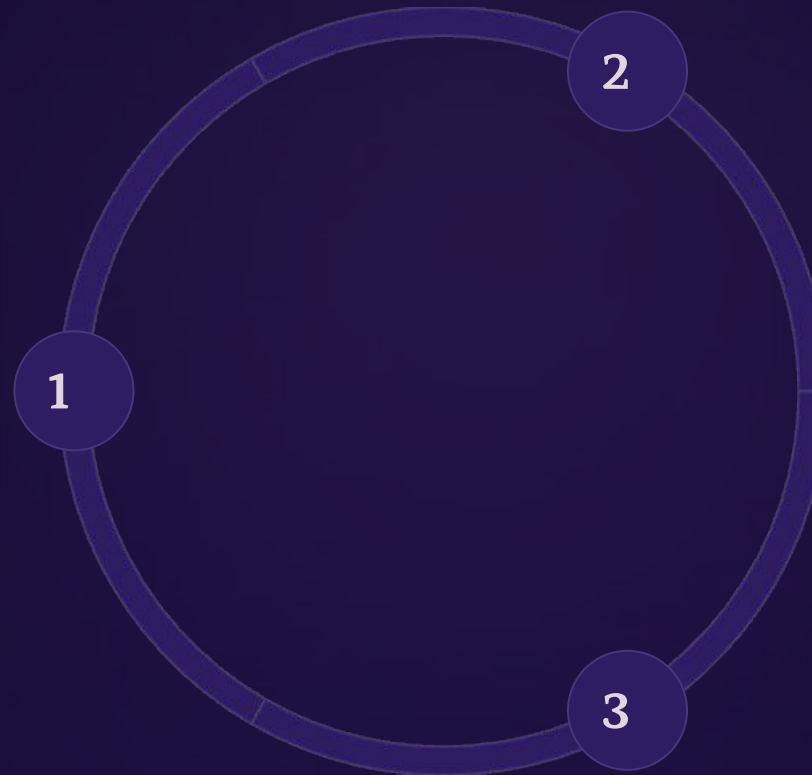


**Real-time Detection**  
Observed about 38.46% accuracy.(10 out of 26 correct)

# Confusion Matrix Analysis

## Diagonal Dominance

Most correct predictions reside along the diagonal.



## Common Confusions

Some letters are frequently confused (e.g., 'I' and 'J').

## Insights

Highlights areas needing model improvement.





# Real-Time Detection Demonstration

1

## Webcam Input

Capturing live hand gestures.

2

## Prediction

CNN outputs the recognized letter.

3

## Display

Detected ASL letter shown on screen.

# Project Conclusion

1

## Performance

Promising accuracy in ASL recognition.

2

## Challenges

Limited test data impacted evaluation.

3

## Constraints

Colab webcam limitations affected real-time demo.

Despite challenges, the CNN model demonstrates potential for ASL translation. Future work should address data limitations.



# Future

## More Epochs

Train the model for a greater number of epochs.

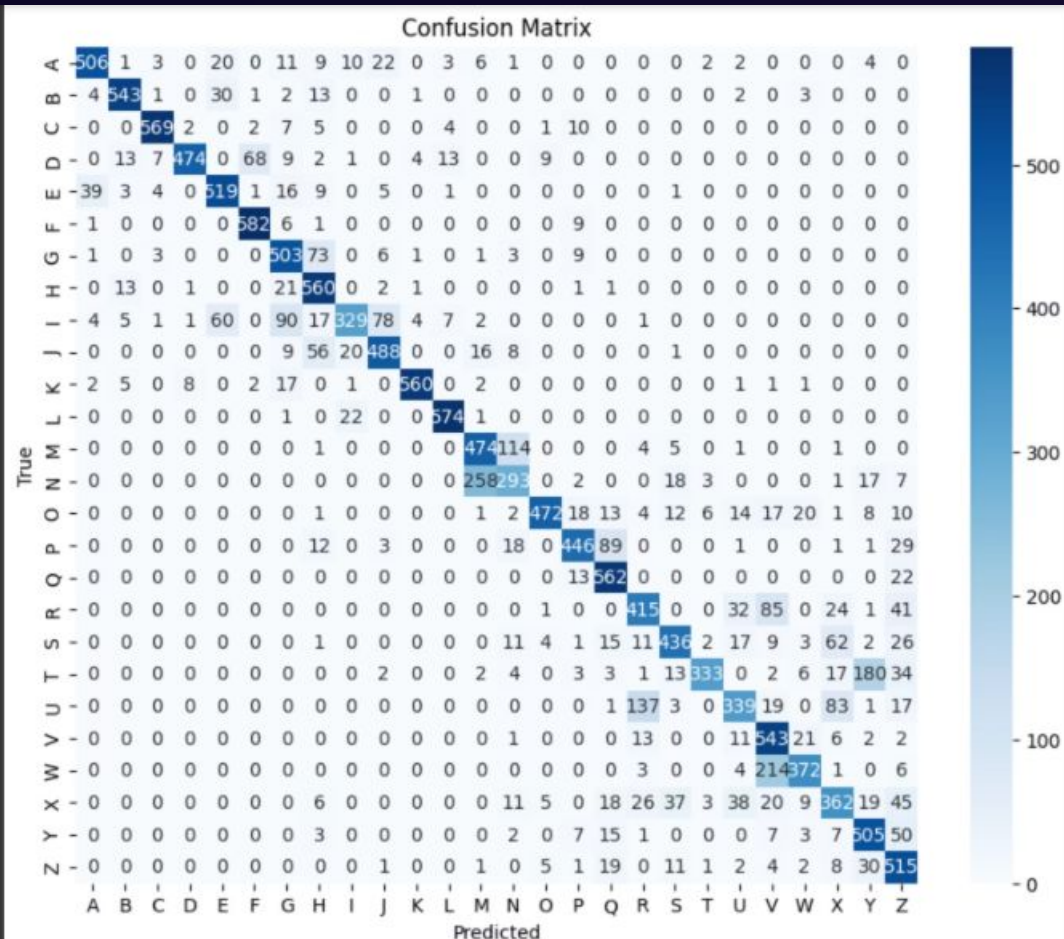
## Larger Images

Increase the image resolution for better feature extraction.

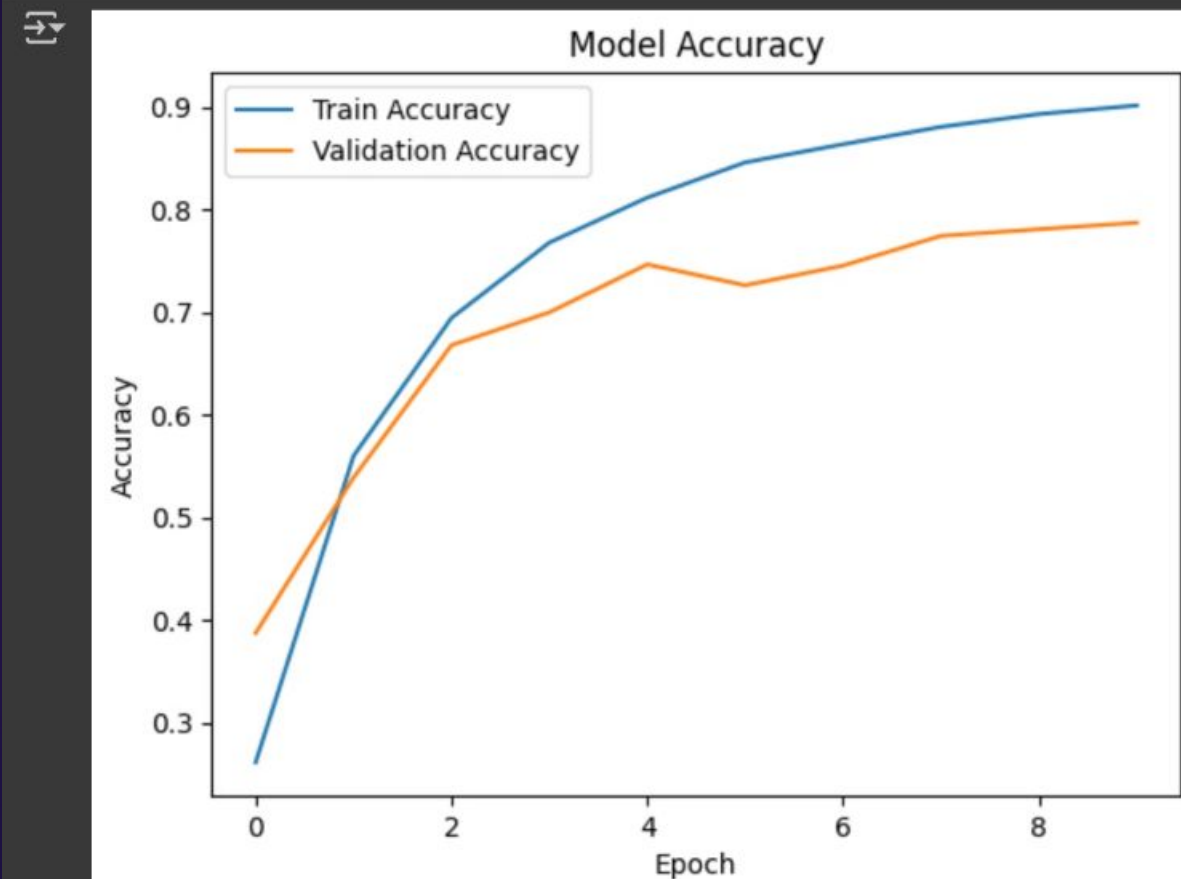
## Expanded Dataset

Incorporate more diverse and extensive training data.





```
plt.plot(history.history['accuracy'], label='Train Accuracy')
plt.plot(history.history['val_accuracy'], label='Validation Accuracy')
plt.title('Model Accuracy')
plt.xlabel('Epoch')
plt.ylabel('Accuracy')
plt.legend()
plt.show()
plt.savefig('/content/accuracy_plot.png') # Save for report
```



<Figure size 640x480 with 0 Axes>

Confusion\_matrix,

# Thank You

We appreciate your time and interest in our presentation on American Sign Language Recognition using CNNs. We hope you found it insightful. We encourage you to explore the potential of this technology and contribute to its development!

