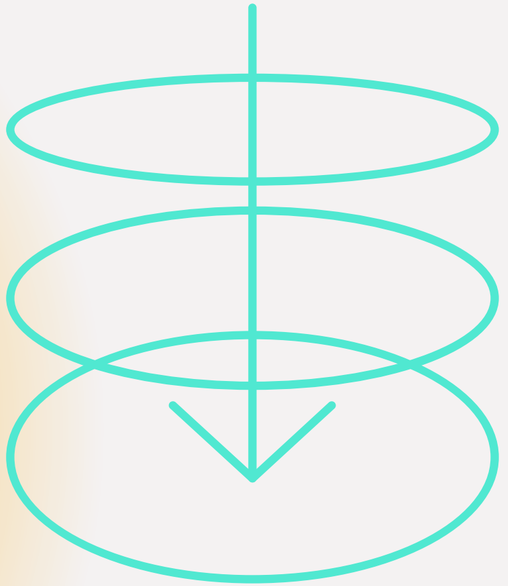
Computer Vision

Sign Language detection



Presentation

Pranjal Upadhyay

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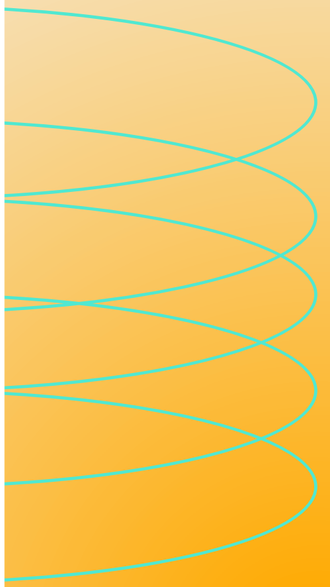
Sign Language Alphabet detection using Computer Vision Algorithms

01 - Motivation

This project leverages image recognition to decode sign language, making communication easier for the deaf and hard-of-hearing. By translating gestures into text, it fosters accessibility, supports learning, and bridges gaps



02 - Dataset

Balanced

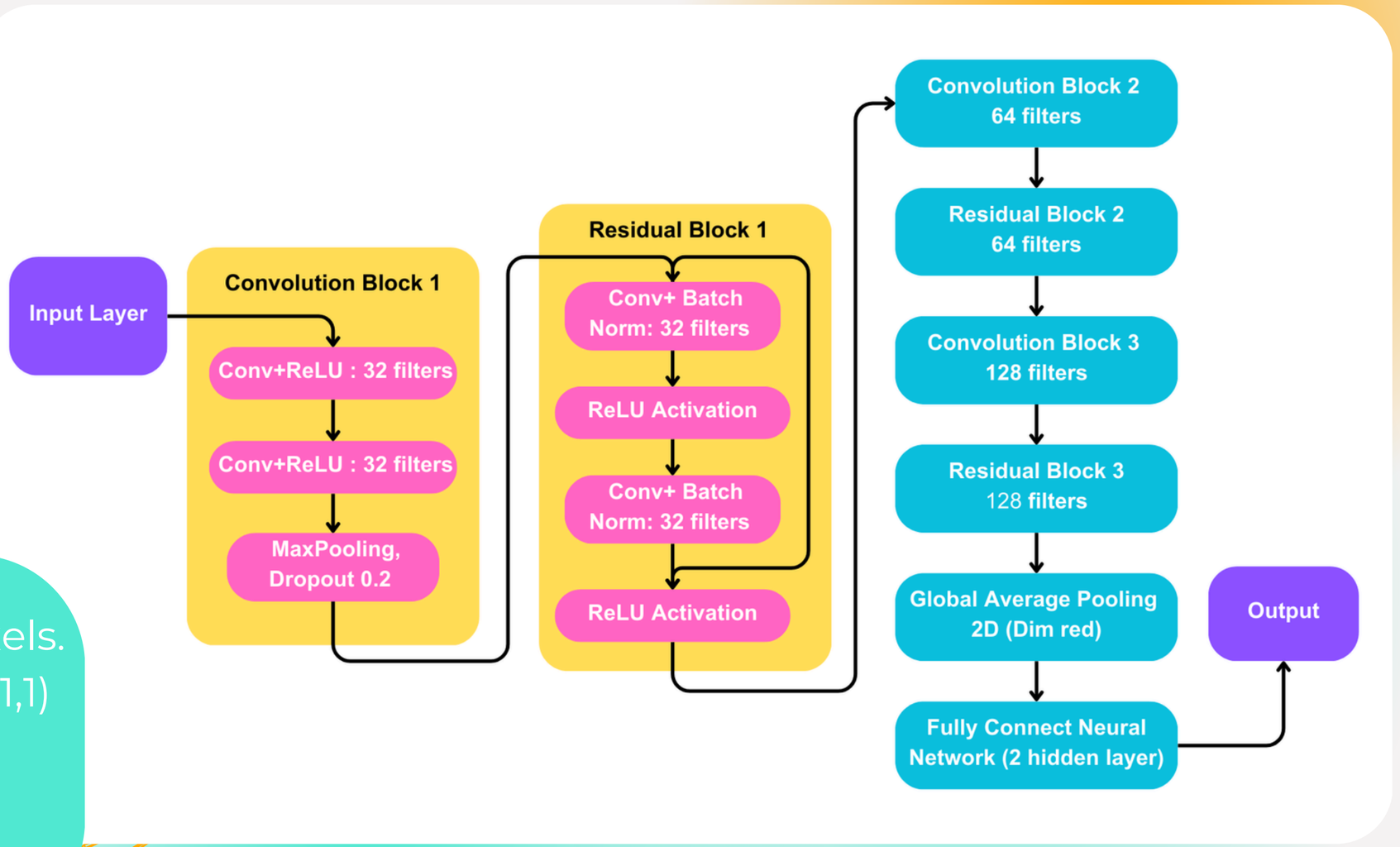
Diverse

Robust

Extensive

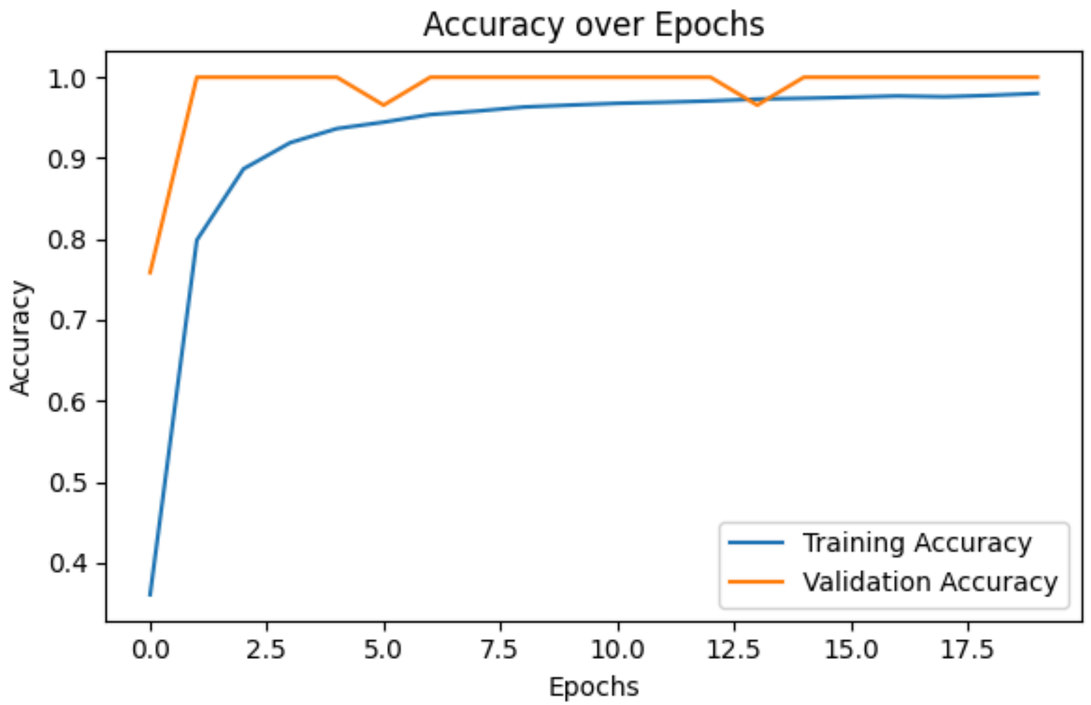
The ASL Alphabet dataset is an open-source collection of images representing the American Sign Language alphabet. It consists of 29 folders, each corresponding to a different class. The training dataset contains 87,000 images, 3k per class, each 200x200 pixels in size, and includes 29 classes: 26 for the letters A-Z, and 3 additional classes for SPACE, DELETE, and NOTHING. The test data set contains a mere 29 images, to encourage the use of real-world test images..

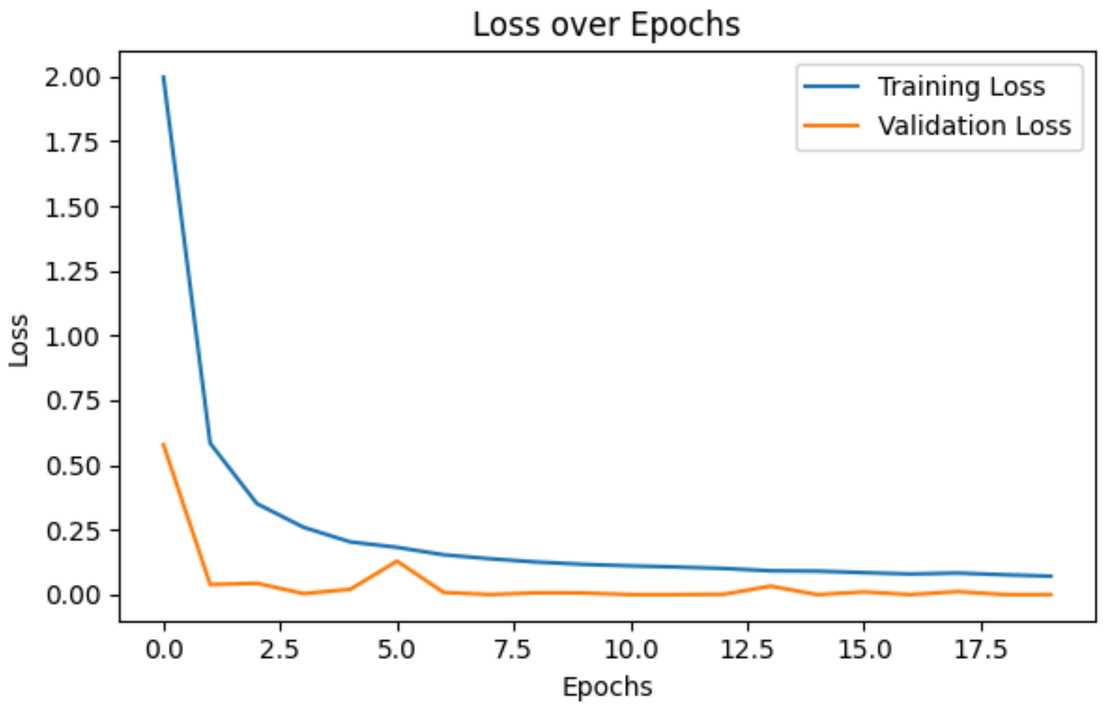
03 - Model



Resized= 64X64 pixels.
Pixels rescaled to (-1,1)
Batch size= 32
Epochs= 20
Classes= 29

04 - Results

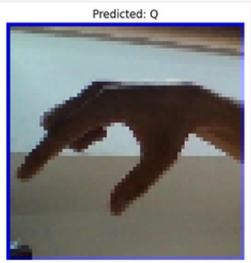


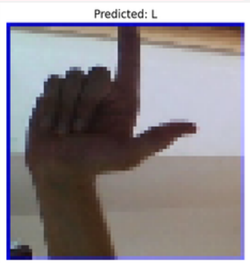


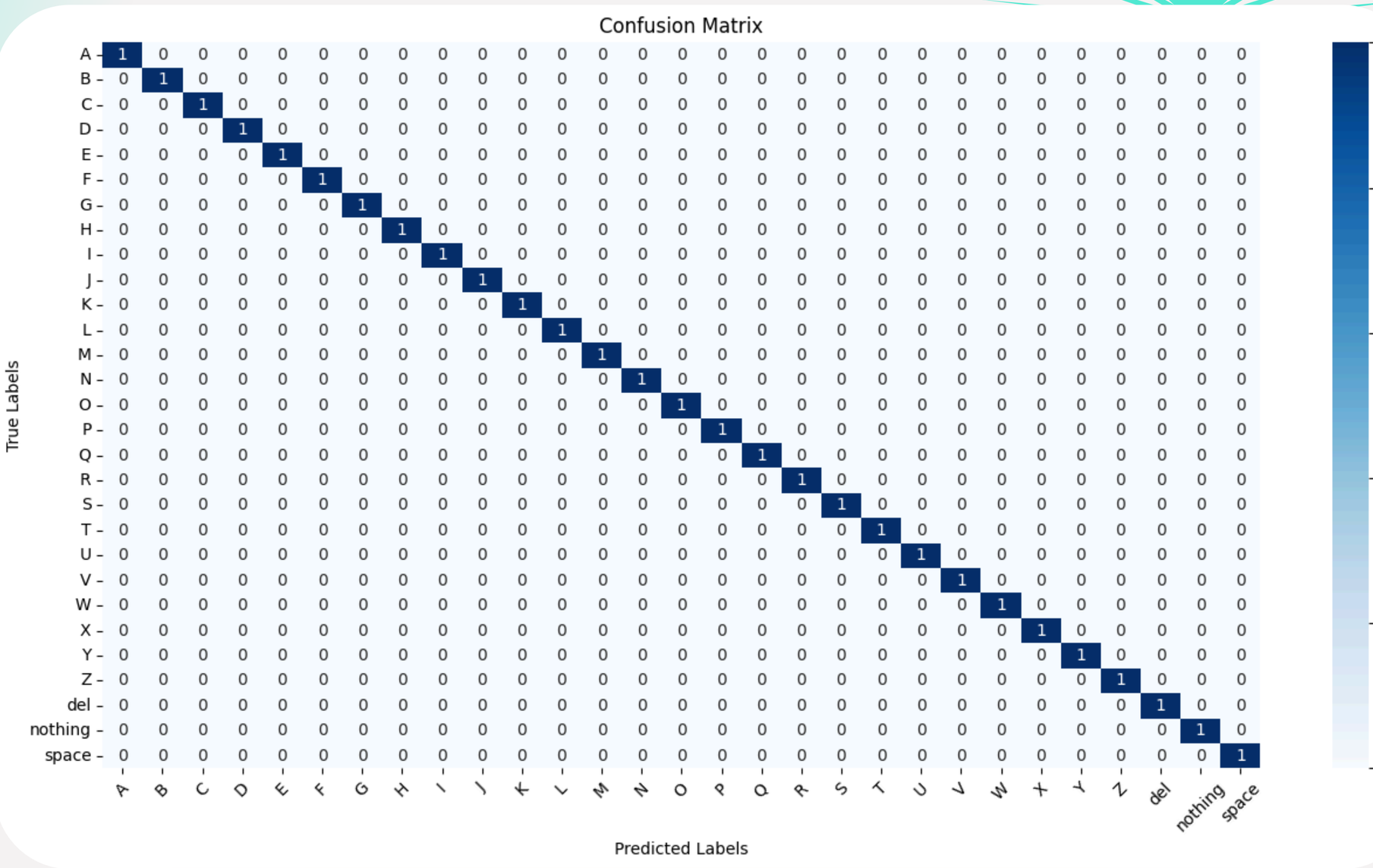
Training accuracy: 0.9794 Training loss: 0.0735
validation accuracy: 1.0000 validation loss: 1.1230e-05

Confusion Matrix

Reason: The model achieves 100% accuracy because it is designed to detect complex and diverse relationships, and the dataset contains prominent, distinguishable features among the classes. These characteristics make the classification task straightforward, leading to perfect accuracy.







05 - Future Scope

- By creating a video dataset, the model can be trained to recognize sign language in video format, leading to the development of a real-time sign language interpreter for improved accessibility and communication.

- The robust architecture can be extended to train on more complex tasks, such as advanced image recognition, enabling its use in diverse applications.

Thanks