Project Design Phase-I
Solution Architecture

Date	08th November 2023
Team ID	Team-591588
Project Name	ASL- Alphabet Image Recognition
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

• The solution is designed to help provide a simple, easy to use and reliable way to bridge the communication gap between ASL users and non-users. The solution provides an interactive user interface through a flask application using which the users can either provide an image of an ASL alphabet and recognize it or turn on their webcam in order to live recognize the webcam feed.

• The model is developed using Deep Learning methods such as CNN and VGG-16 and the best performing model is utilized. The model is then trained using pre-processed images from the given dataset. This model is then saved and used in the flask application. The flask app is developed using HTML, Javascript, CSS and python. The flask app allows the user to provide an input and the input image or frame is processed and is sent to the server where it hits the model and returns a prediction which is displayed in the application as a result.

• The model gives accurate results and the features of our application include a user-friendly interface, easy to navigate design, and provides the users with options to either upload an image or use live recognition. The application can be used to identify 26 ASL alphabets along with "space", "delete" and "nothing" symbols. It displays a result along with the confidence score. The model is scalable and secure to use.

The development of the above solution follows a phase-wise approach. Firstly, we understand the problem statement, empathize with the users and ideate our solution that can effectively return the output. Then we plan the development of the idea and then we break it down into sub-tasks including model development, model training, fine-tuning the model, and flask application development. The final solution is then given by integrating all the above modules.

The solution requires to develop an accurate ASL model, a low-latency response for real-time video image recognition. The solution can be run on any browser and requires a functional webcam to run.

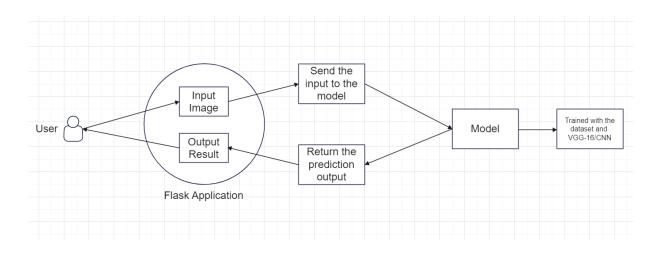**Solution Architecture Diagram:**

Figure 1: Architecture and data flow of the ASL- Alphabet Image Recognition application