Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	21 October 2022
Team ID	PNT2022TMID45380
Project Name	Project - Real-Time Communication System Powered by AI for Specially Abled
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Real-Time Communication System Powered by AI for Specially Abled

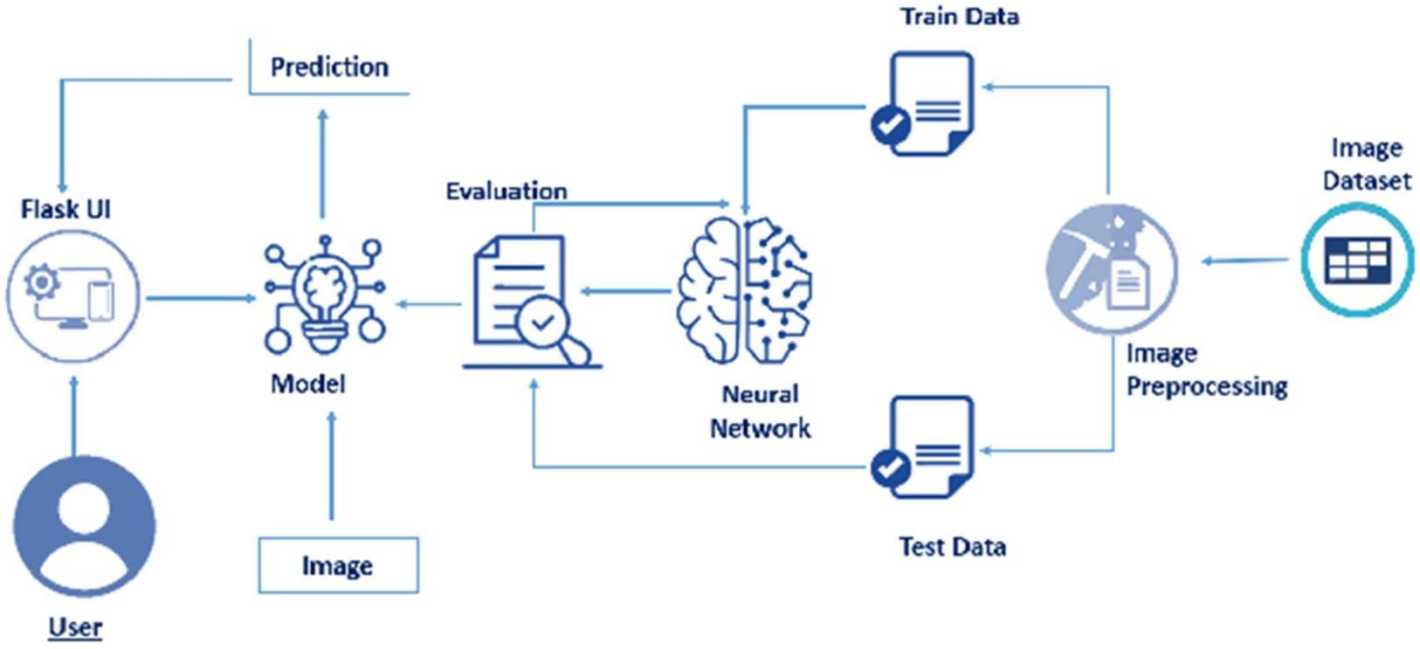

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User	Deaf and dumb people interested and willing to communicate efficiently, without any hesitation with other people.	AI techniques
2.	Flask UI	The components of Flask's User Interface allow one to interact with clients that make use of your application and gather information.	Can be executed using existing cloud technologies
3.	Image Dataset	The prototype of this application is trained on a subset of the dataset containing 20 different signs adhering to the American Sign Language	AI techniques
4.	Image Preprocessing	In the dataset the images are preprocessed to increase the clarity/ sharpness and to remove any noise	ANN, CNN, OpenCV
5.	Training	SVM is run on the training dataset to extract attributes from the images which are then fed to the Neural Network in order to make the prediction	Scikit-learn, Natural Language Processing (NLP)
6.	Testing	In the trained model is then run on an additional untested minimum 10-15 sign language images and performance parameters are evaluated and recorded	Scikit-learn, NLP
7.	Neural Network	The Neural network architecture is also same used for both top-view and bottom-view models; the only difference lies in the number of output units	ANN
8.	Evaluation	Records the generalization accuracy of the proposed model on future / unseen data	
9.	Model	ML algorithms like SVM (Support Vector Machine) are applied to classify in the given image dataset	Machine Learning
10.	Prediction	The attributes extracted from the images are analysis and predictions are made in order to convert the sign-language to the corresponding text	ANN, CNN

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Robots and various other AI tools have made it Easy and possible for people with disabilities to livecomfortably	AI techniques like self-moving robots and other software systems
2.	Security Implementations	Users can authenticated based upon their username/password pair and/or OTP sent to their given mobile numbers/ Email	SHA-1, Encryptions, IAM Controls
3.	Scalable Architecture	We implement a modular 3-tier client-server application architecture that improves the availability, scalability, and performance.	Presentation layer, Application layer and Data Layer modularity, Docker
4.	Availability	The application has an extremely low downtime and it load balancers forward request to other available machines in case of failures happens.	Key performance indicators (KPI)
5.	Performance	The application performs efficiently under a heavy load of translation requests without any significant reduction in the conversion accuracy	Number of requests per minute, accuracy of translation (sign-language to speech & text to sign-language)