

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID52686
Project Name	Project - Real-Time Communication System Powered by AI for Specially Abled
Maximum Marks	4 Marks

Technical Architecture:

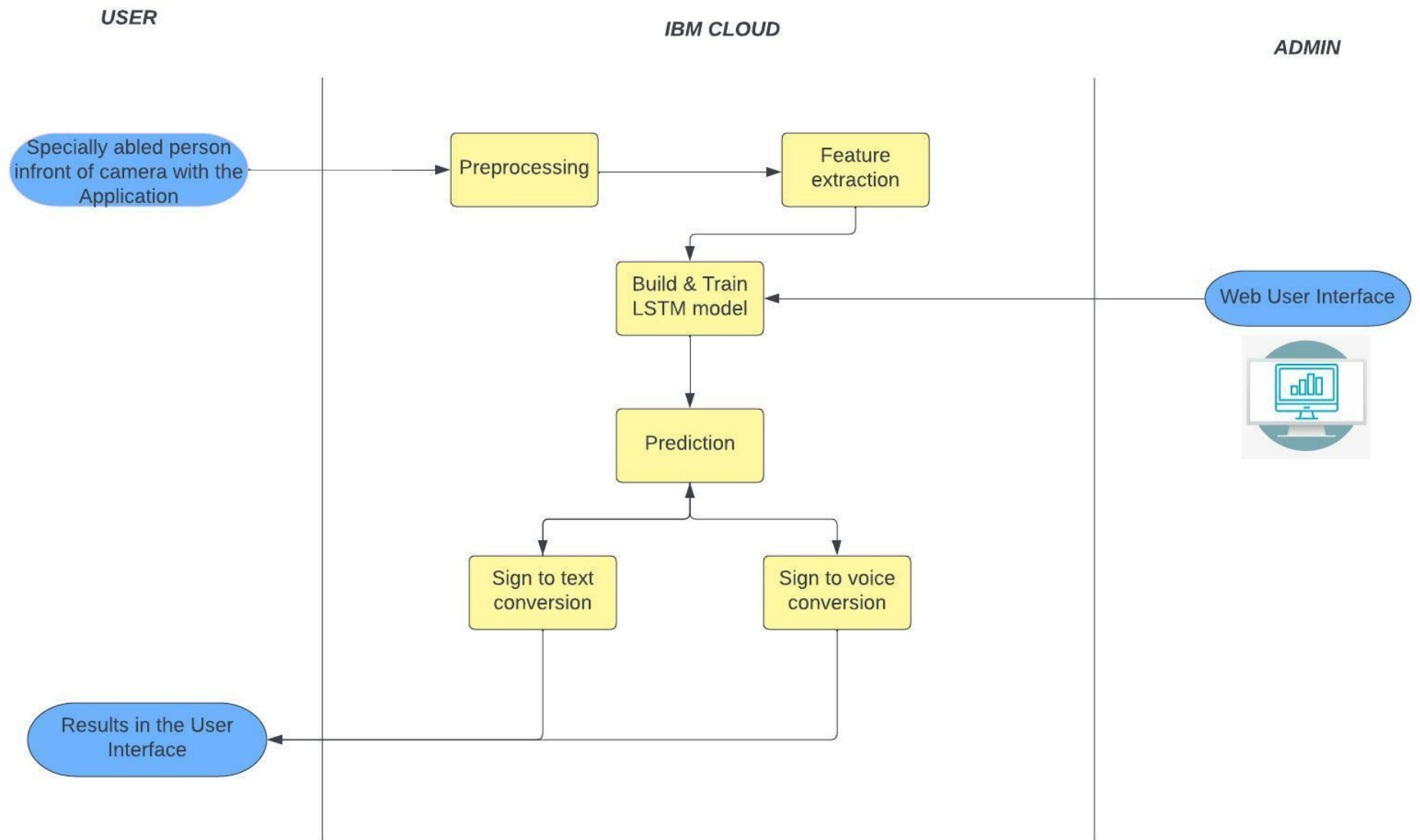


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Deaf and dumb people willing to communicate efficiently, without any hassle with others in their surrounding environment	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 initial 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 Pre processing	The images in the dataset are preprocessed to increase the sharpness / clarity and remove any noise	CNN, OpenCV
5.	Training	SVM is run on the training dataset to extract	Python

		attributes from the images which are then fed to the Neural Network in order to make the prediction	(NLP)
6.	Testing	The trained model is then run on an additional untested 10-15 sign-language images and the performance parameters are evaluated and recorded	Scikit-learn, NLP
7.	Neural Network	The same neural network architecture is used for both top-view and bottom-view models; the only difference lies in the number of output units	CNN
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 the given image dataset	Machine Learning
10.	Prediction	The attributes extracted from the images are examined and predictions are made in order to convert the sign-language to the corresponding text	CNN

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Robots and various other AI tools have made it possible for people with disabilities to live comfortably	Python,Jupyter
2.	Security Implementations	Users are authenticated based on their username/password pair and/or OTP sent to their given mobile numbers	SHA-1, Encryptions, IAM Controls
3.	Scalable Architecture	We implement a modular 3-tier client-server application architecture that improves scalability, availability, and performance. Individual tiers are containerized	Presentation layer, Application layer and Data Layer modularity, Docker
4.	Availability	The application has an extremely low downtime and load balancer forward request to other available machines in case of failures	IBM Cloud
5.	Performance	The application performs efficiently under a heavy	Number of requests per minute,

S.No	Characteristics	Description	Technology
		load of translation requests without any significant reduction in the conversion accuracy	accuracy of translation (sign-language to speech & text to sign-language)