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

Date	15 October 2022
Team ID	PNT2022TMID12764
Project Name	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: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/

Guidelines:

- Include all the processes (As an application logic / Technology Block)
- Provide infrastructural demarcation (Local / Cloud)
- Indicate external interfaces (third party API's etc.)
- Indicate Data Storage components / services
- Indicate interface to machine learning models (if applicable)

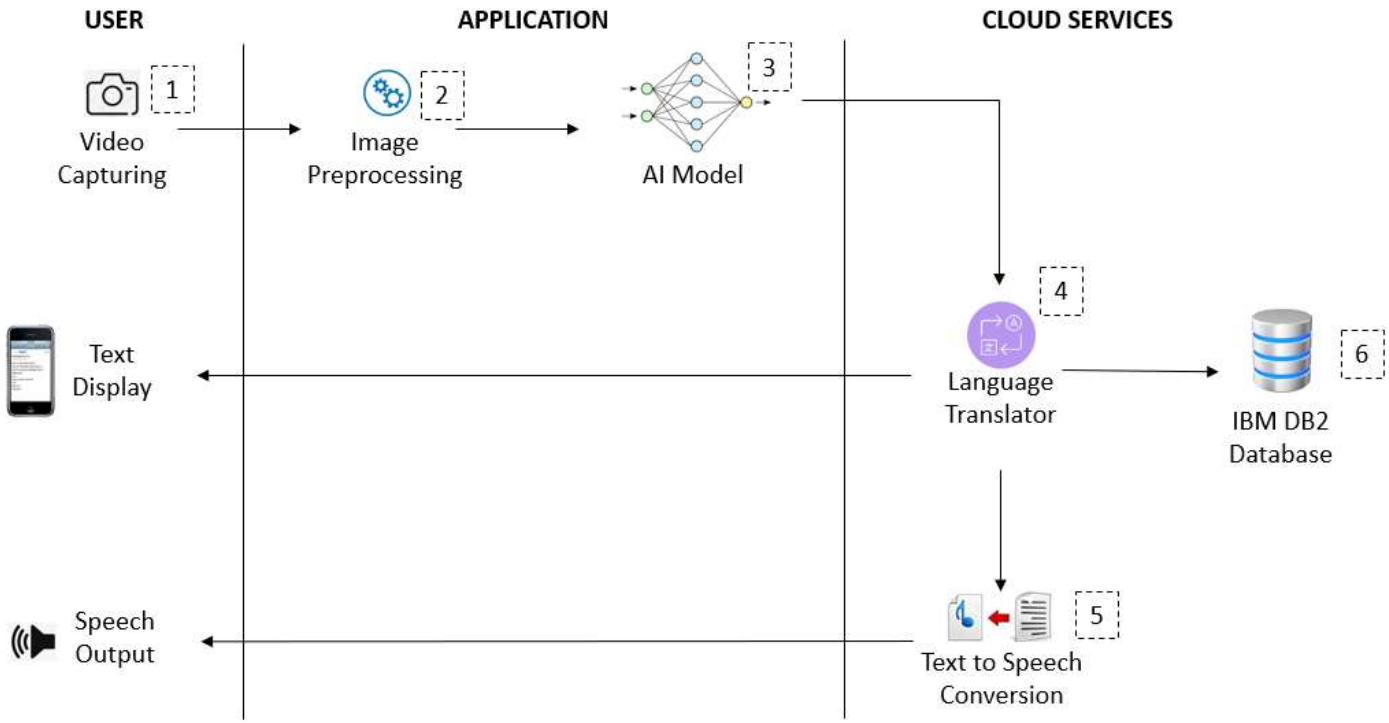

Table-1: Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	Web UI	Flask UI – HTML in Frontend and Python in Backend
2.	Image Pre-processing	The input images from the video are pre-processed for adjusting dimensions, hue, saturation, zooming, flipping, shearing, etc that is suitable for the AI model	Python - Keras

3.	AI Model	This is the model for recognizing gestures. This model is present within the application.	Convolutional Neural Network (CNN)
4.	Language Translator	The English text is converted into user desired language	Google's language translation API - googletrans
5.	Text to Speech conversion	The text is converted to speech	Google's text to speech conversion API - gTTS
6.	Database	For storing user information, text files, etc	IBM DB2 Cloud database – SQL database

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Used for image pre-processing	Keras, TensorFlow
2.	Application Programming Interfaces (APIs)	For interfacing with cloud services	Google's language translation API – googletrans; Google's text to speech conversion API – gTTS; IBM DB2 Database APIs
3.	Security Implementations	Encrypting data while transferring between app and cloud database	SHA-256
4.	Scalable Architecture	The architecture is divided into 3-tire: Web UI, Cloud Service APIs and Database. Each can be developed and scaled up independently of others.	Flask for Web UI, Google Cloud service APIs, IBM Watson DB2 database
5.	Availability	The registration details of the user and other structural data must be stored in the database so that if the user changes the device or reinstall the app, he/she can continue without any difficulty.	IBM Watson DB2 database, Google Cloud Services, Flask Web UI

S. No	Characteristics	Description	Technology
		The AI model must be periodically developed and updates must be released. This new update availability must be notified to the users through the app. The user must be able to update during his/her desired time	
6.	Performance	Since the app works in real time, it should have instantaneous response. The latency in data processing after getting the input must be nearly zero.	Convolutional Neural Network (CNN) for the AI Model

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d