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

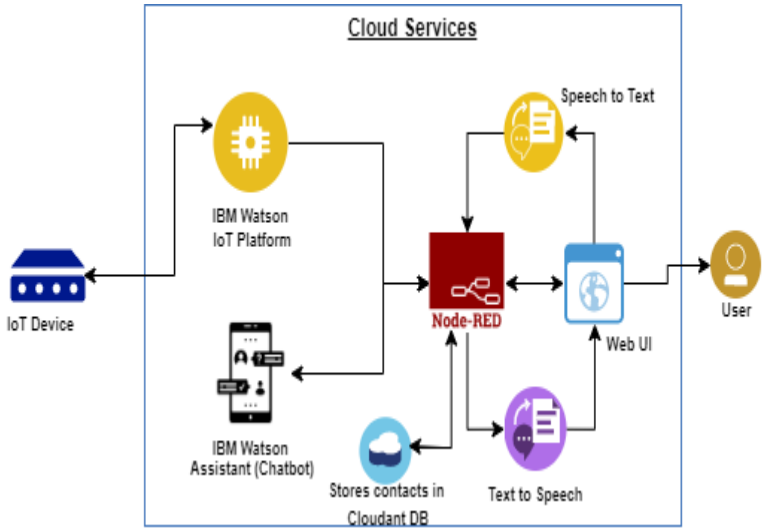
Date	06 May 2023
Team ID	NM2023TMID12828
Project Name	Drowsiness detection and alerting system

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.	Sensors	Various sensors are utilized to monitor physiological or behavioral parameters that indicate drowsiness.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Data Processing and Analysis	Machine Learning Algorithms: Utilize techniques like deep learning, neural networks, or statistical models to analyze sensor data and extract drowsiness patterns. Signal Processing Techniques: Apply filters, feature extraction, or statistical analysis methods to process and interpret sensor signals for drowsiness detection.	Python
3.	Drowsiness Detection Algorithms	Algorithms are developed based on the analysis of sensor data to determine the level of drowsiness. These algorithms may employ various techniques, such as pattern recognition, feature extraction, or classification algorithms.	IBM Watson STT service
4.	Alerting Mechanisms	Visual Alerts: Use visual cues, such as LED lights or graphical displays, to notify users about their drowsy state. Auditory Alerts: Emit sound signals or alarms to grab the user's attention. Haptic Feedback: Provide vibrational or tactile feedback through wearable devices or seats to alert users.	IBM Watson Assistant
5.	Integration	Vehicle Integration: Some drowsiness detection systems can integrate with existing vehicle safety systems, such as lane departure warning systems or adaptive cruise control, to enhance safety measures. Wearable Devices: Utilize wearable devices, such as smartwatches or headsets, to monitor drowsiness and provide alerts.	MySQL, NoSQL, etc.

		Mobile Applications: Integrate with mobile apps to provide drowsiness monitoring and alerts on smartphones or tablets.	
6.	User Interface	Display Interface: Present drowsiness-related information, alert notifications, and user settings on a display screen or interface. User Input: Enable users to interact with the system, configure settings, or acknowledge alerts using buttons, touchscreens, or voice commands.	IBM DB2, IBM Cloudant etc.
7.	Data Logging and Analysis	Data Storage: Store sensor data for later analysis, tracking drowsiness patterns, or generating reports. Data Analytics: Perform data analysis to identify trends, patterns, or anomalies related to drowsiness and provide insights for the user.	IBM Block Storage or Other Storage Service or Local Filesystem
8.	Connectivity	Enable data transmission and communication between different system components, such as sensors, processing units, and alerting devices.	IBM Weather API, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Context of Use	The system's intended context of use is crucial to understand the environmental conditions and user requirements. For example, a drowsiness detection system for long-haul truck drivers may have different requirements compared to a system designed for office workers.	Technology of Opensource framework
2.	User Characteristics	**Consider the characteristics of the target users, such as age, physical abilities, and potential medical conditions. User-specific factors can influence the system's design, interface, and customization options.**	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.

S.No	Characteristics	Description	Technology
3.	Application Domain	Identify the specific domain or industry where the system will be deployed. Drowsiness detection systems can be used in various domains, including transportation (e.g., automotive, aviation, railway), healthcare, industrial safety, and more. Understanding the requirements and constraints of the domain helps tailor the system accordingly.	Technology used
4.	Scalability and Flexibility	Determine whether the system should be scalable to accommodate different deployment scales, from individual users to large-scale implementations across an organization or industry. Flexibility allows the system to adapt to evolving needs and technological advancements.	Technology used
5.	Performance	The performance of a drowsiness detection and alerting system should be evaluated through rigorous testing, validation, and continuous improvement to ensure its effectiveness and reliability in real-world scenarios.	Technology used

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