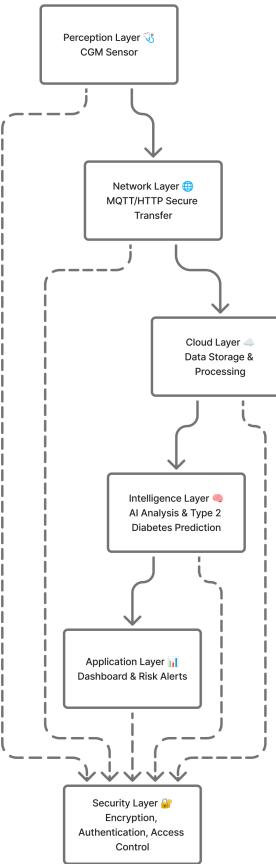


# DiaPredict



## Layer Descriptions

### ⌚ Perception Layer (Sensing Layer)

Includes a Continuous Glucose Monitor (CGM) and smartwatch sensors to gather real-time data such as glucose levels, heart rate, temperature, and steps. Converts these readings into digital signals for processing.

### 🌐 Network Layer (Communication Layer)

Uses secure MQTT/HTTP protocols to transmit sensor data to the cloud in real time. Ensures reliable connectivity between the wearable device and the cloud platform.

### ☁️ Cloud Layer (Data Processing & Storage)

Acts as a central hub for storing and preprocessing incoming health data. Prepares data for analysis and makes it available for AI-driven prediction and visualization.

## Intelligence Layer (AI & Analytics)

Employs an AI model to analyze glucose and activity trends to predict Type 2 Diabetes risk. Detects anomalies in glucose patterns and triggers alerts when risk thresholds are crossed.

## Application Layer (Visualization & Alerts)

Provides an intuitive dashboard displaying glucose readings, activity history, and AI predictions. Sends notifications or alerts to users or healthcare staff when abnormal glucose trends are detected.

## Security Layer (Cross-Cutting)

Applies encryption, authentication, and access control across all layers. Ensures patient data privacy, integrity, and compliance with healthcare security standards.

## Selected Technologies :

Layer	Function	Technologies
Perception Layer	Collect health data	CGM sensor, smartwatch simulator (Wokwi ESP32 or similar)
Network Layer	Data transmission	MQTT / HTTP,
Cloud Layer	Data storage & preprocessing	ThingSpeak, Firebase, MongoDB
Intelligence Layer	AI prediction & analytics	Python, scikit-learn, TensorFlow, PyTorch
Application Layer	Visualization & alerts	Streamlit
Security Layer	Data protection	Encryption (AES), Authentication Tokens / API keys, access control libraries