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Design of IoT Based Health Monitoring System for Diabetic Patients

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Abstract: Diabetes is a chronic health disorder due to the failure of the pancreas to give the necessary level of insulin or to protect the body that isn't consumable. Diabetic patient health observation is a systematic strategy that furnishes us with detailed health data about diabetic patients. Diabetic patient health observation systems play a critical part in observing the patient's health condition, particularly with the utilization of Internet of Things (IoT) connected devices. Diabetic patient observation frameworks are capable essentially to screen diabetic patients and saving certain health information about blood glucose level, blood pressure, and body temperature. Prescient analysis for diabetic patients is needed because of its capability to help diabetic patients, their families, health specialists, and clinical analysts to pursue decisions on diabetic patient treatment in view of the patient's health condition. This paper depicts a new framework for observing diabetic patients' health and examines prescient investigation utilizing Artificial Intelligence algorithms.

Keywords: Diabetes, Internet of Things (IoT), Remote Health Monitoring, and Artificial Intelligence (AI)

I. INTRODUCTION

The expanded utilization of mobile devices and smart gadgets in the zone of health enormously affects the world. Health specialists are progressively taking advantage of these advancements bring, consequently producing a great improvement in medical care in hospitals. A number of patients are being served from the benefits of the M-Health (Mobile Health) applications and E-Health (Electronic Health) to improve and help their health. The Internet of things allows smart wearable devices (Smartwatches, tags) to connect with the Internet and provide data on the health condition of patients and give data continuously to medical specialists who help the patients. Obviously controlling chronic health problems like diabetes, and blood pressure early stages gives a healthy lifestyle to people.

The increment of diabetic patients' count on the planet suggested an increment in the utilization of persistent glucose level checking devices to control diabetic patients' health, these gadgets become the new strategy for constant observing. They give exact information about the body's glucose level. In this article, I present a smart framework for observing diabetic patients utilizing Azure MXChip IoT DevKit and Artificial Intelligence algorithms. The MCU hub is associated with the glucometer to occasionally record the glucose level in a diabetic patient. Utilizing this gathered information, patients can be checked from a remote location by healthcare providers. Subsequently, patients and health specialists need to deal with the collected information and decide on the necessary measure for insulin portions and keep glucose at normal levels. A smart algorithm is executed in our framework, which can send the information to health specialists, to store them in a data set as certain in the wake of being approved (or not) by the health specialist. For our situation study, the included sensors work with the observation of diabetic illnesses.

II. PROPOSED SYSTEM

It is a diabetic patient observation system in light of Azure MXChip IoT DevKit. This framework comprises of three sections, the sensor part for vital data collection, the vital data analysis part, and the processing of the gathered information. The diabetic patient observing framework estimates glucose level for the diabetic patients utilizing glucose sensors and the collected information communicated utilizing Azure MXChip IoT DevKit with the assistance of the IoT framework to the data set for storage and decision making. The deliberate information are ordered and dissected by AI algorithms. The result of the analysis is sent to the health specialist to take a look at the measured levels, while an alert is sent to the patients in an emergency situation.

1. **Glucose Sensor:** A glucose sensor is a sensor expected for estimating the glucose level in a patient's blood. It has a similar capability to glucose level monitoring in regular intervals and can be either a sensor attached to the skin or embedded under the skin.

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2. **Azure MXChip IoT DevKit:** Azure IoT kit is a board and programming IoT device that incorporates a 32-bit microcontroller. Made out of an AZ3166 chip fabricated by Expressive System. It is furnished with a Wi-Fi module, which interacts with the framework by utilizing the USB link for stacking the program into the PC.

3. **Cloud Storage:** The information gathered by the glucose sensor is sent by the Azure IoT kit and saved in the cloud and shown on the mobile application. The information is also dissected by AI algorithms and processed in the server. It is vital to keep patient data as it very well might be utilized in the future. This data set assists the health specialist with interpreting and connecting in an emergency situation, to give the best and quickest conclusion on a patient's health.

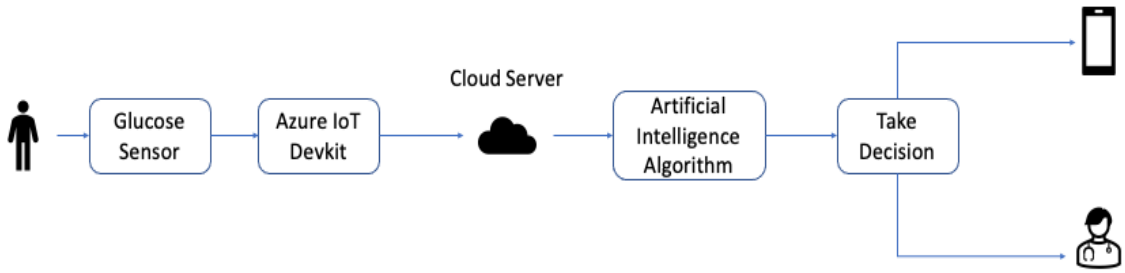

Fig. 1 System overview

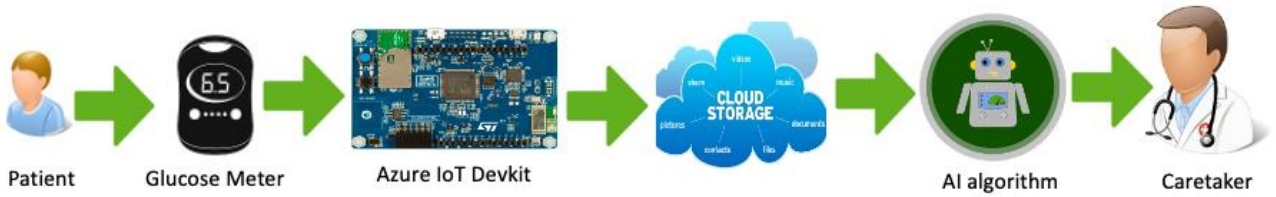

Fig. 2 Proposed Design

The proposed design records the blood glucose levels of a diabetic patient and sends them regularly to the mobile application to save them on the cloud. The server can parse and handle the information got to analyse it. It very well may be considered as a stage for data fair and square of glucose that permits connection among patients and health specialists. Utilizing the Artificial Intelligence algorithms introduced in the server, we can assist clients with checking their glucose levels and foresee future changes in health. Fig. 2 shows the proposed framework for diabetic patient health monitoring.

III. CONCLUSION

The proposed framework of diabetic patient monitoring in view of the Internet of things is an alternative that can be utilized to assist patients with the diabetic disorder. Similarly with this set of arrangements the aim is to improve the living quality of patients, observing them, yet additionally to empower and direct them to further develop their dietary habits and exercise routine schedules.

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