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Diabetics Based Health Monitoring and Low Cost Insulin Pump System Using Iot

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ABSTRACT: Configuration minimal expense insulin siphon diabetic patients and observing the ailments Regulator involving various sensors for knowing the constant status of the strength of the patients, for example, heart beat sensor and blood glucose sensor to detect the serious medical conditions with the patients, so productive clinical benefits can be given to the patient in extremely brief time frame. The gadget is joined to your body by means of a thin tube called an Infusion Set, through which insulin is conveyed. This makes insulin siphon treatment exceptionally watchful. Web of things module is coordinated with proposed idea to see the upsides of sensors in thing talk site. This study assessed a clever diabetes treatment gadget that joins monetarily accessible consistent glucose observing and insulin implantation innovation so as to perform insulin conveyance and glucose detecting through a solitary skin inclusion site (single-port gadget). Ten sort 1 diabetes patients involved the gadget for as long as 6 days in their home/workplace for open-circle insulin conveyance and glucose detecting. On an extra day the gadget was utilized in mix with a calculation to perform robotized shut circle glucose control under medical clinic settings. To survey the exhibition of the gadget, narrow blood glucose fixations were much of not entirely settled and a nonstop glucose sensor was furthermore worn by the patients. Results: The typical mean outright relative deviation mean ARD from blood glucose fixations got for the sensor of the gadget was low interquartile range and didn't vary from that of the moreover worn glucose sensor. Besides, insulin conveyance with the single-port gadget was dependable and protected during home use and, when acted in blend with the control calculation, was sufficient to accomplish and keep up with close normoglycemia. Our information show the plausibility of open-and closedloop glucose control in diabetes patients utilizing a gadget that joins insulin conveyance and glucose detecting at a solitary tissue site.

Importance: The decrease in gadget size and obtrusiveness accomplished by this plan may generally increment patient comfort and upgrade acknowledgment of diabetes treatment with persistent glucose observing and insulin conveyance innovation.

KEYWORDS: Heartbeat Sensor, Blood Glucose sensor, Insulin pump.

I. INTRODUCTION

As one of the major concerns is diabetes in health care area, development of diabetic monitoring system for diabetic patient's demands as way to support them. In this advanced time, people are using all the smart devices and technology for any problem, but still they need to go to the physicians to diagnose their health conditions manually. However, the smart health care system should provide better service for remote health care. Our system and architecture are designed for individual patients or hospitals for monitoring and measuring different parameters and risk factors for diabetics. Along with tracking down the previous health monitoring data, our system also implements easy visualization of patient data. Another major concern of this system is analysing the data and identifying risk levels for the individual patient. Aside from all these features, our system provides alert to doctors and family members based on the analysed result and identified risk level of any diabetic patient. In this paper we will discuss our solution based on diabetes patient's food intake, sugar level, heart pulse, and exercise status, risk status with conjunction to SMS andemail services, various sensors, parameters for patient's data analysis that implements the drawbacks of most of the existing systems.

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II. LITERATURE SURVEY

Biometric technology is concerned with recognizing the identity of individuals based on their unique physical or behavioural characteristics. The physical characteristics such as iris, face, fingerprint, retina, vein and hand geometry or the behavioral characteristics such as hand writing, human gait, signature, and keystrokes have unique, accurate and stable information about a person to be used in authentication applications. The growing developments in information technology have made it possible to use biometrics in applications where it is required to establish or confirm the identity of individuals .Now a day, the increasing demand for enhanced security in the daily life towards the digitalization has directed the improvement of the reliable and intelligent person identification system based on biometrics. The cards or passwords are used in traditional identification systems. This traditional system may be broken down by losing or stealing cards and failing to remember password. [1]

The fundamental behind this is that, Deep Learning requires an exponentially large amount of data for training. This huge amount of data is unavailable to most of the iris researchers. Another major fact is that not much study had been conducted in iris recognition using Deep Learning, even if Deep Learning is very much advanced in computer vision tasks. Using the Deep Learning framework, iris recognition was initially proposed by Liu et. al. İn 2016. DeepIrisNet proposed by Gangwar& Joshi is also an application of iris recognition in images retrieved from various sensors. Convolutional Neural Networks (CNN) was used to extract features and representation of iris images in their study. Another approach proposed by Nguyen et al. is that, iris features can be represented by the generic descriptors obtained by using Deep Learning. Multibiometric iris identification system proposed by Al-Waisy et al. uses both eyes of a person. They have used normalized iris images in the proposed method.[2]

Parikh et al.first approximated the iris boundary by color-based clustering. Then, for off-angle eye images, two circular boundaries of the iris were detected, and the intersection area of these two boundaries was defined as the iris boundary. However, these methods are affected by eyelashes and hairs or dark skin. The true boundary of the iris is also not identified if it includes the area of eyelids or skin, which reduces the overall iris authentication performance. The third type of segmentation methods is composed of active contours and circle fitting-based methods. A similar approach is used in the local Chan–Vese algorithm, where a mask is created according to the size of the iris, and then an iterative process determines the true iris boundary with the help of the localized region-based formulation. Among all learning-based methods, deep learning via deep CNN is the most ideal and popular in current computer vision applications because of its accuracy and performance.[3]

Neural Architecture Search is becoming more and more popular in designing efficient mobile size convnets. By adjusting the network width, depth, convolution core type and size extensively, it achieves better efficiency than manual mobile size convnets. Some methods can scale convnet for different resource constraints: RsNet can reduce or increase layer by adjusting network depth, while Wide ResNet and Mobilet can extend the width channel through the network. The input image resolution is also helpful to improve the efficiency of the network model. And the depth and width of the network involved are important for the expression of convnets. Although these methods can improve model performance by scaling a single dimension, there are still ways to effectively extend convnet to better efficiency and accuracy. The overall performance is improved by scaling the available resources to balance all dimensions of network width, depth and image resolution. Our work is based on the EfficientNet-b0 baseline model which uses a set of fixed proportional coefficients to scale each dimension evenly, and improves accuracy and efficiency through automl and model scaling.[4]

Unlike fusing the hand-crafted and CNN-based features, Fang etal.suggested a multi-layer deep features fusion approach (MLF) based on the characteristics of networks that different convolution layers encode the different levels of information. Apart from the fusion methods, a deep learning-based framework named Micro Stripe Analyses (MSA)was introduce to capture the artifacts around the iris/sclera boundary and showed a good performance on textured lens attacks. Yadav et al. presented DensePAD method to detec PAs by utilizing DenseNet architecture. Furthermore, Sharma and Ross also exploited the architectural benefits of DenseNet to propose an iris PA detector (D-NetPAD) evaluated on a proprietary database and the LivDet-Iris 2017 databases. Although fine-tuned D-NetPAD achieved good results on LivDet-Iris 2017 databases with the help of their private additional data, scratch D-NetPAD still failed in the case of cross-database scenarios. These works inspired us to use DenseNet as the backbone for further design of network architectures. Very recently, Chen et al. proposed an attention-guided iris PAD method for refine the feature maps of

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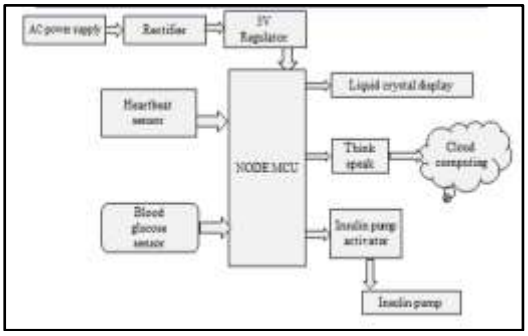
DenseNet. However, this work used conventional sample binary supervision and did not report cross-database experiments to verify the generalizability of the added attention module.[5]

III. PROPOSED SYSTEM



Block Diagram of Proposed System

In patients checking framework, one's require gear, gadgets and supplies that action, showed record human mental states of patient observing framework for giving ceaseless checking of a patient incorporates an information obtaining and handling of information from the patient and afterward this wellbeing related information is shipped off the clinical staff through Web of things (IoT) by utilizing PIC microcontroller. This proposed work will prompts quick conveyance of essential restorative assistance to fix the patients.Notwithstanding this framework limited quantity of insulin that your insulin siphon constantly gives you. Your pre-modified not set in stone by your own body's necessities and customized by your medical care proficient. The proposed framework, records the heartbeat and blood glucose level and it incorporates an information obtaining and handling of information from the patient and afterward this wellbeing related information is shipped off the clinical staff through Web of things (IoT) by utilizing microcontroller.

Extra insulin can be conveyed "on request" to match the food you will eat or to address a high glucose. In light of the blood glucose level the insulin will be infused naturally. At the point when heartbeat rate fluctuates in view of the sensor esteem, crisis will be displayed in show.

The framework utilized for wellbeing checking is the proper observing framework, which can be identified just when the patient is in medical clinic or in bed. As of late open frameworks are tremendous in size and accessible just in the clinics in Emergency unit. These days, zig honey bee can be utilized to communicate the patient data to their friends and family or to their concerned specialist

The noticed fundamental indications of the patients are broke down and checked against the standard reach to recognize the strange state of the patients, we have proposed a framework in which patient's blood glucose level , heart beat rate, perusing results that are being observed by the framework. The different sensors are put on the patient's body and they take the readings and convey the relating message to the site. Here, different sensors are utilized to gauge the patient's internal heat level, pulse; Circulatory strain and their particular outcomes are shipped off the information base and can be checked from anyplace overall through the web worked with by means of GSM module. The subtleties can be effortlessly gotten to online by appropriate confirmation and wellbeing status of the patient can be observed.

IV. IMPLEMENTATION

Recognizing the different boundaries of the patient utilizing Web of Things is finished. In wellbeing observing framework in light of IoT projects, the continuous elements of the patient are shipped off the cloud by utilizing web association. These information can be shipped off anyplace on the planet, with the goal that the client will see the subtleties whenever. This is the significant benefit over SMS based wellbeing checking framework. In IoT based patient wellbeing checking framework, information of the patient wellbeing are frequently seen by specialists or their friends and family.

The explanation for is that, the information must be gotten to by visiting a web webpage or PC address, though in Worldwide Framework for Portable correspondence based patient checking framework, the wellbeing boundaries are sent utilizing GSM through SMS. IoT based wellbeing observing framework has 3 detects. Beginning one is a temperature sensor, second one is heartbeat gadget, and the third one is respiratory sensor. This is incredibly valuable since the specialist will distinguish the patients' wellbeing boundaries basically by visiting web site or IP address. Furthermore, today a few IoT applications are likewise being created. So the specialist and family members will screen or track the patient wellbeing through Android applications. To work an IoT based wellbeing global positioning framework, you will requireIoT medical services is the most arising field in the clinical region. This venture is primarily for old individual who is separated from everyone else at home. It is additionally useful for senior residents living alone or with 1 or 2 individuals. This is truly useful when family members or individuals from the family need to go out for a few inescapable reasons. Multi tested individual can utilize this task.

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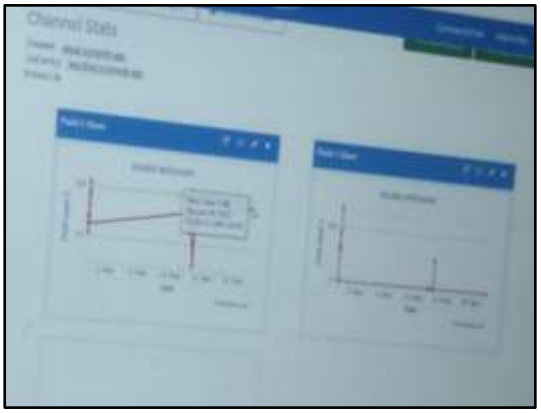
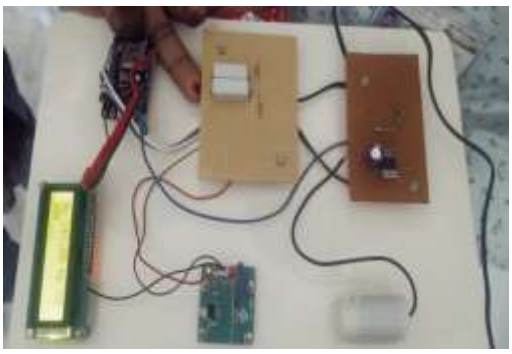
IoT following demonstrates truly helpful when we really want to record, screen and monitor changes in the wellbeing boundaries of the patient. In Web of Things based patient checking framework, we can have the data set of the wellbeing boundaries. This assists the specialist with effectively tracking down the progressions in the wellbeing boundaries or history of the patient while recommending the treatment or medication for patient. Medical clinic stays are decreased because of distant patient observing. Emergency clinic visits for standard check-ups are additionally limited. Patient wellbeing boundaries are put away in the cloud. So it is more helpful than keeping up with the records in printed paper in isolated documents or in advanced PC, PCs, pen drives or explicit memory area. In such cases there might be a possibility losing the information. While in the event of IoT, the information is put away in the cloud and has negligible possibility of information misfortune. Fix can be given at beginning stage. Notice to specialist is sent in the event of basic circumstances despite the fact that the patient can't give any subtleties.

V. RESULT

The glucose concentration time courses obtained with the single-port sensor paralleled those measured with the control sensor. In addition, the glucose concentrations obtained with the two sensors agreed well with the blood glucose levels determined with the blood glucose meter. Time courses of the sensor and blood glucose concentration as well as insulin infusion rate from a representative subject are the single-port device sensor as well as the control sensor, 632 paired sensor and blood glucose values were obtained from the experiments. Error grid and residual plots for all collected data pairs.The below picture represents the output of the proposed system.



Insulin Infusion Output



Prototype Picture

VI. CONCLUSION

The result of the present study indicate the feasibility of open and closed loop glucose control in diabetes patients using a treatment device that combines glucose sensing and insulin delivery at same tissue site. The reduction in device size and invasiveness achieved by this design may largely increase patient convenience and enhance acceptance of diabetes treatment with continuous glucose monitoring and insulin delivery technology. This system is the simplest way to inject the insulin to out body.

In this era, elderly and patients with chronic health conditions, such as diabetes, require special and continuous healthcare services. However, remote health monitoring (RHM) helps patients, caregivers, and healthcare society to improve healthcare services by benefiting from recent advanced technologies. Importantly, achieving good healthcare services for diabetic patients is still a challenging task.

The proposed study aims to review RHM for diabetic patients based on Health technologies, including, diabetic management and control, diabetes prevention, diabetes intervention program, diabetes selfefficacy, continuous glucose monitoring, glycemic control improvement, diabetic patients treatment, diabetes prediction system, diabetes care improvement, continuous and remote monitoring system, insulin dose management, and carbohydrate measurement.

VII. FUTURE WORK

The future work is to develop the kit into the analysis blood glucose and pulse rate in our body to give the insulin to our body with the help of iot (think speak) .Additional insulin can be delivered “on demand” to match the food you are going to eat or to correct a high blood sugar. Whenever heart beat rate varies based upon the sensor value, emergency will be shown in display. This module schedules a diet for diabetes management by generating whole meals for breakfast, lunch, and

supper to meet the nutritional requirements of the diabetic patient. The recommender system uses the knowledge-based approach, where meals are recommended using the user's profile and a knowledge base.

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