

## Diabetes Detection using Sensor

Prof. Ganesh Deshmukh<sup>1</sup>, Mansi Bhosale<sup>2</sup>, Manisha Chavan<sup>3</sup>, Madhuri Kamble<sup>4</sup>, Rutuja Tilekar<sup>5</sup>

<sup>1</sup>Professor, Department of Computer Engineering, PCETs Pimpri Chinchwad College of Engineering, Pune Maharashtra, India

<sup>2,3,4,5</sup>Student(BE), Department of Computer Engineering, PCETs Pimpri Chinchwad College of Engineering, Pune Maharashtra, India

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**Abstract** - The technologies used to detect glucose level are several like we detect diabetes using machine learning algorithms, sensors, IOT techniques. Patients with high glucose level may worried about various health issues like short term health complications as well as long term health complications. In this paper we presents our application which consist of two modules in which first is nothing but detecting diabetes and second will be paperless prescription. In first module we are detecting diabetes with the help of sensor and then output generated by sensor are given as input to our second module and then based on glucose level our application help patients to search nearby doctors using KNN algorithm once doctor will be selected by patient, based on their communication between doctor and patient paperless prescription is given by doctor to patient.

**Key Words:** Diabetes mellitus, sensor, practo app, monitoring, glucose values

### 1.INTRODUCTION

Diabetes mellitus (DM), commonly known as diabetes is a chronic disease that injures many body parts of diabetic person. [4]The diabetes symptoms often include frequent urination, eye irritation, foot ulcer, increased thirst, and increased hunger. It is leading to cause eye problems (blindness), kidney failures, skin problems, foot ulcers. If person is not treating diabetes early then, diabetes can cause many complications. And acute complications can lead to diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death of the person. Diabetes is a long-term metabolic disorder in which the blood glucose (BG) level varies and is caused when there are high blood sugar levels over a prolonged period and occurs when either the pancreas not producing enough insulin, or cells of the body not responding properly to the insulin produced. Proper management of diabetes depends on maintaining blood glucose values within specified acceptable values. To keep track of blood glucose levels non-invasively is now possible due to diverse breakthroughs in sensors technology[5]. However, each user might have different requirements, routines and symptoms when it comes to selecting a self-monitoring solution. After extensive research and careful selection, we proposed an application to detect diabetes using sensor for diabetes patients. The main objective of this research is to detect whether or not a person is having diabetes and if person has diabetes then our system provides

solution to diabetic person where special doctors guide and suggest to patient which will improve health outcome.

### 2.RELATED WORK

A designed system[4] is to identify the feasibility of monitoring people remotely with diabetes. It enables the patient to understand the disease and physician in better way. One touch glucose meter is a diabetes tracking system, has ability to store more than 200 readings, along with an event label to analyze the changes in blood glucose level. It has a serial port to generate communication with computer. In, "In-touch" software includes 2 parts i.e. diabetes management and education. But, it is required to use Glucose Meter 3 times in a day. In paper[5], It focuses on the Alzheimer which is leading cause of kidney failure and blindness. It have been discovered technique establishing specific connection with diabetes and habits developed in regular basis i.e. diet (eating habits) etc. including BMI(Body Mass Index).It uses Machine Learning, Cross Validation, Decision Trees. Along with diabetes blood pressure has been identified. But, it has less in accuracy. In paper[1], It uses signal-to-noise ratio, Kriging based algorithm for prediction of diabetes, i.e. to predict glucose concentration. Kriging involves temperature, mineral, location prediction and signal coverage. It uses the methodology such as Weight factor, Vector Support Engine, Root Mean Square error etc. Blood Pressure has been identified less accuracy of results. In paper [3], It uses Invasive and non-invasive methods for monitoring blood glucose level. Avoid pain of patient (blood pricking) using noninvasive Techniques. Some input is needed like salivary, tear. To bridge the gap between IT and end users, along with hardware and software, uses optical monitoring.

### 3.EXISTING SYSTEM

#### 1)Practo application:

The Practo App is the very famous world's leading healthcare application and it provides a platform where millions of patients are connected with hundreds of thousands of healthcare doctors around the world and helps people make better healthcare decisions and go with proper treatment.

The aim of the Practo App is to reduce the search and transaction costs for patients and improve the facility of the healthcare system and helps patients find the right doctors through easily accessible. And is an app for online booking

appointment patients with the doctor. It provides cashless clinic visits, paperless work, and painless treatment for the patients.

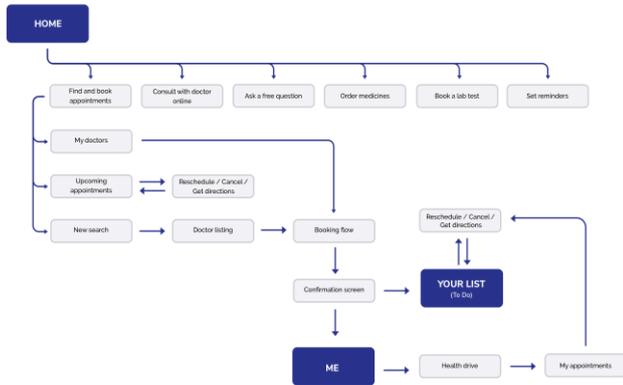


Fig-1: Practo App flow

**2)Diabetic monitoring system by using CGM sensor:**

Continuous Glucose Monitoring (CGM) Sensor used for monitoring the real-time Blood Glucose Level in diabetes patient body now it is with the help of CGM. CGM sensor usually attached to the belly or arm of the patient and Continuous Glucose Monitoring sensor measure the Glucose level continuously every 5 to 10 minutes and the reading sent to the device like mobile, iPad by using Bluetooth communication device. But it is very expensive for the common man and CGM sensor life is also around 14 days only.



Fig-2: CGM Sensor

**4. PROPOSED SYSTEM**

Diabetes is a metabolic disease that occurs when the blood sugar, is too high. So, there is a need to plan a diabetic care accordingly, i.e. Regular based check-up, consultation etc. diabetes detection using non-invasive methods, i.e. via sensor, to avoid blood pricking. We have used Sensor – AS7262 visible 6-bin spectral sensor, for diabetes detection, to know whether the blood glucose value is high or low.

After the diagnosis of diabetes, the medical details have been displayed.

Based on the geographical location of the user, the list of nearby diabetologist has been listed(displayed). The user has to look after the available diabetologist according to his/her convenience and book the appointment. Consultation takes place and then the paperless prescription has been generated, and here the consultation and treatment procedure takes place and gets completed.

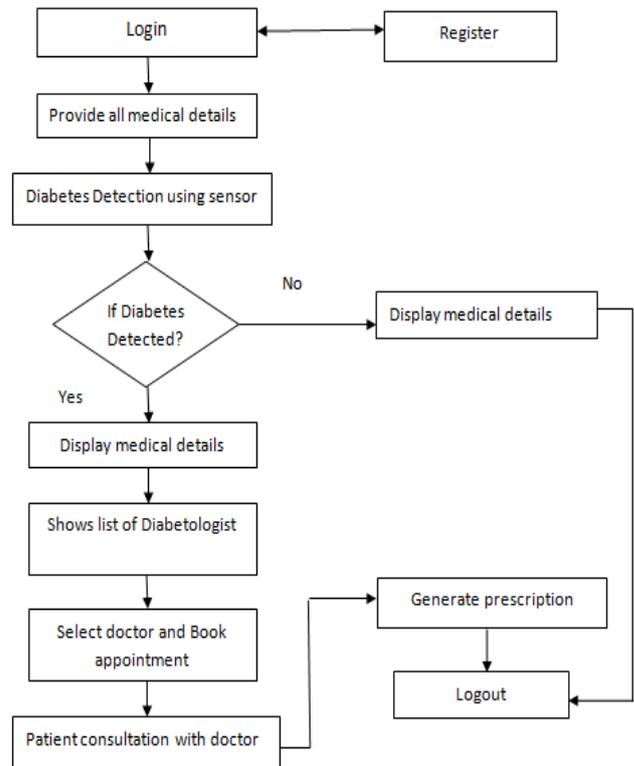


Fig-3: Proposed system

**5. RESULTS**

The system result is going to detect whether or not person is having diabetes and if a person is having diabetes then our diabetes application is showing the list of doctor who are available in same city where a diabetic person live. Diabetic patient can select the doctor from the list of doctor and going to book an appointment for consultation as shown in the figure (6). Doctor can see list of patient for consultation as shown in figure(7). After booking an appointment, doctor gets request of that patient as shown in figure (6). And Doctor is either accepting or rejecting request of diabetic patient. Doctor accepts request and interact with the patient through online chat in application as shown in the figure (8). Doctor and patient interact through virtual manner doctor gives suggestion to patient and give prescription to the patient.

The figure(4) has sensor which is used to detect diabetes glucose values and that values are as follows:  
 Diabetic : High, Non-diabetic: Low

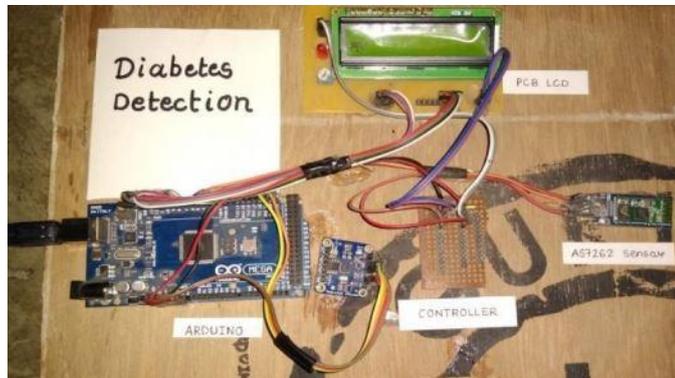


Fig-4: Hardware

Application shows list of doctors to cure diabetes and take guidance of doctors by taking with them.



Fig-5: Registration

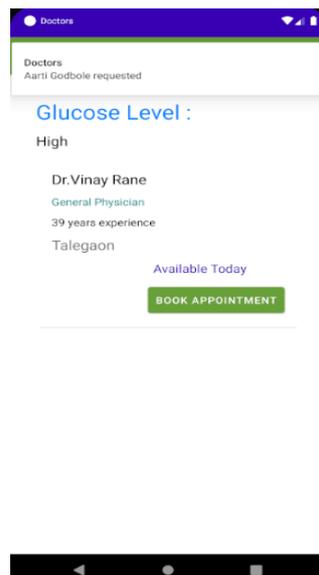


Fig-6: Book appointment

Doctor interacts with patient in our application in virtual manner.

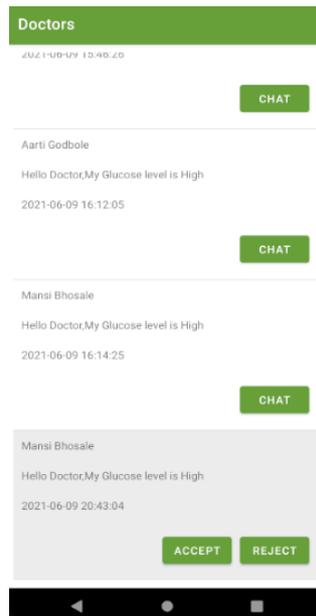


Fig-7: Accept Request

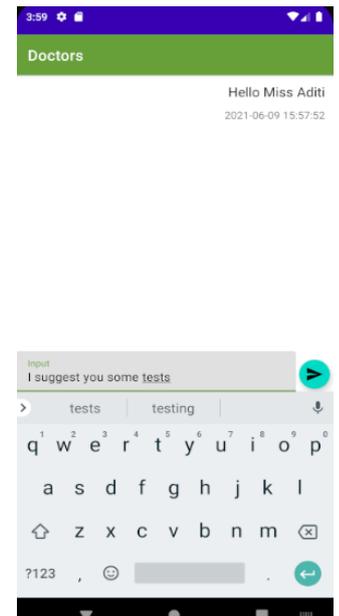


Fig-8: Chat

## 6. LIMITATION

The sensor only determines high and low glucose values of sugar in diabetic patient. And the Video - calling is unattainable for the discussion.

## 7. APPLICATION

Diabetes detection becomes simpler and convenient. It provides a list of nearby Diabetologist based on location of patient. Using concept of Paperless Prescription i.e. virtualization. It is cost-effective.

## 8. CONCLUSIONS

The technologies to detect diabetes are several, using sensors, IoT, Machine learning algorithms. Patients with diabetes may become worried over a variety of things. Such patients may also worry about the short-term health complications which can affect to the body parts of human being, such as hypoglycaemia, as well as long-term health effects.

In this paper, we present a method to detection of diabetes using a sensor. With the help of the non-invasive method, the patient can easily check the glucose levels. For that, we use the AS7262 visible 6-bin spectral sensor. This sensor provides the glucose level of a diabetic patient. Therefore, we proposed a new approach called the detection of diabetes using a sensor with a paperless prescription. The proposed system is comprised of two steps, in the first step glucose level is measured in high and low status. And status will be sent to the mobile application which is used as the second step for detection of diabetes and based on

prescription done by the doctor. A Patient can search for a nearby doctor and choose a nearby doctor and take a prescription from the doctor.

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