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# Management of an Instinctive Approach for Diabetics Domain: Embedded System

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**ABSTRACT:** Diabetes is an incurable disease where it influences the body in several ways by prompting varied real sicknesses and untimely mortality. A glycaemia level is a prime role in diabetic convalescent. The proposed framework is concerned with the advanced method of simulation that can be used to implement real insulin pump that can work in real-time to prevent the fatal effects of diabetes on health. This technique utilizes to detect the glucose level using a GSR sensor (galvanic skin response). In this system it helps more efficiently for glycaemia monitoring from patient sweat. If the glucose level is critical and then automatically insulin will be injected into the patient. This process balances entirely the safety-critical system aspect required to build a structure that has a direct effect on human life. The control algorithm adapts the glucose metabolic rate and determines the appropriate amount of insulin to be delivered into the body. To provide better insulin management to reduce the need for human supervision, we have proposed a control algorithm for the insulin pump to automate the delivery process

**KEYWORDS:** GSR sensor, glycaemia, exogenic insulin, exogenic insulin.

## I. INTRODUCTION

Diabetes is a chronic disease that appears when the pancreas does not produce insulin, or the body cannot metabolize it properly. Insulin is one of the hormones that regulate the glycaemia in the body. Hyper glycaemia is the result of a non-controlled disease. In advanced stages of non-insulin-dependent diabetes or insulin dependent diabetes, the insulin infusion is required. The conventional therapy consists of the management of exogenic insulin, several times in a day with tight glycaemia control, but this cannot prevent its consequences effectively. Insulin is a hormone produced by pancreas to process and regulates glucose level in human body. The irregularities in insulin production may lead to a group of metabolic disorder known as c (DM). There are two variants of DM: Type-1 diabetes, where the body is incapable of producing adequate amount of insulin and Type-2 diabetes, where body is incompetent to make use of insulin in a proper manner. In both cases the treatment includes insulin injection via a syringe or using an insulin pump. An insulin pump is a compact portable electronic gadget permanently connected to the body to deliver required amounts of insulin by means of a catheter set below the skin, usually abdomen area. The invention of insulin pump was a relief for diabetic patients, as they could dispense insulin dosages self-reliantly.

## II. OBJECTIVE

The main objective is to monitor the glycaemia level of the diabetes patient. To implement an automatic insulin injector for the diabetes patient. Where the level of glucose can be monitored in GSR sensor when glucose level in peak range it will be hyper glycaemia. To prevent from the hyper glycaemia to inject the insulin injective

### III. EXISTING AND PROPOSED SYSTEM

Hyperglycemia and hypoglycemia are the stages of diabetes disease. If a patient's level drops to hyperglycemia, they experience some symptoms, such as Fatigue, Pale skin, Seizure, Loss of consciousness. A patient needs to inject glucagon into the skin of the lower abdomen, thigh or upper arm. If a patient's level drops to hypoglycemia, they experience some symptoms such as frequent urination, increased thirst, blurred vision, fatigue. To avoid the subcutaneous insulin injection. At the injection side due to continuous injecting of insulin it may affect the injection jone and causes swelling, itching and may be some other major problems.. Hyperglycaemia can damage the vessels that provide blood to vital organs, which can increase the risk of heart disease.

### IV. EXISTING OF DIABETES SYSTEM

Basically (and this is, of course, oversimplified for game ability. It is recognized that reducing hyperglycaemia early on in disease progression has long-term benefits for patients with diabetes With the development of modern insulin analogs , the field has evolved. Large clinical trials have improved our understanding of the potential benefits and risks associated with intensive glycaemia control in different patient populations and highlighted the need for individualization of glycaemia targets and treatment strategies.

### V. PROPOSED SYSTEM

In this technique GSR (Galvanic skin response) is used for detecting the glycaemia level. The GSR sensor can measure the glycaemia level from the patient's sweating. When it's an abnormal glycaemia levels such as hyperglycaemia or hypoglycaemia is sensed by sensor. Insulin and glycogen inject as per the glycaemia levels by using insulin control unit.

### VI. AUTOMATIC INSULIN CONTROL UNIT SYSTEM

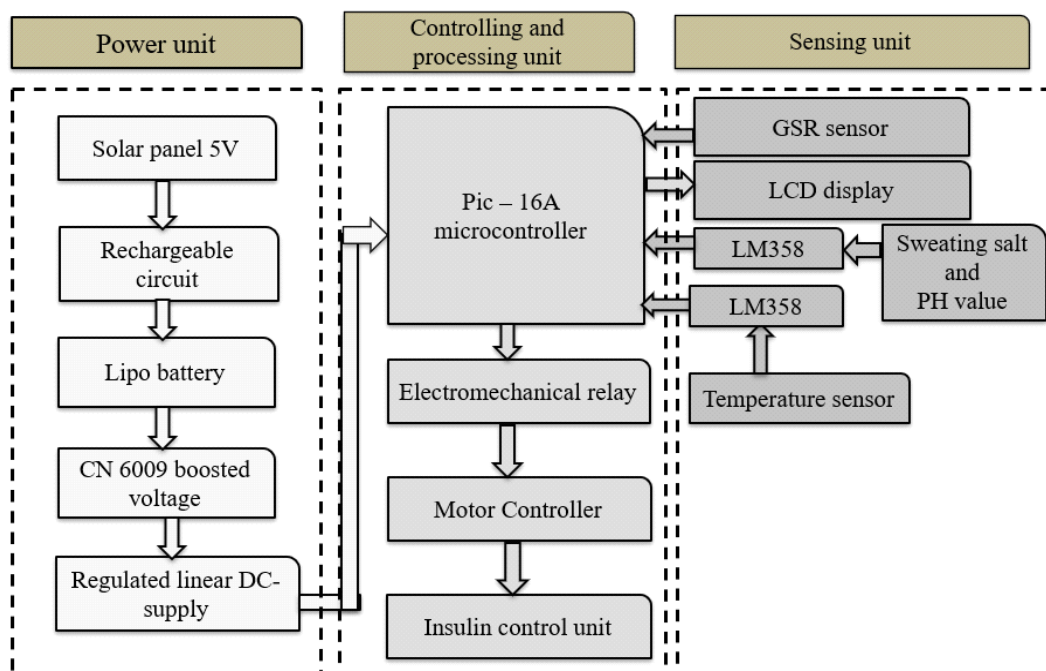


Fig.1. block diagram



## VII. WORKING PRINCIPLE

In this technique monitoring the glycaemia level of the diabetic convalescent. Insulin will be injected automatically. In power unit using power from solar panel is converted into linear DC supply then the power stored in the lipo battery. The CN 6009 booster is used for increasing the low voltages into the higher voltages from the battery. In most of the cases the power supply might be very less in such cases it is used for the boosting it up and supplied for the pic 16 A microcontroller. Keep track on sensing unit for glycaemia level of the convalescent by manipulate the GSR sensor The GSR sensor monitoring the glucose range from the sufferer sweat. At this import temperature constrain, PH merit and salt estimate the sweating determines the sufferer glucose on a level is detected. The convalescent glucose level is continuously monitored. The quantity level of glucose is showed off in lcd screen. If the glucose level is valley in turn of peak the insulin will be injected automatically by utilizing the insulin control unit.

In this technique we are differentiating the units such as power unit, controlling and processing unit, sensing unit. The proposed system charged with solar panel 5V from a rechargeable circuit for increasing the voltage in Lipo battery from . GSR sensor measures sweat gland. If the glycemia level is greater than 250mg/DL the insulin automatically injects using insulin control unit.

The technique that we developed is used of recovery of the diabetes illness. Insulin will be injected automatically. In power unit using power from solar panel is converted into linear DC supply then the power stored in the lipo battery. The CN 6009 booster is used for increasing the low voltages into the higher voltages from the battery. In most of the cases the power supply might be very less in such cases it is used for the boosting it up and supplied for the pic 16 A microcontroller. Keep track on sensing unit for glycemia level of the convalescent by manipulate the GSR sensor. The GSR sensor monitoring the glucose range from the sufferer sweat. At this import temperature constrain, PH merit and salt estimate the sweating determines the sufferer glucose on a level is detected. The convalescent glucose level is continuously monitored. The quantity level of glucose is showed off in LCD screen If the glucose level is valley in turn of peak the insulin will be injected automatically [9] by utilizing the insulin control unit.

## VIII. CIRCUIT DIAGRAM FOR PROPOSED SYSTEM

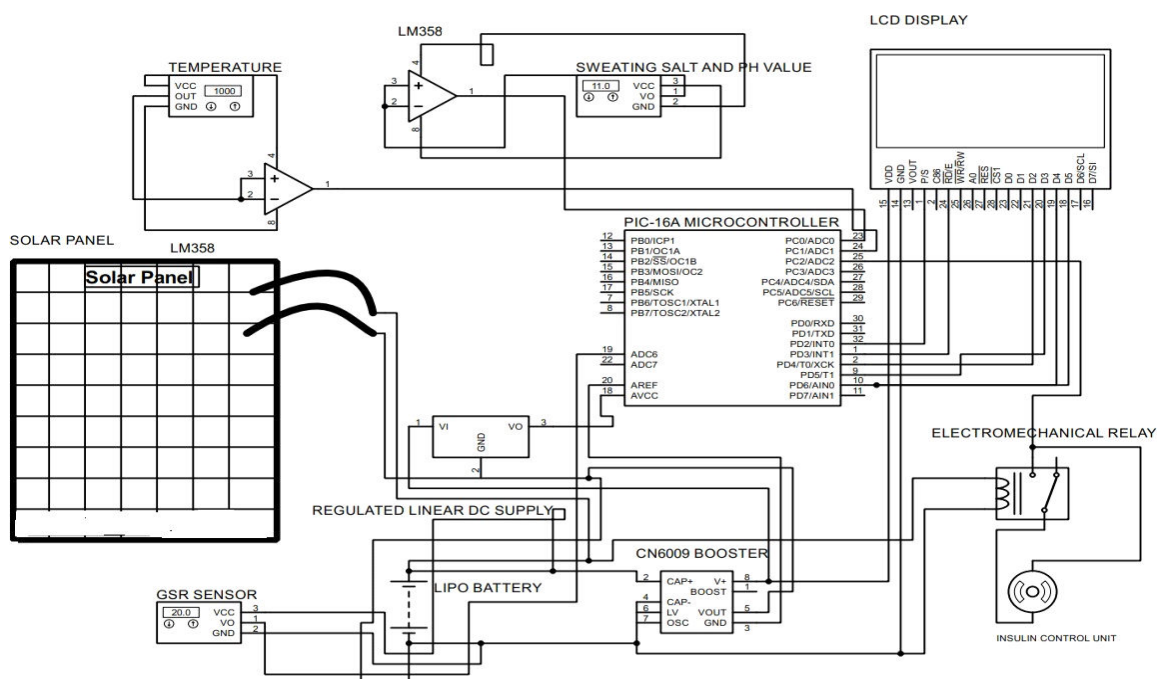


Fig.2. Circuit diagram for proposed system

The power from the solar panel is stored in the lipo battery by using a charging circuit. The CN6009 booster will be used for boosting the voltage from the battery then 12v to 5v is converted into a linear DC supply. Then the voltage is given to the microcontroller. The salt and PH measure sensor has 3 pins VCC pin is connected to a 5v supply. GND pin is connected to the ground. Vo pin is secured to LM358 differential comparator and then the output of the comparator is connected to controller analog pin co. The temperature sensor has 3 pins VCC pin is equated to a 5v supply. GND pin is connected ground. V out is secured to LM358 differential comparator for converting analog to digital, then the output of the comparator is connected to controller analog pin c1. GSR sensor has 3 pins VCC pin is connected to 5v supply. GND pin is connected ground. V out pin is connected to the controller analog pin. LCD is connected to controller digital pins and GND is connected to ground, VDD pin is connected to 5v supply. Electromechanical relay is connected to controller digital pin for activating the motor for insulin injects to the glycemia patient.

## IX. RESULT

### a. Insulin Monitoring Output:



Fig.3. Insulin Monitoring Output

If the glucose level is hyperglycaemia the insulin will be injected automatically by utilizing insulin control unit. This system can help delay or prevent diabetes complications such as heart attack, stroke, kidney diseases. Hypernatremia is the medical term to describe too much sodium in the blood. Sodium is one of the body's electrolytes found mostly in the blood that is important for many bodily functions.

### b. Body salt Detecting Output

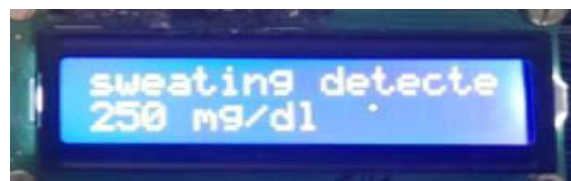


Fig.4. Body salt Detecting Output

### c. Glucose Level Monitoring

Tracking on the level of glucose when it is peak on range insulin can be injected

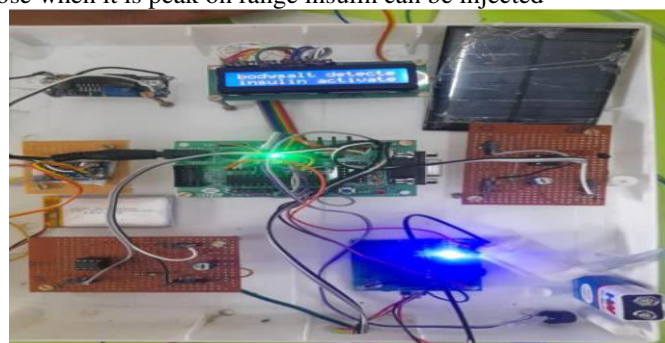


Fig.5.Experimental Setup

## X. CONCLUSION

This project presents the information about the use of automatic glucose monitoring for diabetic patients. So, the patient can track the glucose level continuously and keep up the glucose level.

The continuous monitoring of glycaemia level is used to prevent the complications of diabetes convalescent.

## XI. FUTURE ENHANCEMENT

Diabetes may also directly influence resting heart rate. So, pulse oximeter is used to monitor.

The device that developed is very minute and it is easily wearable for the clients in such a way that it doesn't feel uncomfortable, thus it helps for the continuous monitoring of glucose level in blood.

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