

Glucosense AI:Diabetes Risk Predictor

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Abstract - Diabetes is a problem for our health. Lots of people have it. The numbers are going up. This is because people do not move enough and they eat badly. Also many people do not know they have diabetes for a time. Diabetes is not just bad for you it can also cause heart problems, kidney problems and nerve damage. If we catch it early it makes a difference .The point of GlucoSense AI is that it helps us find out who might get diabetes before it becomes serious. It gives people an easy way to understand their health. To figure out the risk the system looks at some health signs. How many times a woman has been pregnant blood sugar and blood pressure levels skin thickness, insulin levels, body mass index and age.

Glucosense AI is a tool that uses machine learning to help us. It was trained on a set of patient data and it learned to recognize patterns that show diabetes risk. The data is cleaned up. Formatted so the model can understand it.

When we put in our health information the system tells us how likely we are to get diabetes. It puts us into one of four groups. Low moderate, high or critical risk. Then it gives us health advice that's just for us. It makes a report that we can take to the doctor. The system is easy to use, for people who are not good with technology.

This is important because machine learning can really help us with our health with finding diseases early. Glucosense AI helps people stay informed take action early and hopefully reduce the effects of diabetes on their lives.

Key Words: Diabetes Prediction , Machine Learning Neural Network, Healthcare Analytics , Pima Indians Diabetes Dataset, Risk Prediction , Artificial Intelligence , Medical Decision Support System.

1. INTRODUCTION

Diabetes is a health problem that happens when our body has much sugar in the blood. This can happen if our body does not make insulin or if our cells do not use insulin correctly. It is a health problem all around the world. If we find out we have diabetes early we can control it. Reduce the chance of getting other health problems.

Many people do not find out they have diabetes until its too late.The tests doctors use to diagnose diabetes are not

always easy to get.We need systems to check if we are at risk for diabetes because of this.

Machine learning is good at checking health data and finding patterns.These patterns help predict if someone will get diabetes.It's actually pretty good at it.We can use machine learning to look at our health data Then we can see if we have a risk of getting diabetes.It's a way to check our risk, for diabetes.

Machine learning and health data can help us know if diabetes is a risk.

It helps find diabetes risk by looking at health data.We need systems, like this to know our diabetes risk.

This paper talks about an strong way to predict diabetes risk using GlucoSense AI. It lets users put in their health information and get a risk analysis with warnings and advice.

2. LITERATURE SURVEY

There have been studies on using machine learning to predict if someone will get diabetes. Researchers have used kinds of models like logistic regression, decision trees and neural networks. They have used a dataset of people with diabetes to train their models.

The GlucoSense AI system is special because it is simple and easy to use. It not tells you if you are at risk of getting diabetes but it also gives you tips to stay healthy. It even gives you a report that you can take to your doctor.

The system was built using a network model that was trained using the PIMA Indians Diabetes dataset. The model looks at things like pregnancy ,your glucose level, blood pressure, skin thickness, insulin level, BMI and age. It then tells you how likely you are to get diabetes.

Here are the things the GlucoSense AI system looks at to predict if you will get diabetes:

- Pregnancy
- Your glucose level
- Your blood pressure

- Your skin thickness
- Your insulin level
- Your BMI
- Your age

Table 1:Performance comparison of models

Model	Accuracy	Complexity	Features
Logistic regression	Medium	Low	Simple Prediction
Decision Tree	Medium	Medium	Easy to understand
Neural network	High	High	Prediction+advice+report

3. PROPOSED SYSTEM

The GlucoSense AI system has a main parts:

a) Data Collection: we use the PIMA Indians Diabetes Dataset which is available on the Github uploaded by the Jbrownlee and we look at things like how many times a woman has been pregnant ,blood sugar and blood pressure levels,skin thickness, insulin levels, body mass index (BMI) and age.

b)Data Preprocessing: we use a tool to make sure the data is clean and formatted correctly.Handled missing values and applied a StandardScaler for feature scaling.

c) Model Architecture: The model we are using is a neural network and it is for predicting if someone has diabetes. This model looks at 7 things like how much glucose's in your blood, your BMI and how old you are.The first layer of the model has 16 neurons. This is where the model starts to look at the data we give it. It uses something called ReLU activation. The ReLU activation is helpful because it helps the model find the stuff, in the data we put in the model. The model can focus on what matters in the data because of the ReLU activation.

The next layer has 8 neurons. It also uses ReLU so the model can really dig deep and find more things that are important.

The last layer, which is the output layer has 1 neuron and it uses a sigmoid activation function so it gives us a number between 0 and 1. This number tells us if the person is diabetic or not.

d) Prediction Logic: The model takes 7 health inputs like glucose and BMI. It checks if the values are valid (except pregnancy).After that the system tries to figure out if someone's likely to get diabetes. It does this by giving a score between 0 and 1. This score is, like a probability of diabetes. The system uses this score to predict the chance of diabetes. Diabetes is what the system is trying to predict

We can put the results into four groups. Low moderate, high or critical risk. The system also gives us health tips based on our risk level. It makes a report that we can download.

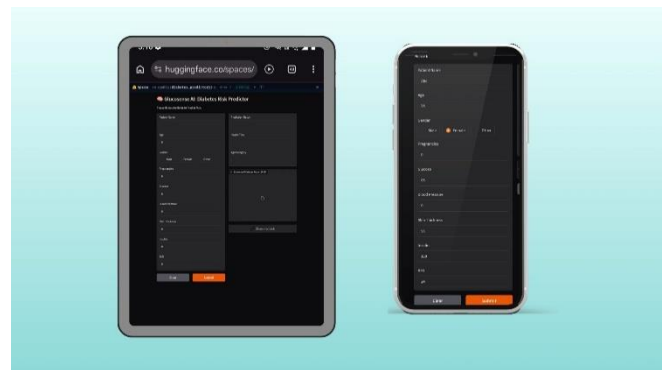


Fig 1: Glucosense AI: Diabetes Risk Predictor System overview

4. ADVANTAGES

- It helps you find out if you are at risk of getting diabetes
- It is quick and easy to use
- It gives you tips to stay healthy
- It gives you a report that you can take to your doctor
- It shows how machine learning can be used in healthcare

5. CONCLUSION

The GlucoSense AI system is a tool for helping people stay healthy. It is simple, easy to use. Gives you the information you need to take care of yourself. In the future we can make it even better by using data and advanced models. We can even use it with devices that can monitor your health in time.

The GlucoSense AI system is an example of how machine learning can be used to help people. It is a tool that can help you understand your health risks and take action to stay healthy. The GlucoSense AI system is a resource, for anyone who wants to stay healthy and avoid getting diabetes

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