Diapatetics

New Mexico

Supercomputing Challenge

Final Report

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Team Id:

073

School Name:

Portales High School

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Project's area of science:

Medicine and Health

Computer language used:

Python

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Summary:

For diabetics, keeping track of their blood sugar levels is a necessity. Keeping track of blood sugar levels helps doctors when they need to look at possible medicines and also when they need check on insulin levels. The problem is that people who have diabetes, don't always keep track of their sugars, thus complicating many people's lives. To make everyone's lives easier, and since diabetics are supposed to check their sugar levels anyways, an app to put in those levels would work nicely.

With most of America owning a smartphone, the app would be very convenient because then keeping track of blood sugar levels would be much simpler. Most people don't go anywhere without their phone. Having it to where diabetics could keep track of their sugar levels on their phones would make it to where when they had to go to the doctor, they would simply pull out their phone and they could show the doctor their blood sugar levels. This would make the discussions easier and also it would make the doctor's job easier cause the patient would know their sugars. The doctor could then prescribe the correct medicines, if the patient needs them.

Many diabetics also forget to check their sugars multiple times a day, which is an important part of regulating blood sugar levels. The app will also send a reminder out to the user, to remind them to check their sugar levels, because if the patient's sugar is too high or too low, a message will come up, telling them to perhaps eat a little bit of something sweet, if their sugar levels are low, and to seek medical attention, if it is too high. This will hopefully encourage people to make sure that they are taking care of themselves.

Introduction:

Many diabetics do not take proper care of their diabetes, which makes not just their lives more difficult, but the job of their doctor hard too. Diabetes is when your body does not produce enough insulin, thus resulting in the lack of absorption of sugar in the body. This results in high blood sugar levels. Checking your sugar levels is an important part of managing your diabetes. Many people who do check their sugars do not record their sugar levels because they don't think they have too, but not checking the sugars means that when they go to the doctor they have to guess what their average is. With 9.3% percent of Americans having diabetes, this is a lot of guessing taking place.

We want to help to make life simpler for everyone who has diabetes, and also the doctors who treat diabetic patients. Our project is a program that will help make the lives of doctors and diabetics easier. The program will record ask the diabetic to check their blood sugar levels, and input the number that they get as a result. With the sugar levels it will make a weekly average. The program will keep track of the numbers that have been put in, and will make it easier for someone to give the information to their doctor.

Since most of America owns a smartphone of some sort, by having the program accessible for them, it will make sharing the information with your doctor. With having all the data available on your smartphone, you can just pull out your phone and show it to your doctor. Then, there is no worry about having to remember the numbers or having to write down the numbers and taking a whole bunch of paper to the doctor's office.

Methods and Materials:

The issue that we are facing is that many people do not record their blood sugar levels. This then causes many hassles involving doctors and also treatments for the diabetics. A patient

should go to the doctor to get their A1C sugar levels checked. This should be done every now and then with your health care professional, if your family has a history of diabetes. If you are overweight or not very active, it is always a good idea to get your sugar levels checked, annually.

If you do have diabetes, you are supposed to check your sugars at least twice a day. This is because you need to keep an eye on your sugar levels. When you check your sugars, you should record your numbers, so that when you go to the doctor, you can simply share the information via the application we are making. The patient-doctor experience would greatly increase, mainly due to the increased ease of access to a patient's medical information. To create our app, we have been utilizing the Python programming language, Python forums, and other internet resources.

HYPOTHESIS SO WE DON'T LOSE IT **(DELETE LATER)**

Our program will greatly benefit both patients and doctors alike, helping keep important medical information organized.

Results:

The following table provides general guidance about diabetic sugar levels.

Target Levels by Type	Upon waking	Before meals (preprandial)	At least 90 minutes after meals (postprandial)
Non-diabetic	N/A	4 to 5.9 mmol/L 72 to 106.2 mg/dl	Under 7.8 mmol/L Under 140.4 mg/dl
Type 2 diabetes	N/A	4 to 7.1 mmol/L 72 to 128 mg/dl	Under 8.5 mmol/L Under 153 mg/dl
Type 1 diabetes	5 to 6.9 mmol/L 90 to 125 mg/dl	4 to 7.1 mmol/L 72 to 128 mg/dl	5 to 6.9 mmol/L 90 to 125 mg/dl
Children w/ type 1 diabetes	4 to 7.1 mmol/L 72 to 128 mg/dl	4 to 7.1 mmol/L 72 to 128 mg/dl	5 to 6.9 mmol/L 90 to 125 mg/dl

The following table lays out the criteria for diabetes and prediabetes.

Plasma Glucose Test	Normal	Prediabetes	Diabetes
Random	Below 11.1 mmol/L Below 199.8 mg/dl	N/A	11.1 mmol/L or more 199.8 mg/dl or more
Fasting	Below 6.1 mmol/L Below 109.8 mg/dl	6.1 to 6.9 mmol/L 109.8 to 124.2 mg/dl	7.0 mmol/L or more 126 mg/dl or more
2 hours postprandial	Below 7.8 mmol/L Below 140.4 mg/dl	7.8 to 11.0 mmol/L 140.4 to 198 mg/dl	11.1 mmol/L or more 199.8 mg/dl or more

Discussion:

The first unit listed in each column, mmol/L, stands for millimoles per litre. This is the form of measurement used in the United Kingdom to measure medicine. The second measurement is mg/dl, which means milligrams per deciliter. This is the most commonly used form of measurement in medicine, in the United States. The reason this information is important is because it gives insight in what the normal levels should be for diabetics and nondiabetics alike. This data supports our hypothesis because it gives data about the levels that a human's blood sugar levels should be. This is important because people need to know if their sugar levels are high or low. This data is the basis for what our program is about.

Conclusions:

Diabetes is a real problem, stretching from the United Kingdom, United States of America, and the entire world. Diabetes is a growing concern, too, and action needs to be taken. With the ever-growing population of people afflicted with diabetes, why not take advantage of the resources most people have in the afflicted areas, and put it on your phone? With the app being available in your smartphone, it will be simple to give the needed information to the doctors. The data will be put into a personal database, and the blood sugar levels will be recorded. This will help make the lives of millions of people much simpler.

Personal Statement:

Acknowledgments:

Mr. Willis:
Thank you for having patience with us and giving us helpful advice along our long journey. Thank you for all your support and for not losing faith in us when the times were rough.