Understanding Diabetes

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Brief history

Diabetes is a disease caused by the presence of an abnormal amount of glucose(sugar) in the bloodstream. It's first discovery is dated far back as 1522 BC in Egypt. Although there were no sophisticated processes or established bodies of knowledge to vividly isolate this disease or its symptoms from others, traditional methods such as tasting a patient's urine and also looking out to see if a patient's urine attracted ants were used to identify patients who were diabetic. In 1800 scientific processes were developed to measure the amount of sugar contained in a blood sample. This was a great feat towards understanding diabetes as a disease.

Diabetes in the 21'st century

According to the World Health Organization(WHO) and diabetes.co.uk, the largest diabetes community in the world today, about 422 million people worldwide have diabetes (with 46% of this population undiagnosed, most diabetic patients do not know they are diabetic until long term damages show signs), this population occupies about 9% of the world's adult population. The World Health Organization also states that diabetes is one of the leading causes of death in the world as Type 1 diabetes often leads to other chronic diseases such heart diseases, kidney diseases and blindness.

With the decline in healthy feeding culture in the 21st century and its impact especially on children, diabetes poses to be a major concern for the future. According to the Immune Deficiency Foundation (IDF) diabetes atlas, the population of diabetic patients is expected to increase by a factor of about 1.52 to 642 million people by 2040. The World Health Organization in April, 2020 also reported that worldwide obesity had tripled since 1975, with 340 million children and adolescents between the age of 5-19, and 38 million children under the age of 5 being either overweight or obese as at 2016.

Way forward

Although diabetes remains a disease with no known cure, precautionary methods have been found to reduce the possibilities of extremities. Being an asymptomatic disease (i.e. shows no symptoms in the early stage), a helpful tact will be the ability to predict personalized risk levels of being diabetic in the future so as to sensitize people with high risk levels to precautionary methods to reduce their risk levels. This can be done using supervised machine learning models.

An analogy of supervised machine learning models.

Supervised machine learning models work like training a child to identify different fruits, firstly we give the child samples of fruits (e.g. oranges, apples) with labels/name attached to them and after, test the child's ability to name the different but similar fruits (another orange or apple) without their labels provided, how the child performs in naming unlabeled fruits is the overall test of how much the child has learnt to correctly identify fruits. The child's brain is able to identify the different fruits by attaching colors, sizes and other measurements to different fruits. Given measurements of some patients' health data such as blood pressure, insulin level, body mass index, etc. with labels provided to differentiate diabetic patients from non-diabetic patients, supervised machine learning models build mathematical and logical equations around the patients' data to be able to predict if a new patient will be diabetic or not provided we have measurements of the new patient's health data. Also, unlike the human brain, the use of mathematical equations allows machine learning models to provide calculated probabilities of being diabetic or not.

Finally, to be able to improve healthcare services through supervised machine learning models, data collection and storage in the health industry has to be improved, especially in developing nations where a large percentage of the population do not have access to wearable devices that collect and store patient's data in real-time.