

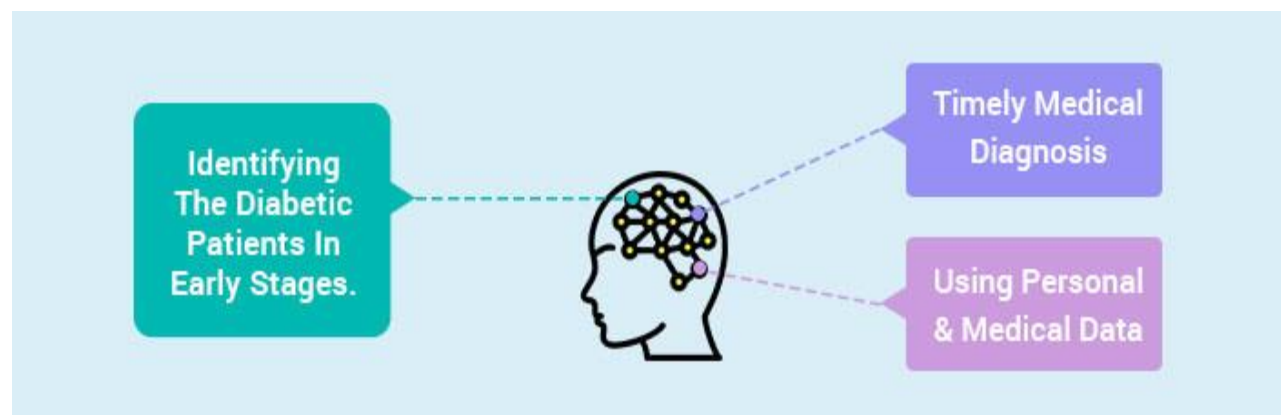
AI-BASED DIABETES PREDICTION SYSTEM

Over 25 million people or around 8.3% of the entire United States population suffers from diabetes.

Diabetes is also linked with a broad range of complexities from heart disease and stroke to blindness and kidney disease.

Many people with diabetes are diagnosed late and develop Type 2 diabetes.

Predicting patients with diabetes is necessary to have a better understanding of these complications that people with diabetes suffer.



With the rise of Artificial Intelligence-based approaches, we can find a solution to this issue. The core challenge is to develop an advanced software system using AI which can predict

whether the patient has diabetes or not. The AI can extract hidden knowledge from a vast amount of diabetes-related data and help identify the diabetes patients in early stages.

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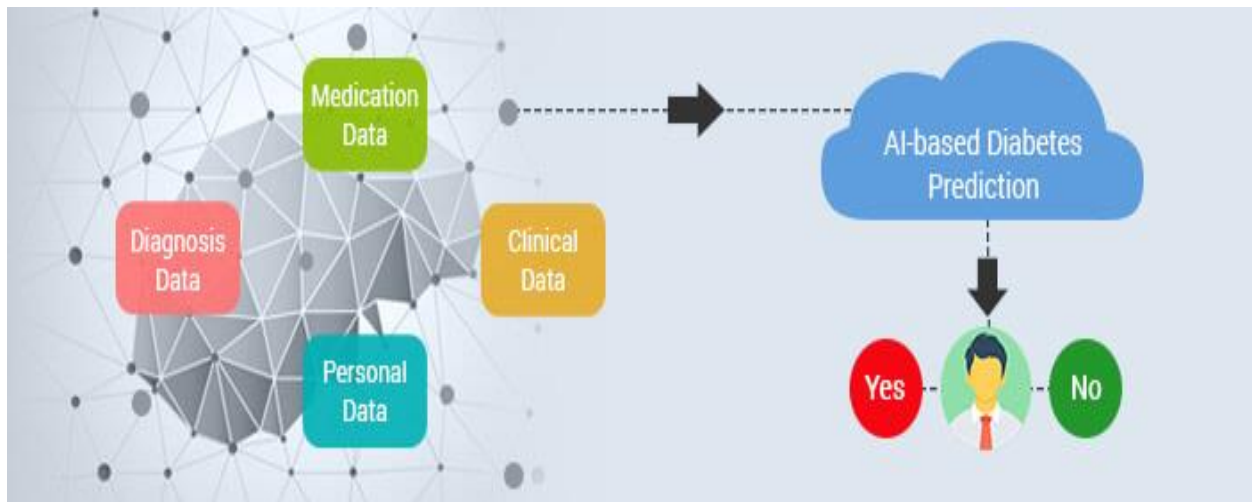
Analysis

DEFINING THE SOLID ROADMAP

The goal was to create a proprietary AI-based platform that predicts an individual's risk for developing Metabolic Syndrome related diseases such as diabetes.

The system was based on personal, medical, diagnosis and medication data collected by a patient.

After brainstorming with the client, OSP proposed a comprehensive system which will be handled by the healthcare providers to collect, note, and store this data to help predict the pattern.





OSP engineered a brilliant system architecture to view all the required datasets with their current status easily. Our finalized conceptual system design included in-depth AI architecture diagrams, report layouts, and the screen designs. We have created an intelligent roadmap to leverage the random forest algorithm consisting of 2000 trees on the diabetes datasets.

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Solution

DELIVERING ON THE PROMISE

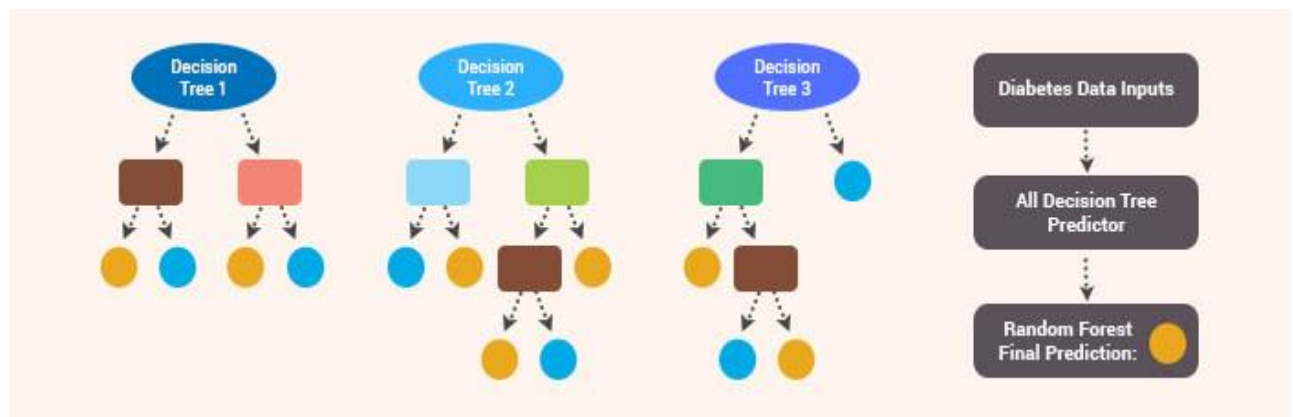
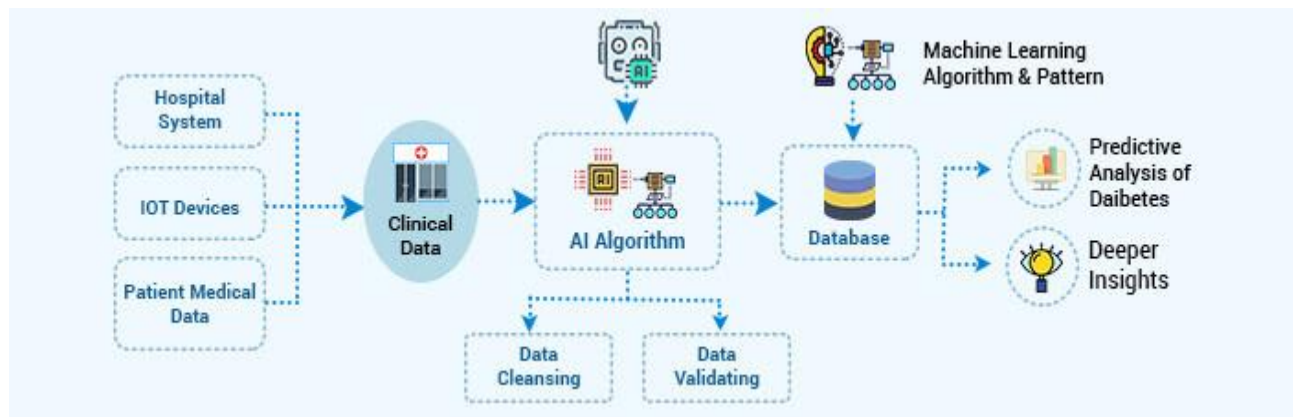
Data collection and storage was the crucial part of this system to work. We simplified the data sets into four major components.

Personal data include age, pregnancies and weight, whereas the lab data consists of the body measurements and data gathered from a few basic medical tests.

The lab data as per the dataset text included the patient's BMI, blood pressure, glucose level, insulin level, skin thickness. We used the median of the collected data.

Providers can add the diagnostic description with automated ICD-9 coding for every patient using an advanced dashboard.

Data Collection link: <https://www.kaggle.com/datasets/mathchi/diabetes-data-set>



The system also included the prescribed medication for each patient for their respective diagnosis. The EMR data with complete historical data of patients were applied with random forest algorithm and log loss metric to derive the approximate possibility of a patient suffering from diabetes or not. The AI-based predictive analytics solution has the potential to identify the patients that are currently suffering from Diabetes Mellitus.

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Result

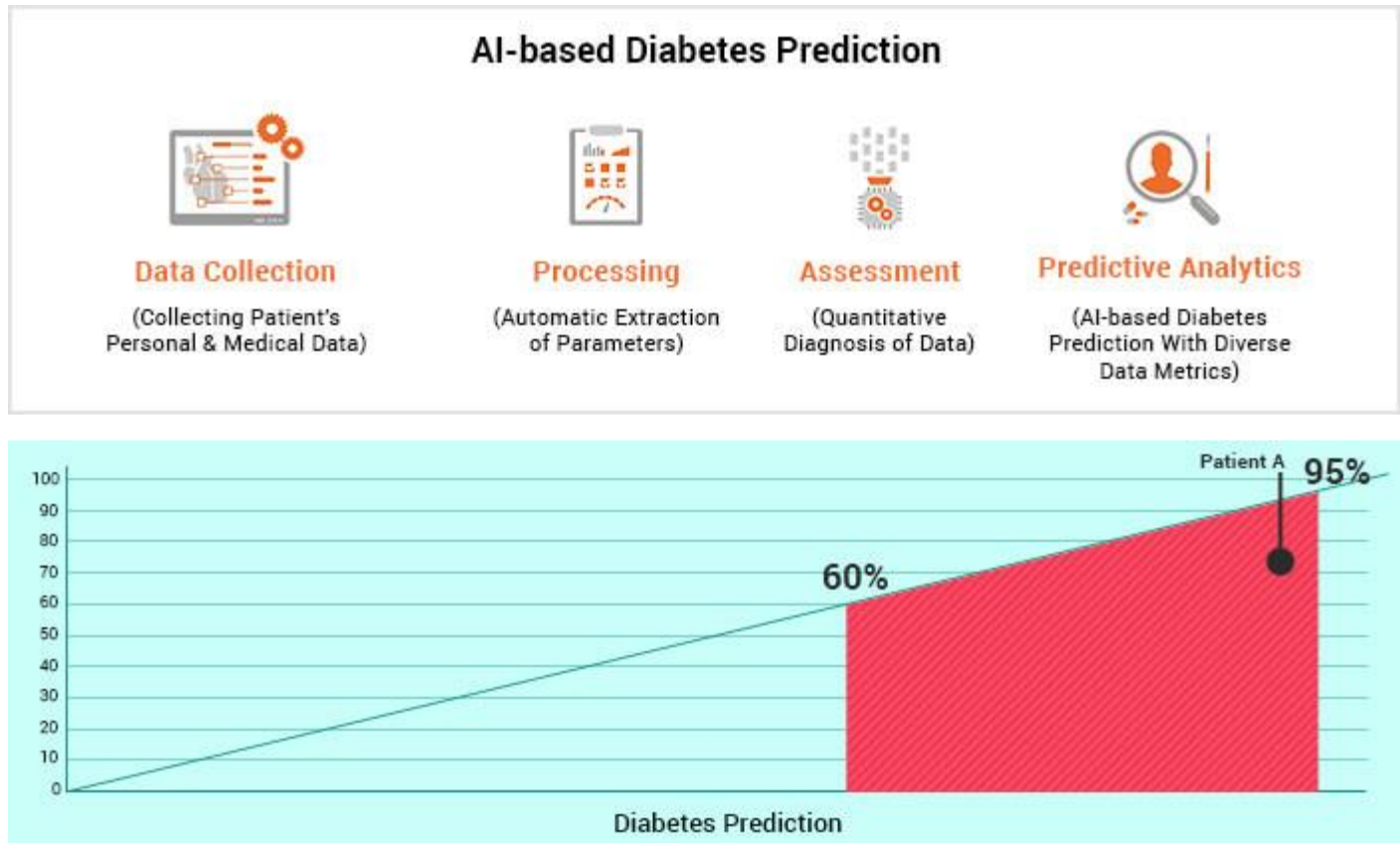
BUILDING TO DELIVER EXPERIENCES

This AI-based predictive analytics offers risk stratification that is critical for early intervention and cost-effective resource allocation by healthcare providers and payers.

The system enables to focus on people at highest risk for chronic conditions like Diabetes.

People with 95%+ accuracy are already suffering with the Diabetes, whereas the people with 60% accuracy may have a chance to get diabetes in near future.

The randomness in building the random forest algorithm helps to consider many likely explanations, where it can capture a much broader picture of the data than a single tree with autoscaling feature.



The AI-driven diabetes predictive analytics uses electronic medical record data to enhance public health by predicting the patients suffering from diabetes from a dataset of de-identified medical records. We have proved that the AI-based MVP has the potential to transform the diabetes risk prediction using advanced computational methods and algorithms. The random forest gives us a better accuracy than the logistic regression model or a single decision tree, without tuning any parameters. OSP simplified the most challenging task of identifying the patients with diabetes that were going unnoticed and help clinicians to make a better decision about the disease status.