d alchemy

Identify diseases in the body before they manifest using Data Analytics

dAlchemy's predictive analytics engine combs through your patient report data to create a solution that helps to gain insights into the risk profile of patients, driving improvements in patient care.

We strive to help doctors and the healthcare indusrtry to deliver better patient care with the use of Predictive Modeling in Data Analytics
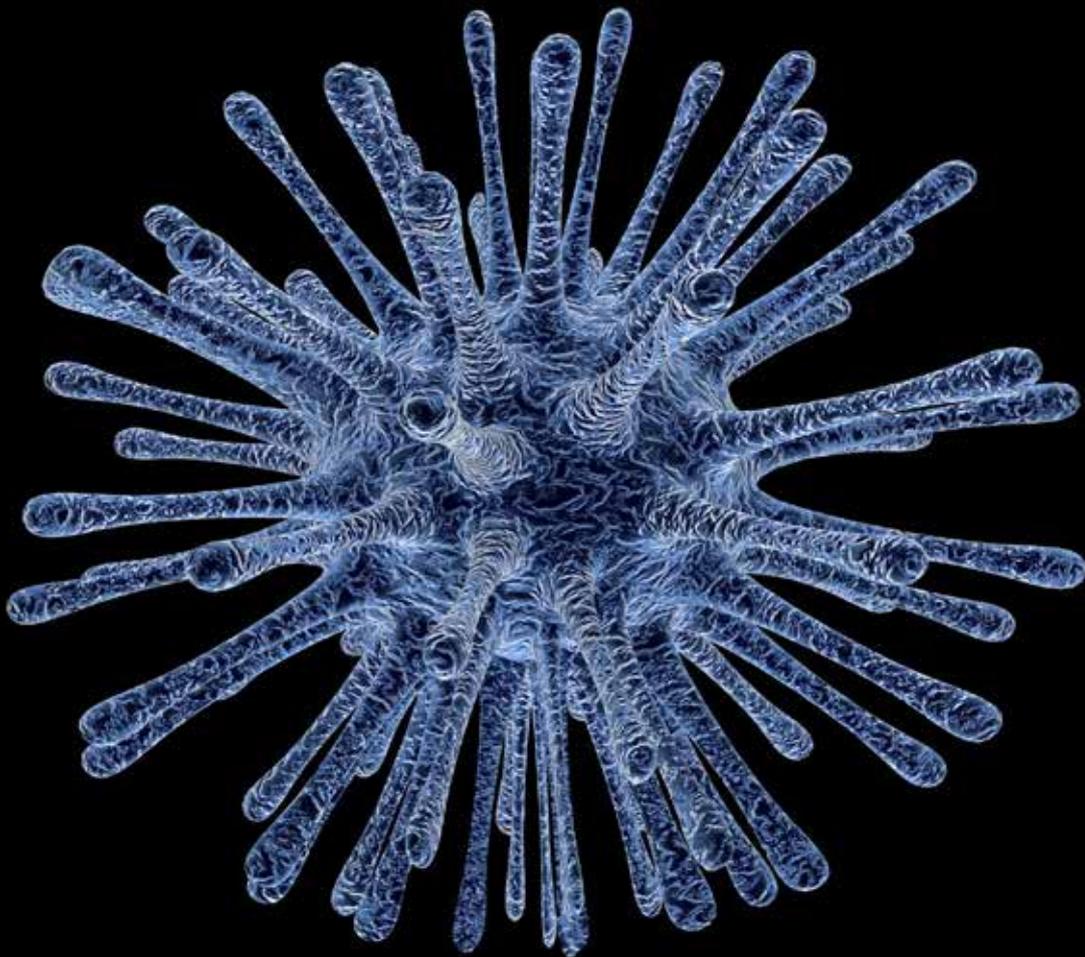
Healthcare organizations are now leveraging analytics and big data to drive improvements in patient care and generate a wealth of actionable information. However, the variety of available data in the healthcare space – both structured and unstructured, makes analysis of healthcare data quite challenging.

ABOUT THE CLIENT

dAlchemy's client is a one-of-a-kind world-class Yoga university based in Bengaluru which has a mission to combine the best of the East (Yoga and Spiritual lore) with that of the West (modern scientific research). The university promotes yoga research as well as yoga therapy. It has been substantiating scientific validation through Research and has successfully published more than 200 research papers.

The client tapped dAlchemy for its big data health initiative, with the aim to gain insights into the risk profile of patients for various diseases.

THE CHALLENGE

Diabetes mellitus is a chronic, lifelong condition in which it is seen that the sugar levels in the blood are high and the body is unable to use the energy found in food. India has one of the highest populations of diabetics in the world.

The challenge for the client was to analyse diabetes risk for patients based on their life style – the analysis had to be done region wise as well as age wise. The information gleaned could be used to find out if populations of a particular area or region are more prone to diabetes.

The client needed this data for its research since it has been found that appropriate lifestyle intervention can prevent or delay the onset of type 2 diabetes if individuals at risk are identified and treated early. Thus, complications arising due to diabetes like cataract and vision problems can be prevented.

This big data health initiative involved collecting external data required for the analysis - which was taken from India Diabetic survey. For such initiatives, the quality of the data collected has to be very good – this helps in more accurate predictions and better preventative treatment.
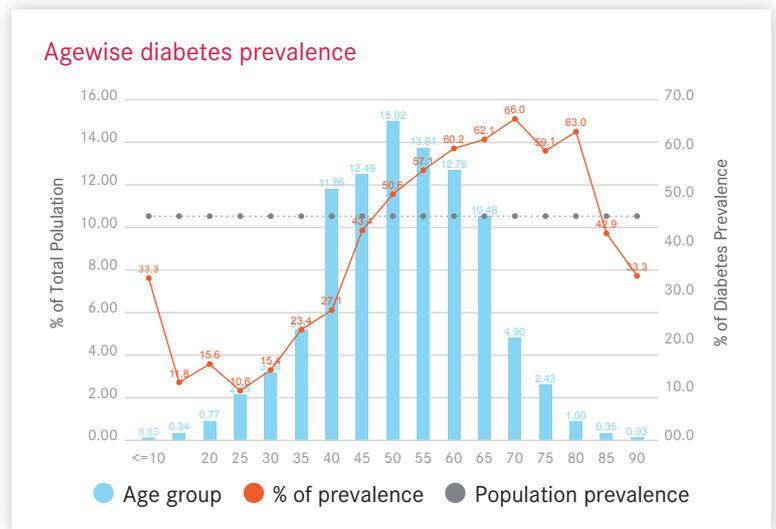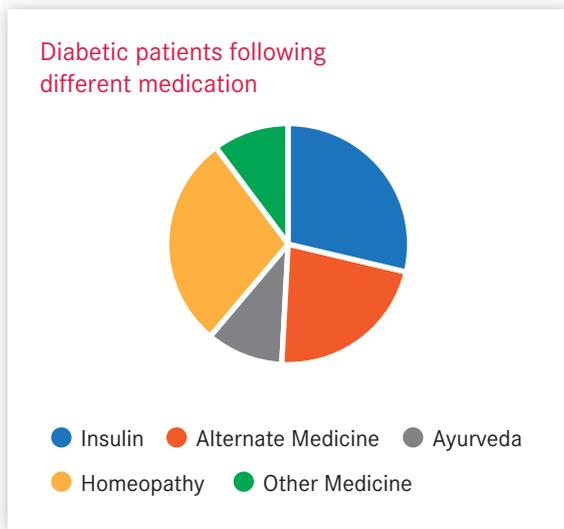
THE SOLUTION

Before starting the analysis, dAlchemy needed to trim, clean and scrub the available data to improve its quality and prepare it for reporting. A **descriptive analysis** for patients was done - several factors were assessed to predict a patient's risk of getting diabetes – some of these like total tryglycerides, family history of high blood sugar, waist measurement and waistto- hip ratio were considered to have a higher correlation with diabetes. Based on the demographic data, food behaviour and consumption, medicines currently consumed, lifestyle habits, previous lab reports and previous diseases, there were trends and patterns that analytics could catch to predict a patient's probability of turning diabetic.

Segmentation was done to figure out which segments or areas were at highest risk. This helps doctors create targeted prevention programmes and give suggestions to reduce the risk level for a particular segment. They could judge whether patients would benefit most from drug treatment or preventive lifestyle strategies such as regular exercise, reduction in smoking or weight loss.

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Diabetic patients following different medication

- Insulin
- Alternate Medicine
- Ayurveda
- Homeopathy
- Other Medicine

Agewise diabetes prevalence

- Age group
- % of prevalence
- Population prevalence

THE BENEFITS

This health initiative by the client helped to turn large amounts of data into actionable information that could benefit the society. The quality of healthcare delivery was improved since doctors could take better-informed decisions. Advanced analytics was applied to patient profiles and individuals were identified who would benefit from preventative care or lifestyle changes. Patients could more effectively manage their own health and adopt healthier habits and behaviours.

The approach for this health initiative is broadly applicable, and can help to develop precise prediction models for other diseases and their treatments.

THE PROCESS

dAlchemy followed the CRoss-Industry Standard Process for Data Mining (CRISP-DM) Methodology (refer page 3 for the diagram) for carrying out this project. The CRISP-DM methodology is based on the practical, real-world experience of how people conduct data mining projects and it is described in terms of a hierarchical process model, consisting of sets of tasks described at four levels of abstraction (from general to specific): phase, generic task, specialized task, and process instance.

The following figure shows the six phases of the CRISP-DM reference model. Moving back and forth between the different phases is always required. The outcome of each phase determines which phase, or particular task of a phase, has to be performed next. The arrows indicate the most important and frequent dependencies between phases.

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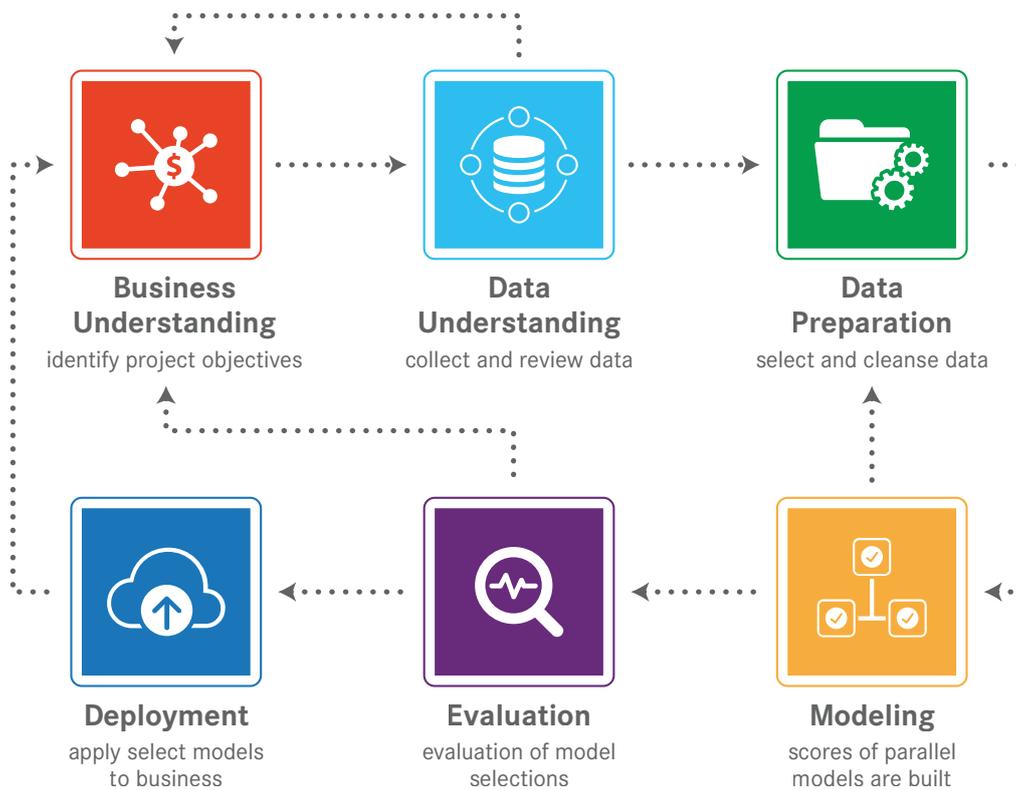
Figure: The phases of the CRISP-DM reference model

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