BUSINESS INTELLIGENCE PROJECT

VIT®

Vellore Institute of Technology

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TOPIC

BUSINESS INTELLIGENCE ON HEART DISEASE ANALYSIS

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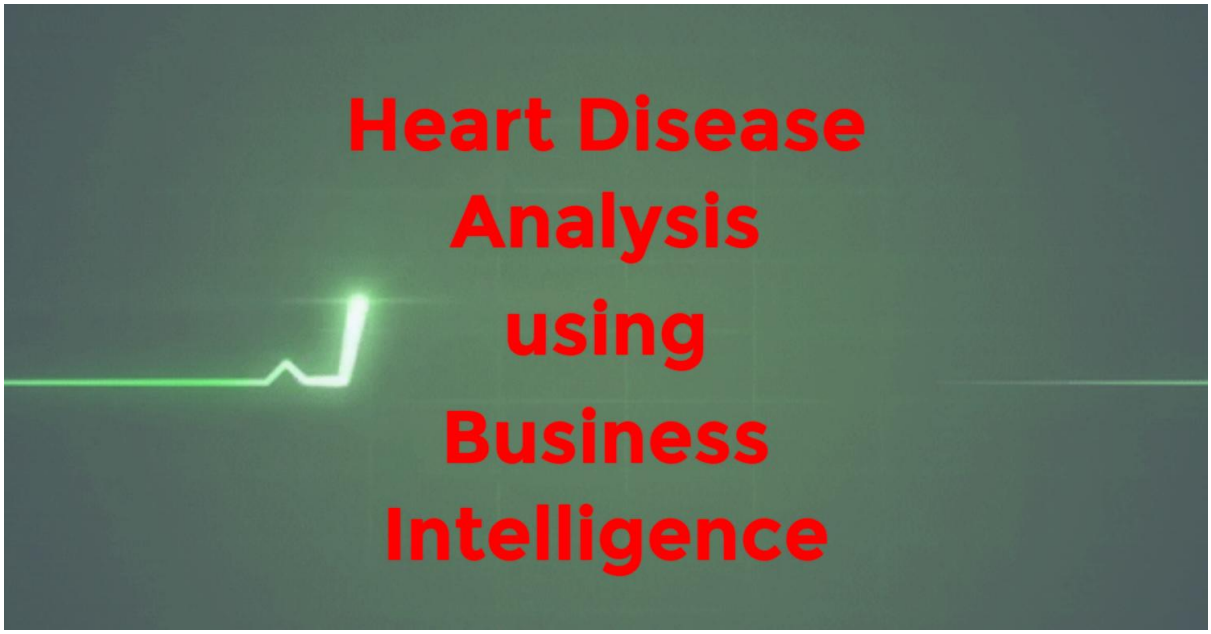

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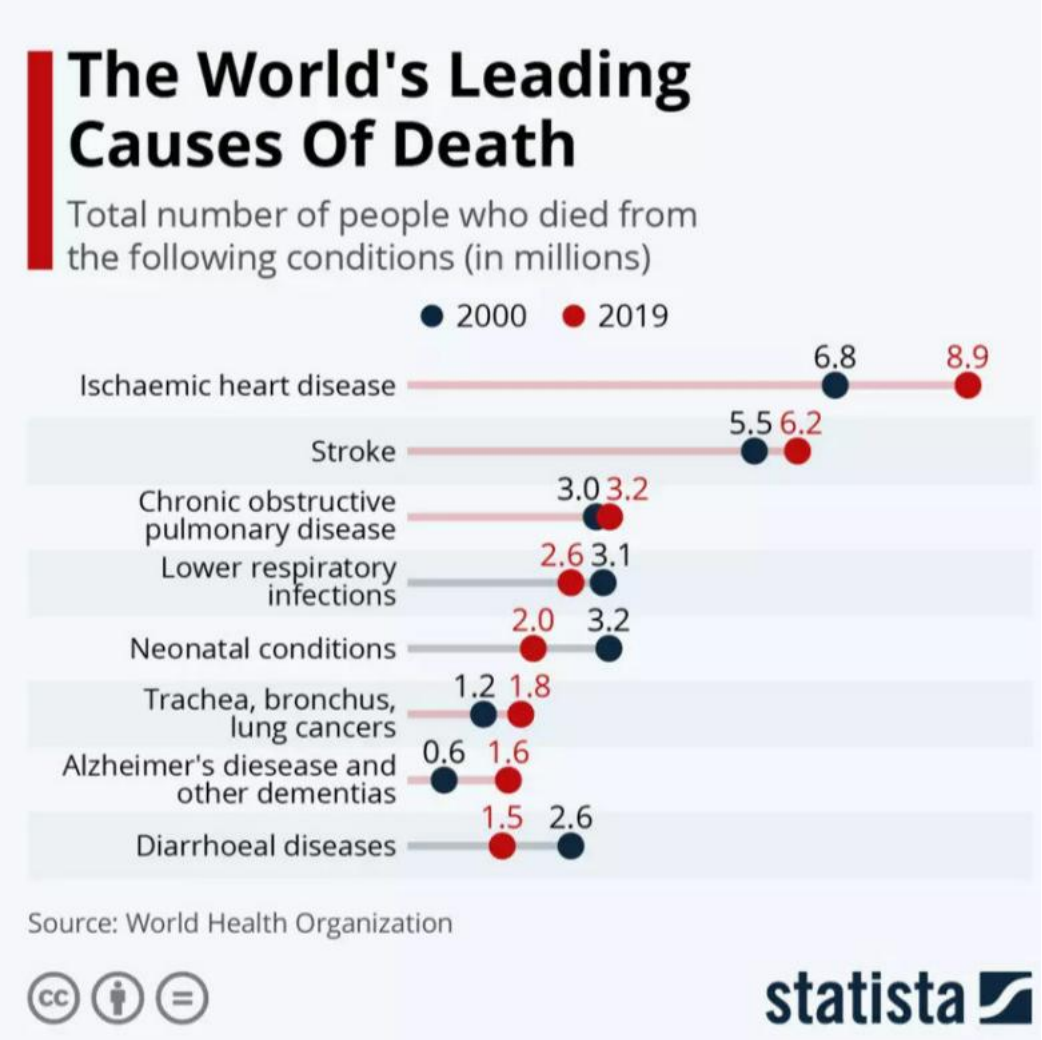
INTRODUCTION

Business Intelligence in healthcare industry is paving the way for remote healthcare and offer benefits of improved patient safety and management to reduced costs, and increased revenue to better visibility into financial operations. From monitoring cash flows to remaining compliant,the healthcare industry is moving into the data-driven world. And while, it's only the beginning, BI is no longer an option for healthcare. It's a necessity.



ABSTRACT

One of the leading causes of death for both men and women is Heart disease.Here in this paper we use different machine learning techinques to predict the heart disease and Apply BI tools to represent the data on the collected.

Heart disease is one of the most significant causes of mortality in the world today. Prediction of cardiovascular disease is a critical challenge in the area of clinical data analysis. Machine learning (ML) has been shown to be effective in assisting in making decisions and predictions from the large quantity of data produced by the healthcare industry. We have also seen ML techniques being used in recent developments in different areas of the Internet of Things (IoT). Various studies give only a glimpse into predicting heart disease with ML techniques.

In this paper, we propose a novel method that aims at finding significant features by applying machine learning techniques resulting in improving the accuracy in the prediction of cardiovascular disease.

The prediction model is introduced with different combinations of features and several known classification techniques. We produce an enhanced performance level with an accuracy level of 88.7% through the prediction model for heart disease with the hybrid random forest with a linear model.

LITERATURE SURVEY

PAPER-1

JOURNAL NAME	JOURNAL DETAILS	FINDINGS
Effective Heart Disease Prediction Using Hybrid Machine Learning Techniques	Published year: 2019 Published by: Mr. Senthilkumar mohan Mr. Chandrasekar Tirumalai Mr. Gautam srivastava	1.Heart disease is one of the most significant causes of mortality in the world today. 2.Prediction of cardiovascular disease is a critical challenge in the area of clinical data analysis. 3.Machine learning (ML) has been shown to effective in assisting in making decisions and predictions from the large quantity of data produced by the healthcare. industry. 4.A novel method that aims at finding significant features by applying machine learning techniques resulting in improving the

		accuracy in the prediction of cardiovascular disease. 5.The prediction model is introduced with different combinations of features and several known classification techniques. 6.In this paper used a hybrid random forest with a linear model (HRFLM) as prediction model for predicting the heart disease and it gave accuracy level of 88.7%.

PAPER-2

JOURNAL NAME	JOURNAL DETAILS	FINDINGS
A Healthcare Monitoring System for the Diagnosis of Heart Disease in the IoMT Cloud Environment Using MSSO-ANFIS	Published year: 2020 Published by: Mr. Mohammed Ayoub Khan Mr. Fahad Algarni	1.Wearable devices have become popular with wide applications in the health monitoring system which has stimulated the growth of IoMT. 2.The IoMT has an important role to play in reducing themortality rate by the early detection of disease. 3.To improve accuracy, an IoMT framework for the diagnosis of heart disease using modified salp swarm optimization (MSSO) and an adaptive neuro-fuzzy inference system (ANFIS) is proposed. The proposed model improves the search capability using the Levy flight algorithm.

		4.The heart condition is identified by classifying the received sensor data using MSSO-ANFIS. A simulation and analysis is conducted to show that MSSA-ANFIS works well in relation to disease prediction. 5.The proposed MSSO-ANFIS prediction model obtains an accuracy of 99.45 with a precision of 96.54, which is higher than the other approaches.

PAPER-3

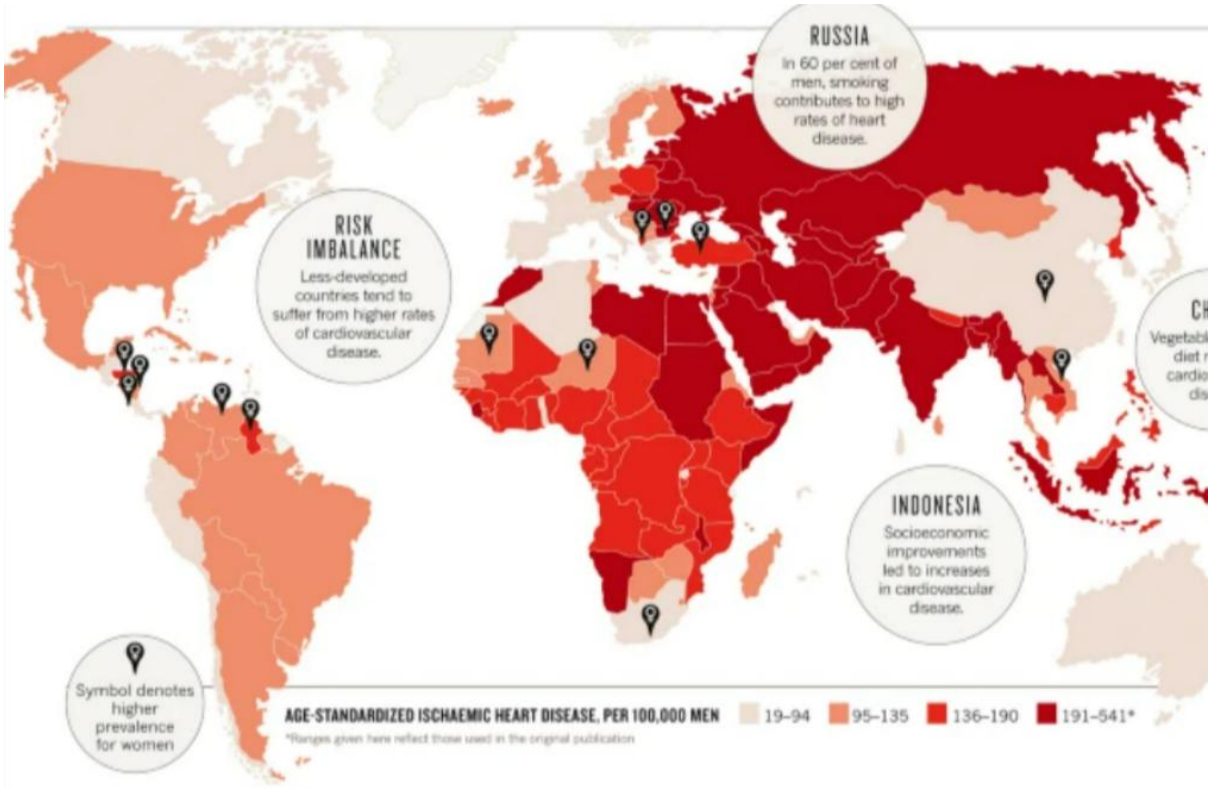
JOURNAL NAME	JOURNAL DETAILS	FINDINGS
Business Intelligence for Cardiovascular Disease Assessment	Published year: 2017 Published by: Mr. Cristiana Silva Mr. Joana Pereira Mr. Luís Costa Mr. Hugo Peixoto Mr. José Machado	1.The health care industry has historicaly generated large amounts of data for various reasons, from simple record keeping to improving patient care. 2.This paper primarily consists in the development of a Data Warehouse in order to transform the abudant and heterogeneous clinical data in a single multidimensional structure capable of responding promptly to the information consulting needs with no redundancy. 3.The main Aim of the project is the construction indicators using data

		visualization Bi tools through Power BI. 4. With the help of indicators it was made an analysis of multidimensional data interactively from multiple perspectives and a comparsion between that data and statistics obtained from studies.

PAPER-4

JOURNAL NAME	JOURNAL DETAILS	FINDINGS
Hypertension Is a Risk Factor for Several Types of Heart Disease.	Published year: 2017 Published by: National Centre of Biotechnological lnformation	1. Many prospective cohort studies have demonstrated that hypertension is a strong risk factor for cardiovascular disease (CVD). 2. Heart disease includes coronary heart disease (CHD), heart failure, atrial fibrillation, valvular disease, sudden cardiac death (SCD), sick sinus syndrome (SSS), cardiomyopathy, and aortic aneurysms. 3. Most of the epidemiologic prospective studies of heart disease focused on coronary/ischemic heart disease. Here we comprehensively reviewed the association between

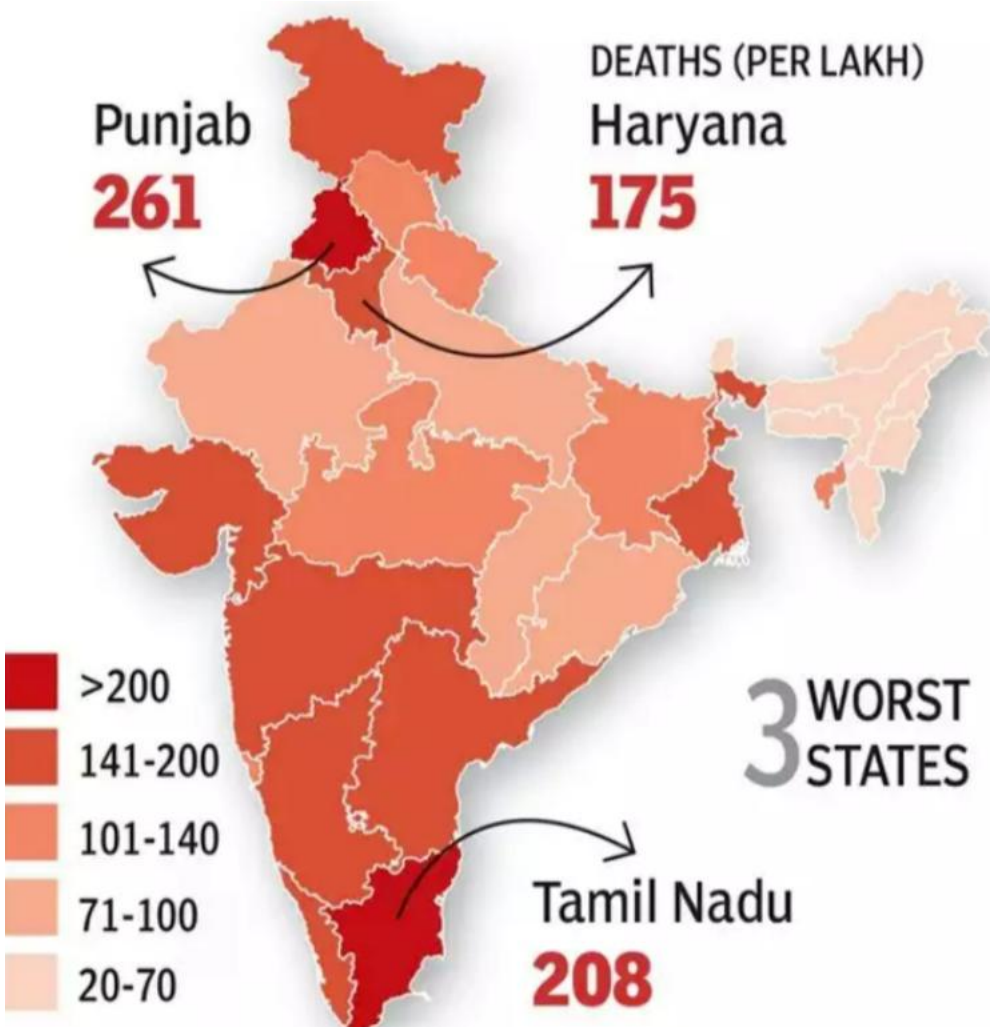
		hypertension and the above-mentioned heart diseases. 4. It found that CHD, heart failure, atrial fibrillation, aortic valvular disease, SCD, SSS, left ventricular hypertrophy, and abdominal aortic aneurysms were all associated with hypertension. 5. Those relations tended to be stronger in men.The prevention of hypertension and lowering one's blood pressure may help reduce the risk of developing heart disease.


RUSSIA
In 60 per cent of men, smoking contributes to high rates of heart disease.
RISK IMBALANCE
Less-developed countries tend to suffer from higher rates of cardiovascular disease.
INDONESIA
Socioeconomic improvements led to increases in cardiovascular disease.
Symbol denotes higher prevalence for women
AGE-STANDARDIZED ISCHAEMIC HEART DISEASE, PER 100,000 MEN
19–94
95–135
136–190
191–541*
*Ranges given here reflect those used in the original publication

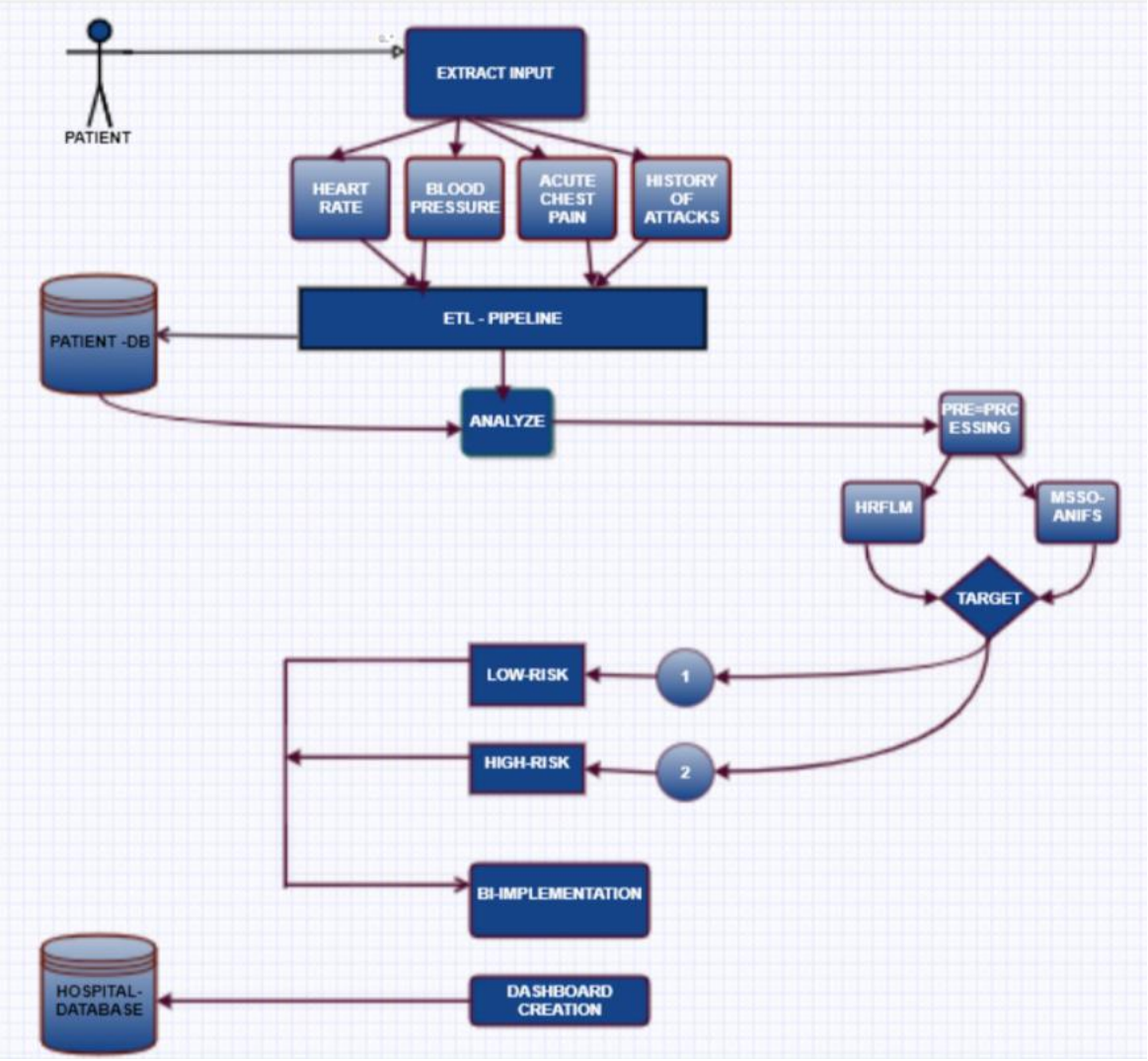
PAPER-5

JOURNAL NAME	JOURNAL DETAILS	FINDINGS
Extreme exercise vs. no exercise at all	Published year: 2021 Published by: CNN	1. Research found evidence that high intensity exercise can acutely increase the risk for sudden cardiac arrest or sudden cardiac death in individuals with underlying cardiac disease. 2. The vast majority of these deaths occur on the athletic field during severe exertion in the context of training or competition 3. Less common causes are a variety of congenital coronary artery anomalies, myocarditis, dilated cardiomyopathy, Marfan's syndrome, and right ventricular dysplasia (in one series). 4. Uncommon but reported causes of

		these athletic field catastrophies include sarcoid, mitral valve prolapse, aortic valve stenosis, atherosclerotic coronary artery disease, and QT-interval prolongation syndrome



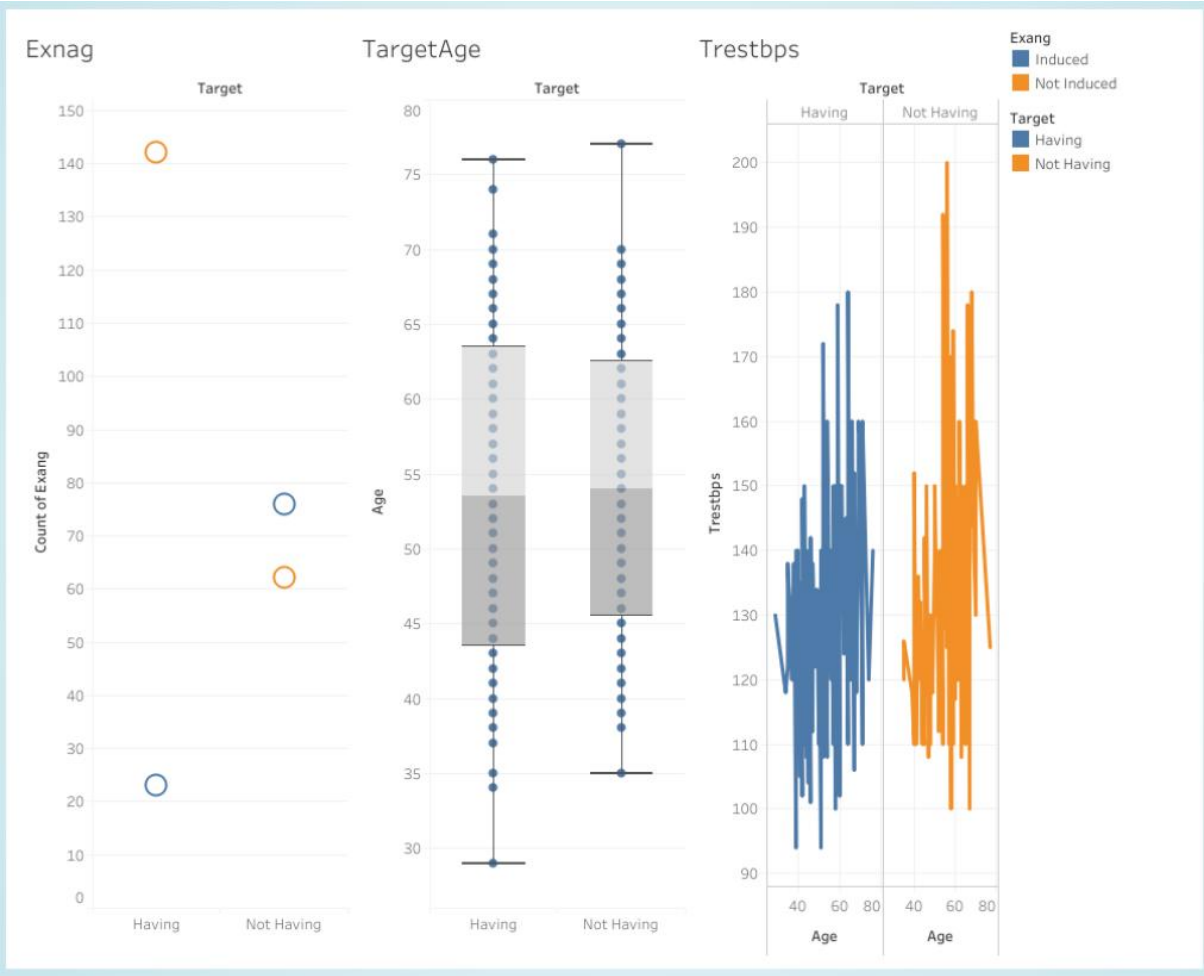
TECHNICAL ARCHITECTURE

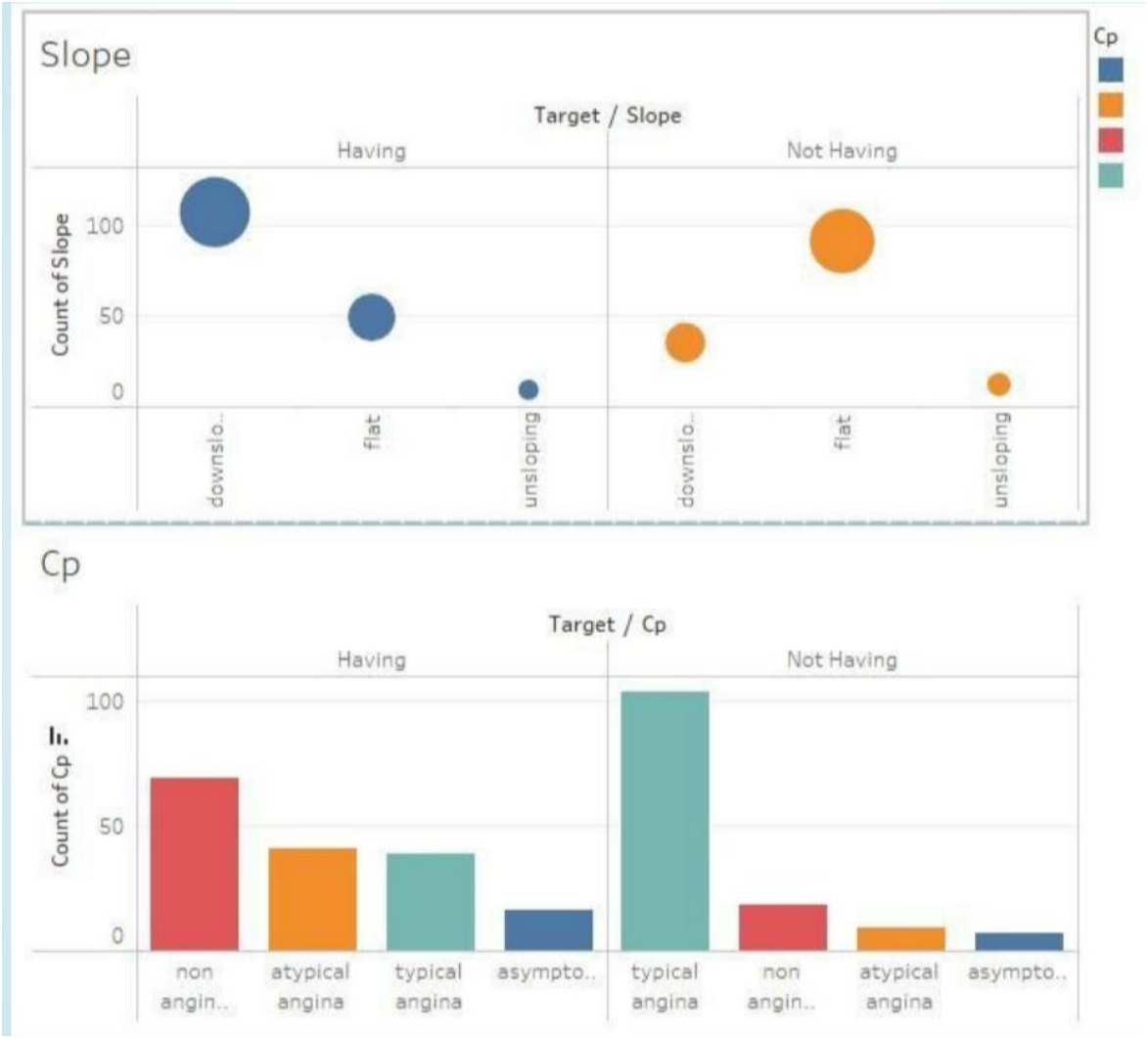


DATASET DETAILS

Attribute	Description	Type
Age	Patient's age in completed years	Numeric
Sex	Patient's Gender (male represented as1 and female as 0)	Nominal
Cp	The type of Chest pain categorized into 4 values: 1. typical angina, 2. atypical angina, 3. non-anginal pain and 4. asymptomatic	Nominal
Trestbps	Level of blood pressure at resting mode (in mm/Hg at the time of admitting in the hospital)	Numeric
Chol	Serum cholesterol in mg/dl	Numeric
FBS	Blood sugar levels on fasting > 120 mg/dl; represented as 1 in case of true, and 0 in case of false	Nominal
Resting	Results of electrocardiogram while at rest are represented in 3 distinct values: Normal state is represented as Value 0, Abnormality in ST-T wave as Value 1, (which may include inversions of T-wave and/or depression or elevation of ST of > 0.05 mV) and any probability or certainty of LV hypertrophy by Estes' criteria as Value 2	Nominal
Thali	The accomplishment of the maximum rate of heart	Numeric
Exang	Angina induced by exercise. (0 depicting 'no' and 1 depicting 'yes')	Nominal
Oldpeak	Exercise-induced ST depression in comparison with the state of rest	Numeric
Slope	ST segment measured in terms of the slope during peak exercise depicted in three values: 1. unsloping, 2. flat and 3. downsloping	Nominal
Ca	Fluoroscopy coloured major vessels numbered from 0 to 3	Numeric
Thal	Status of the heart illustrated through three distinctly numbered values. Normal numbered as 3, fixed defect as 6 and reversible defect as 7.	Nominal
Num	Heart disease diagnosis represented in 5 values, with 0 indicating total absence and 1 to 4 representing the presence in different degrees.	Nominal

BI IMPLEMENTATION




Slope
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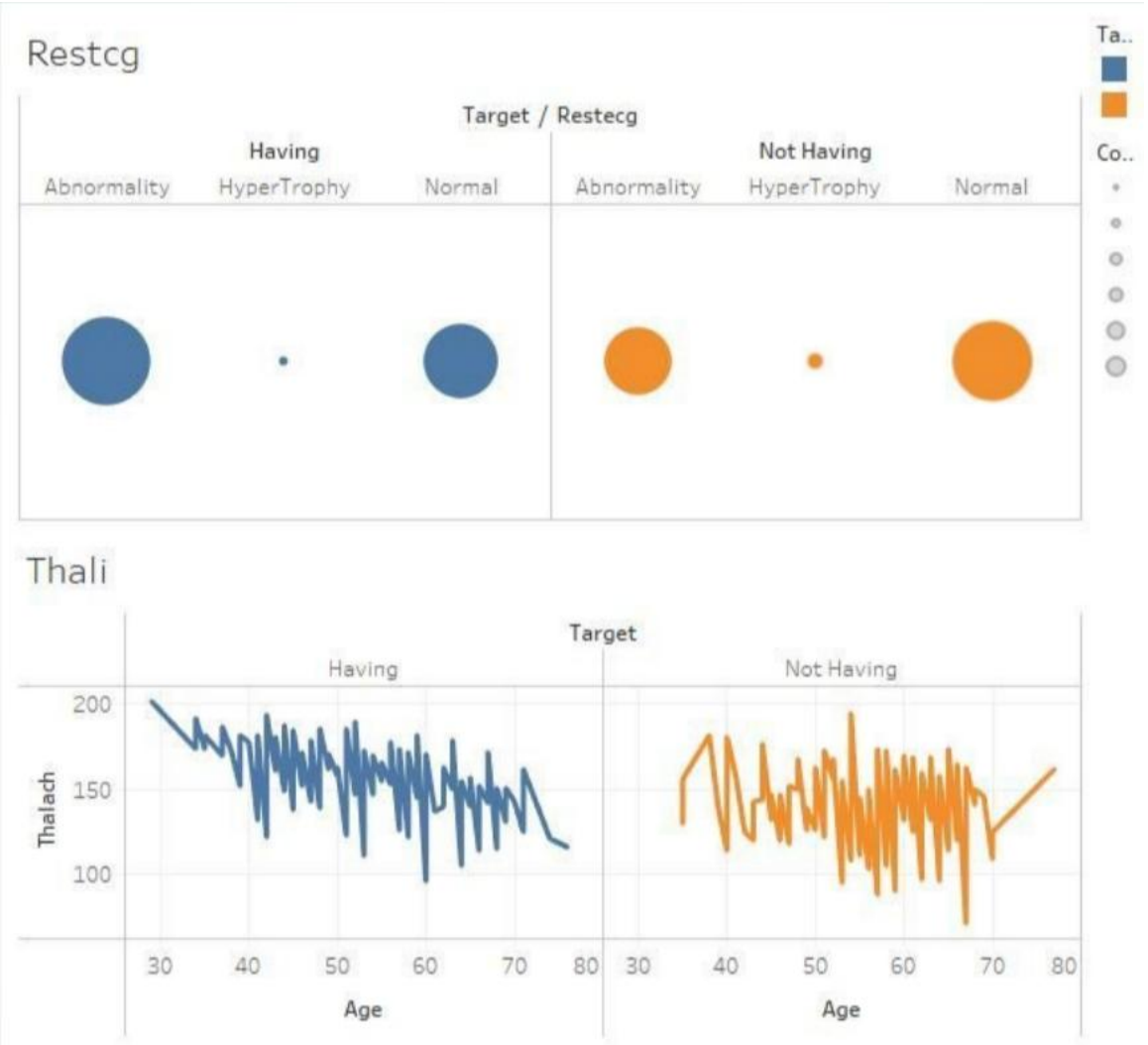
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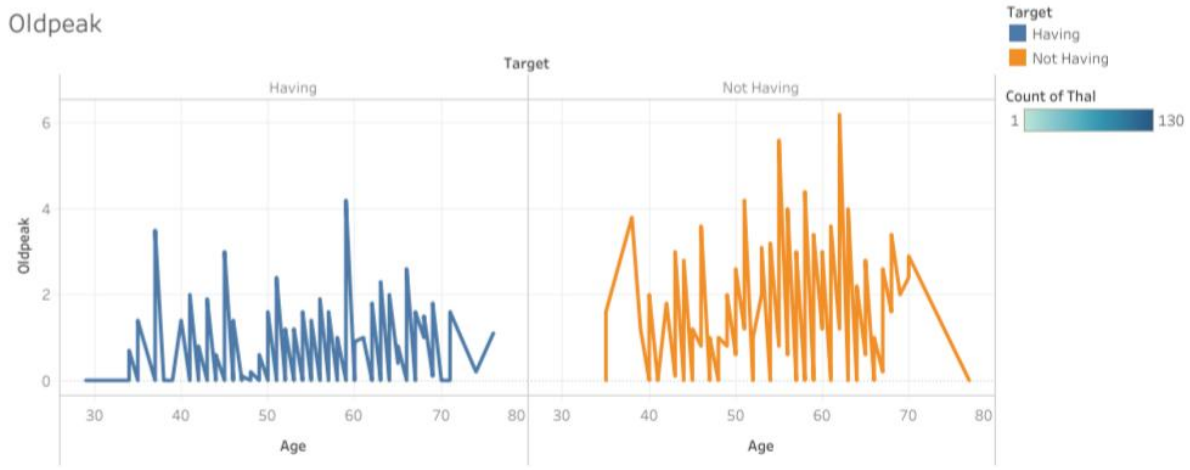
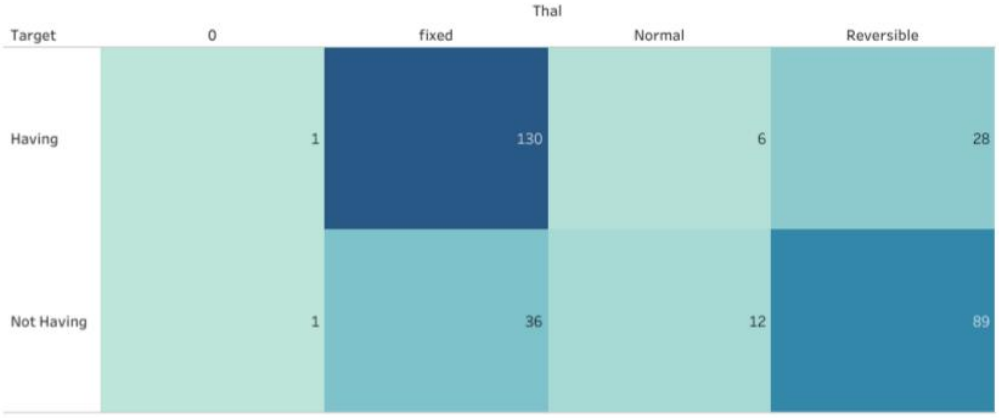
Age

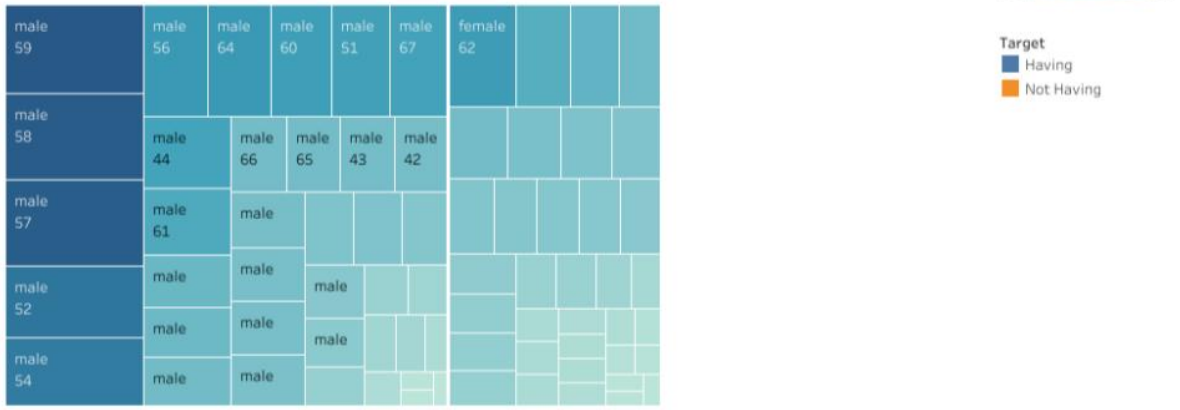
Oldpeak



Thal



SexAge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Age

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PPT LINK

https://slides.com/d/r1UpAVQ/live