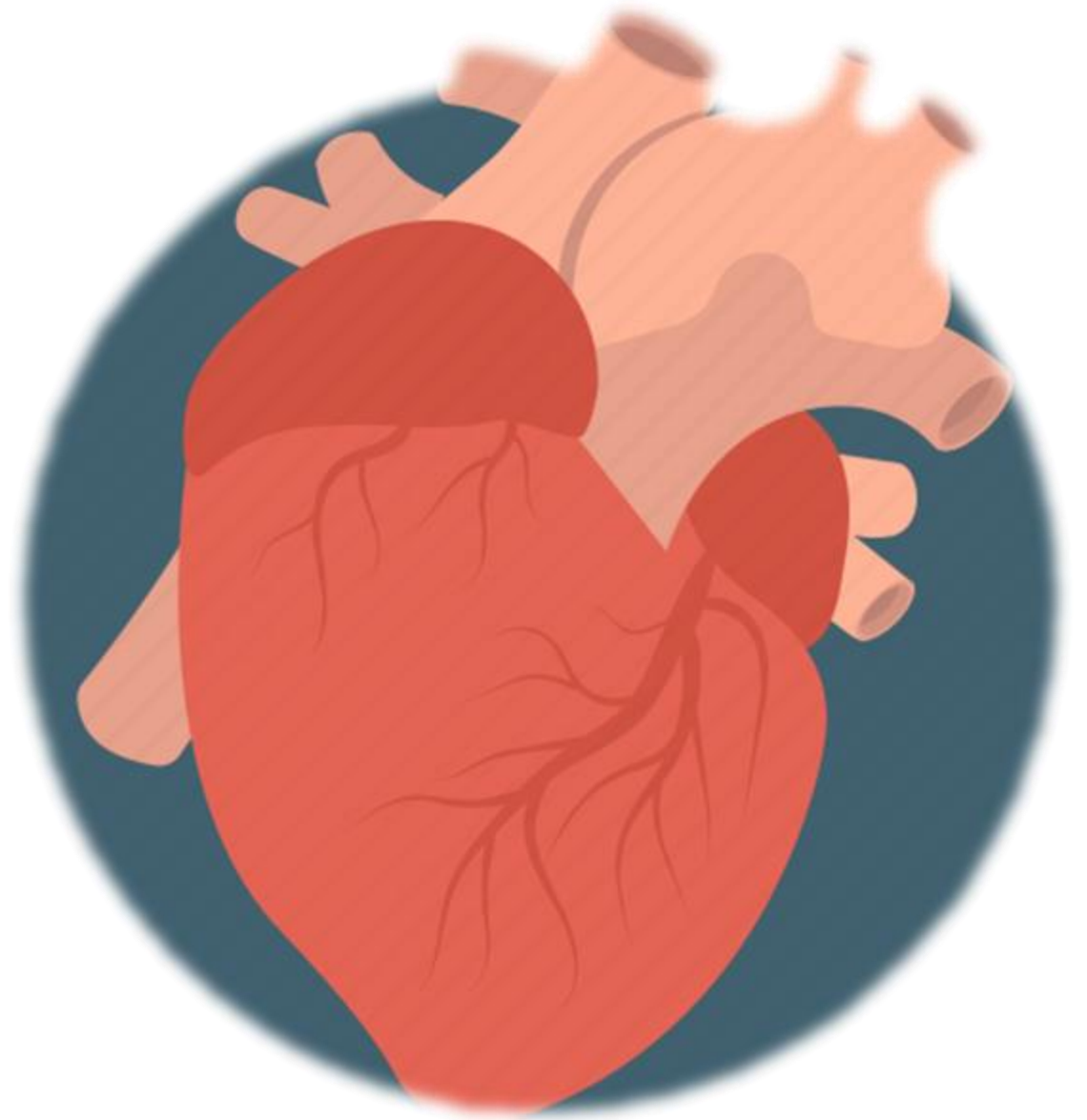


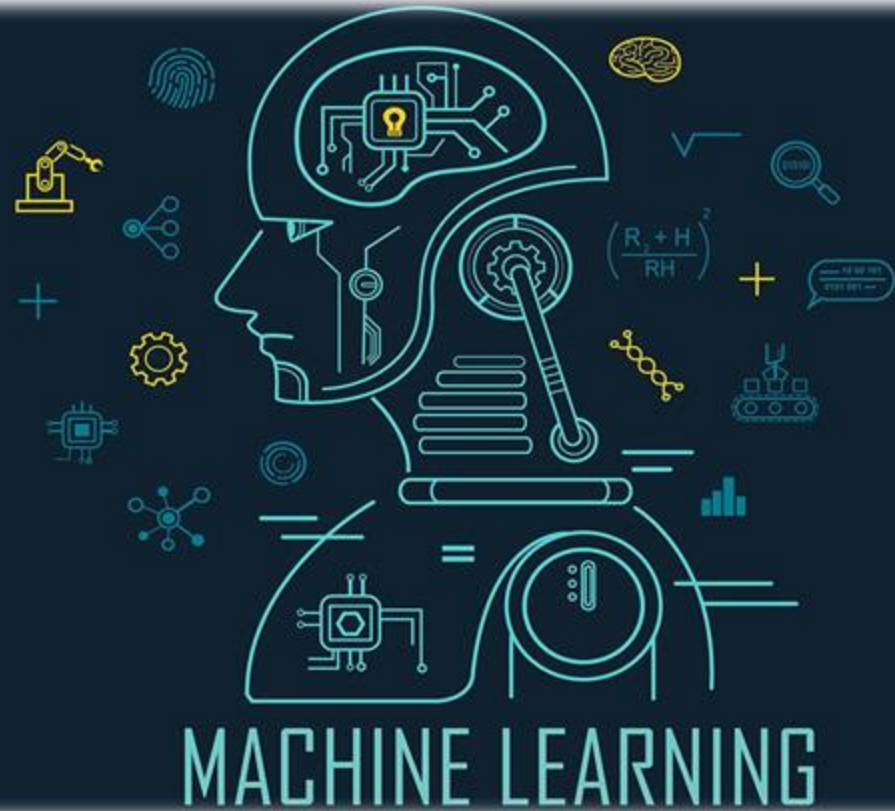
Heart Disease Diagnosis

Lynn Hoang – Gavin Wan – John James – Isaac
Rodriguez Ocampo

#1

Cause of death in
the world





Develop a predictive model for early detection of heart diseases

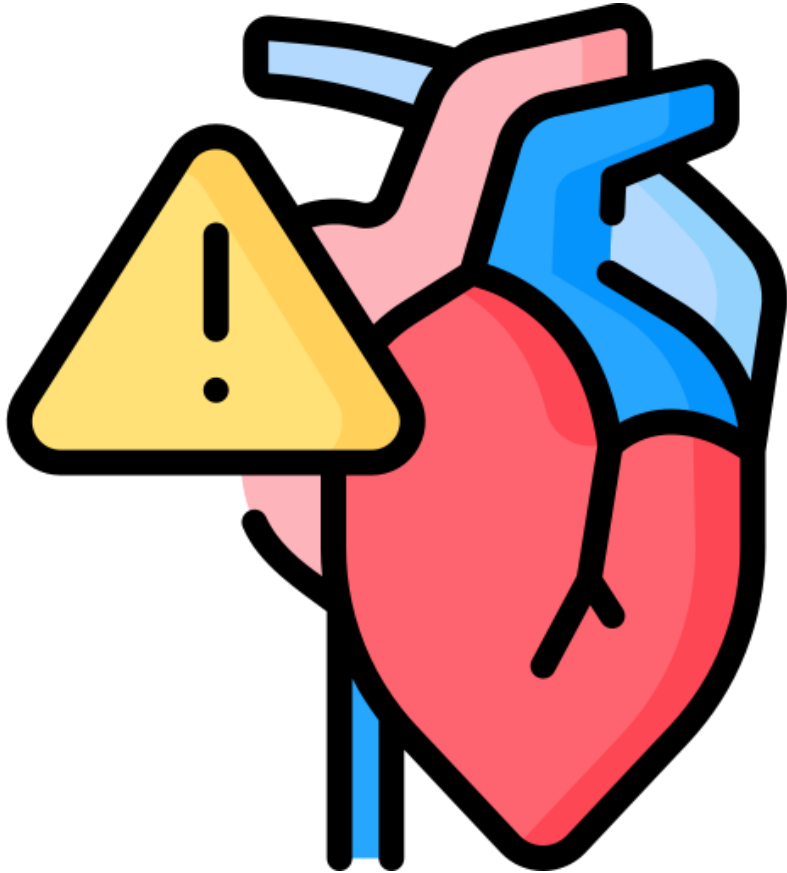
Analyzing various medical and lifestyle factors

Provide accurate risk assessments for individuals

Cleveland heart disease dataset from UCI Repository



Key variables



Age



Sex



Lipid profile



Blood pressure



Heart rate



Exercise

Data Visualization



Project 4 - Heart Disease

Main Title	Most Common of Heart Disease Symptoms	Number on G=Heart Disease	Verfty Age range on Heart Disease
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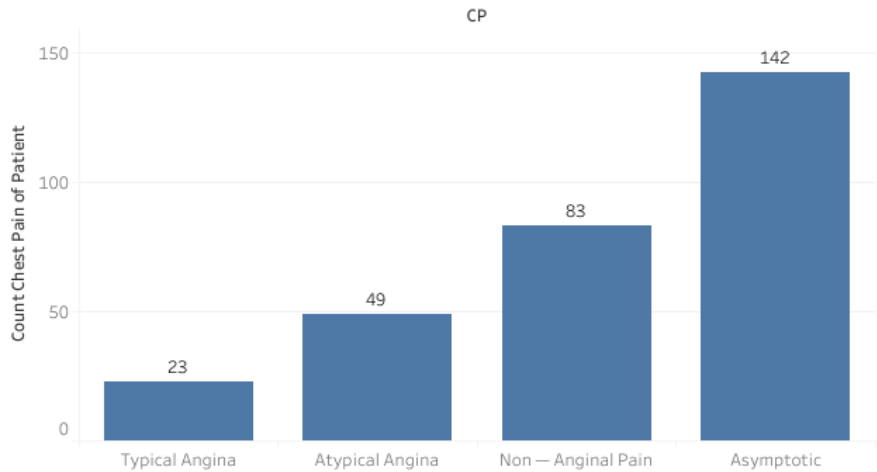
Heart-Disease

CP - Chest Pain Type: Typical Angina / Non — Anginal Pain / Asymptotic / Serum Cholesterol
trestbps - resting blood pressure
chol - Serum Cholesterol
fbs - Fasting Blood Sugar
restecg - resting electrocardiographic results
thalach - Max heart rate achieved
exang - Exercise induced angina..

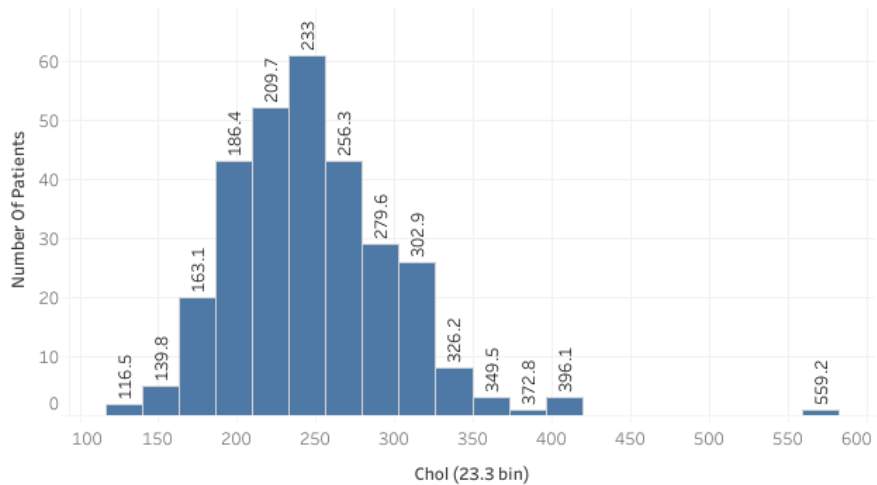
Project 4 - Heart Disease

Main Title	Most Common of Heart Disease Symptoms	Number on G=Heart Disease	Verfty Age range on Heart Disease
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Chest Pain as a Symptom of Heart Disease



Distribution of Serum Cholesterol Levels among Patients



Project 4 - Heart Disease

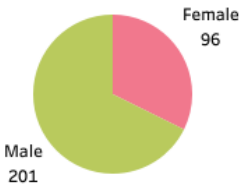
Main Title	Most Common of Heart Disease Symptoms	Number on G=Heart Disease	Verfty Age range on Heart Disease	
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- Diagnosis
- No Heart Disease

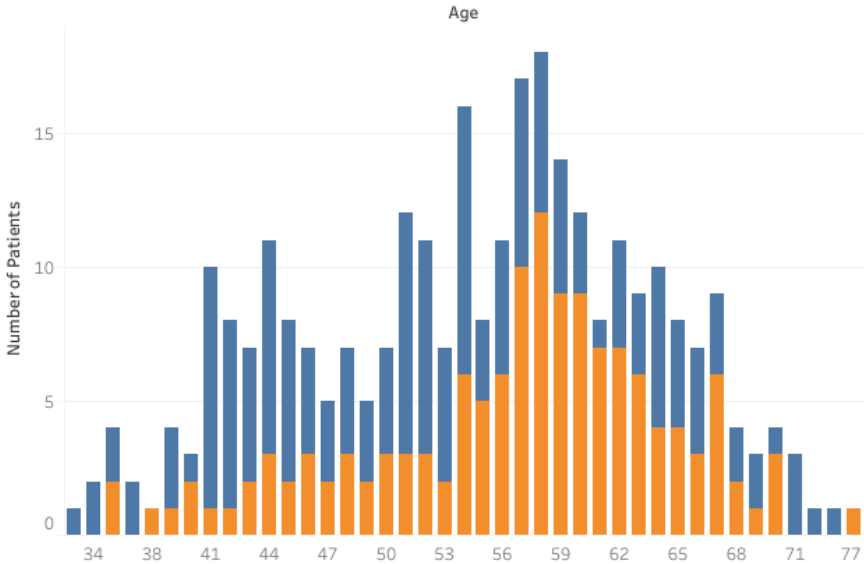
Heart Disease
- Sex
- Female

Male

Male and Female Chest Pain Count



Diagnosis of Heart Disease Based on Age

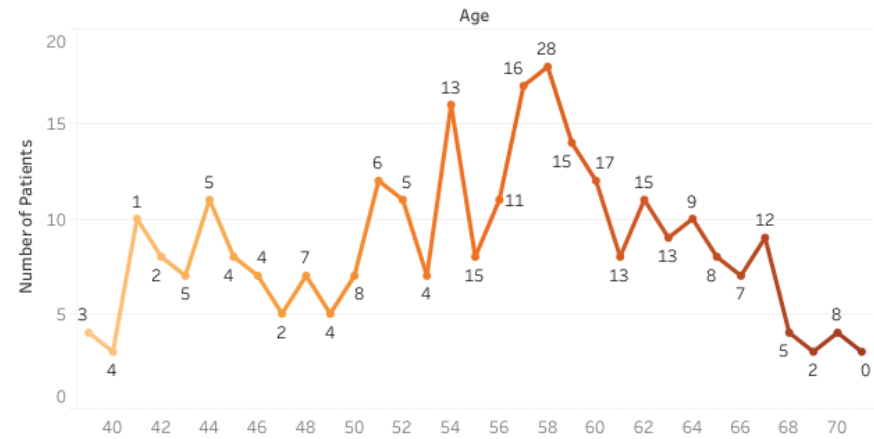


Project 4 - Heart Disease

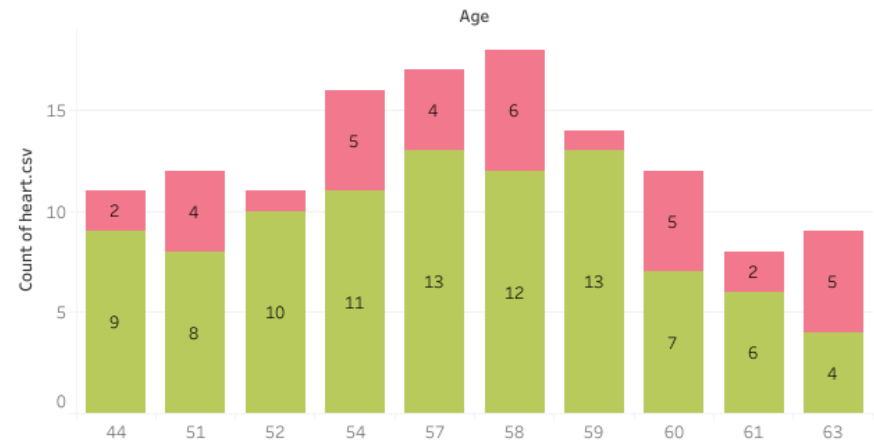
Main Title	Most Common of Heart Disease Symptoms	Number on G=Heart Disease	Verfty Age range on Heart Disease
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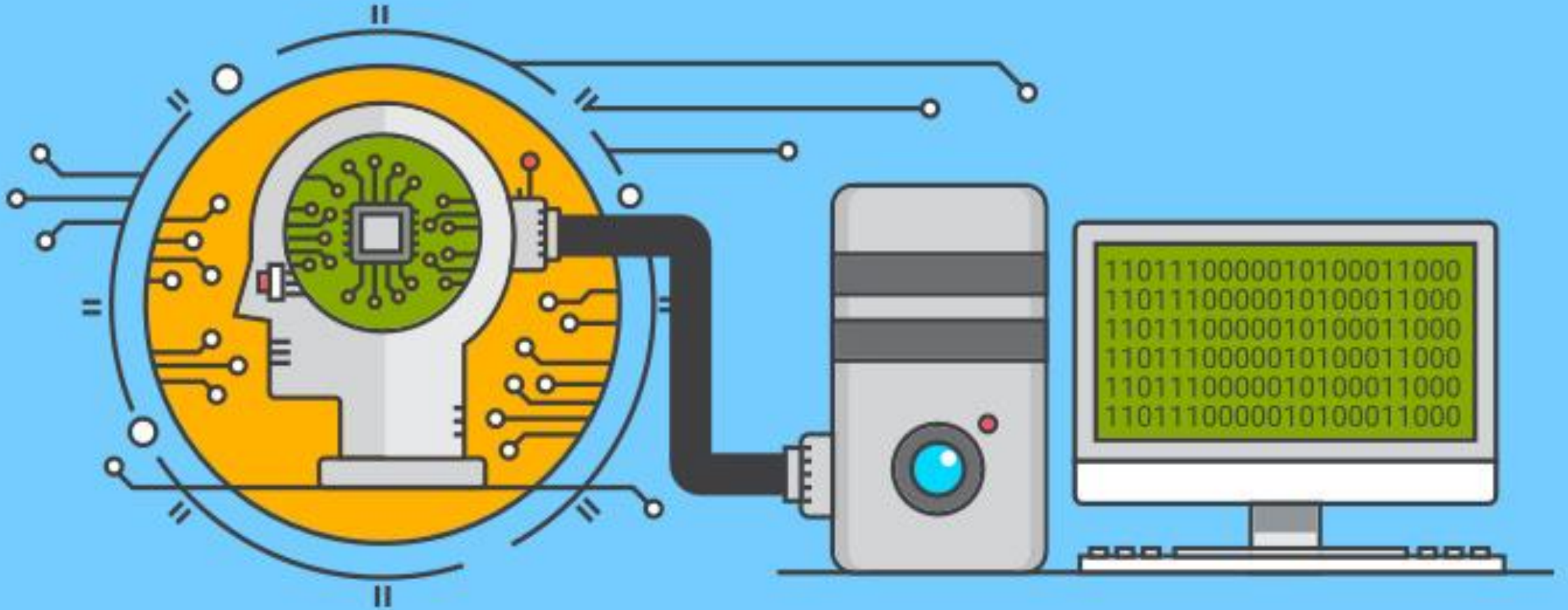
Count of Patients



Top 10 Cardiovascular Disease Potential Patient Admission based on Gender and Age



Machine Learning



Decision Tree

77%

	precision	recall	f1-score	support
Present	0.78	0.78	0.78	32
Absent	0.75	0.75	0.75	28
accuracy			0.77	60
macro avg	0.77	0.77	0.77	60
weighted avg	0.77	0.77	0.77	60

Random Forest

83%

	precision	recall	f1-score	support
Present	0.81	0.91	0.85	32
Absent	0.88	0.75	0.81	28
accuracy			0.83	60
macro avg	0.84	0.83	0.83	60
weighted avg	0.84	0.83	0.83	60

Logistic Regression 87 %

	precision	recall	f1-score	support
Present	0.82	0.97	0.89	32
Absent	0.95	0.75	0.84	28
accuracy			0.87	60
macro avg	0.89	0.86	0.86	60
weighted avg	0.88	0.87	0.86	60

SVM

87%

	precision	recall	f1-score	support
Present	0.82	0.97	0.89	32
Absent	0.95	0.75	0.84	28
accuracy			0.87	60
macro avg	0.89	0.86	0.86	60
weighted avg	0.88	0.87	0.86	60

K Nearest Neighbors 90%

	precision	recall	f1-score	support
Present	0.88	0.94	0.91	32
Absent	0.92	0.86	0.89	28
accuracy			0.90	60
macro avg	0.90	0.90	0.90	60
weighted avg	0.90	0.90	0.90	60

Neural Network

Top 3 Metrics

2/2 – 0s – loss: 0.3778 – accuracy: 0.9000 – 264ms/epoch – 132ms/step
Loss: 0.37784066796302795, Accuracy: 0.8999999761581421
2/2 – 0s – loss: 0.3981 – accuracy: 0.9000 – 273ms/epoch – 137ms/step
Loss: 0.39805153012275696, Accuracy: 0.8999999761581421
2/2 – 0s – loss: 0.3817 – accuracy: 0.9000 – 255ms/epoch – 128ms/step
Loss: 0.3817470371723175, Accuracy: 0.8999999761581421

Neural Network

Top 3 Parameters

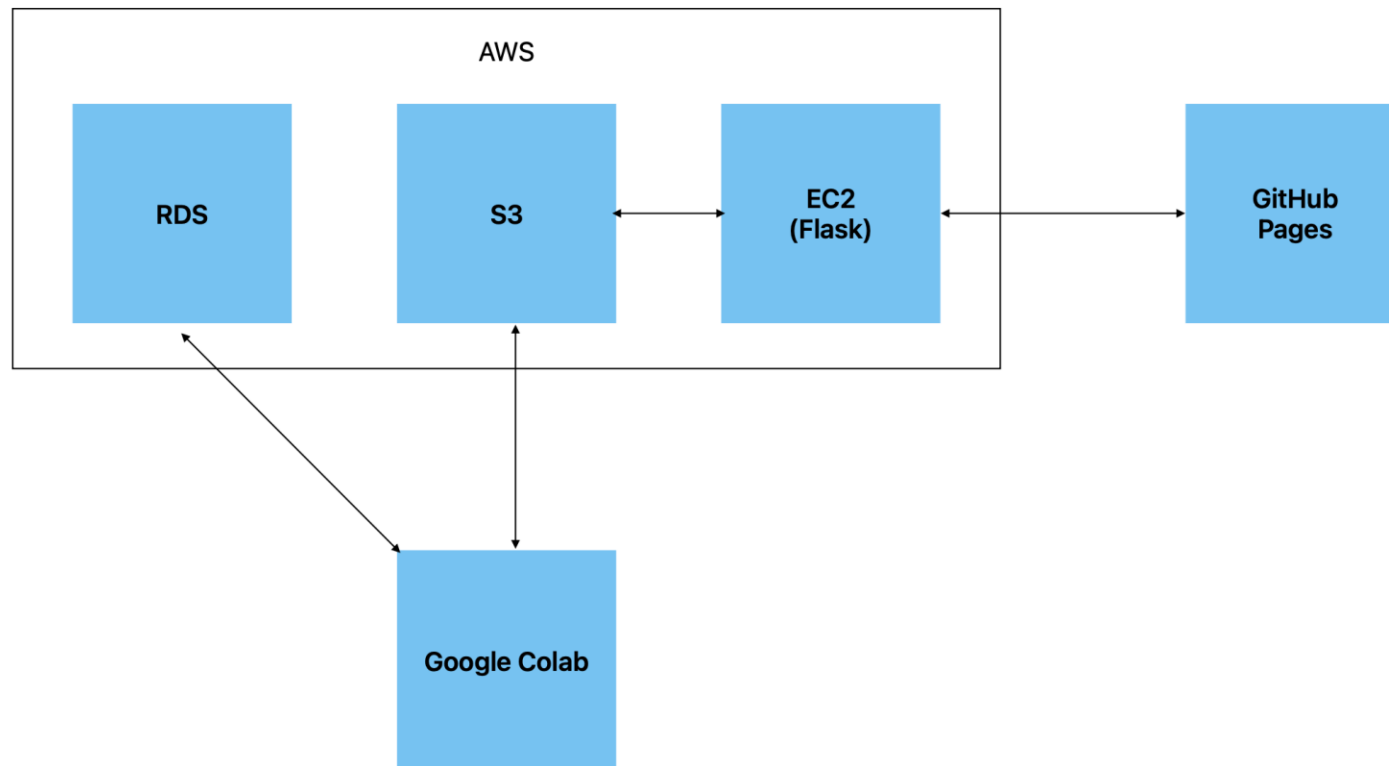
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```

Neural Network

Best Metrics

	precision	recall	f1-score	support
Present	0.86	0.97	0.91	32
Absent	0.96	0.82	0.88	28
accuracy			0.90	60
macro avg	0.91	0.90	0.90	60
weighted avg	0.91	0.90	0.90	60

High Level System Design



Heart Diseases Detection



Heart Disease Detection

Please fill the form below.

Age

years

Sex

Male

Chest pain type

typical angina

Resting blood pressure

in mm Hg

Serum cholestoral

in mg/dl

Fasting blood sugar > 120 mg/dl

Yes

Resting ECG results

normal

Maximum heart rate achieved

Exercise induced angina

Yes

ST depression induced by exercise relative to rest

Slope - the slope of the peak exercise ST segment

upsloping

Number of major vessels (0-3) colored by flourosopy

0

Thalium (thal)

normal

Analyze 🔍