JSS academy of technical education Bangalore

JSSATE
BENGALURU

Artificial Intelligence and Machine Learning

Title

Crop Production Prediction
FIFA World Cup Analysis
IBM HR Analytics: Employee Attrition & Performance
Heart Disease Diagnostic Analysis

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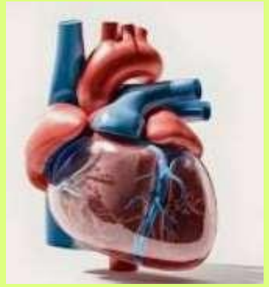
CONTENTS

ABSTRACT

This series of projects applies data analytics to healthcare, agriculture, sports, and human resources to uncover valuable insights. The **Heart Disease Diagnostic Analysis** focuses on identifying risk factors for heart disease using clinical data. The **Crop Production Prediction** project aims to forecast crop yields based on historical agricultural data. The **FIFA World Cup Analysis** examines tournament data to determine key performance metrics influencing match outcomes. Finally, the **IBM HR Analytics** project explores factors affecting employee attrition and performance. All projects utilize data preprocessing, exploratory analysis, and interactive dashboards to facilitate informed decision-making.

INTRODUCTION



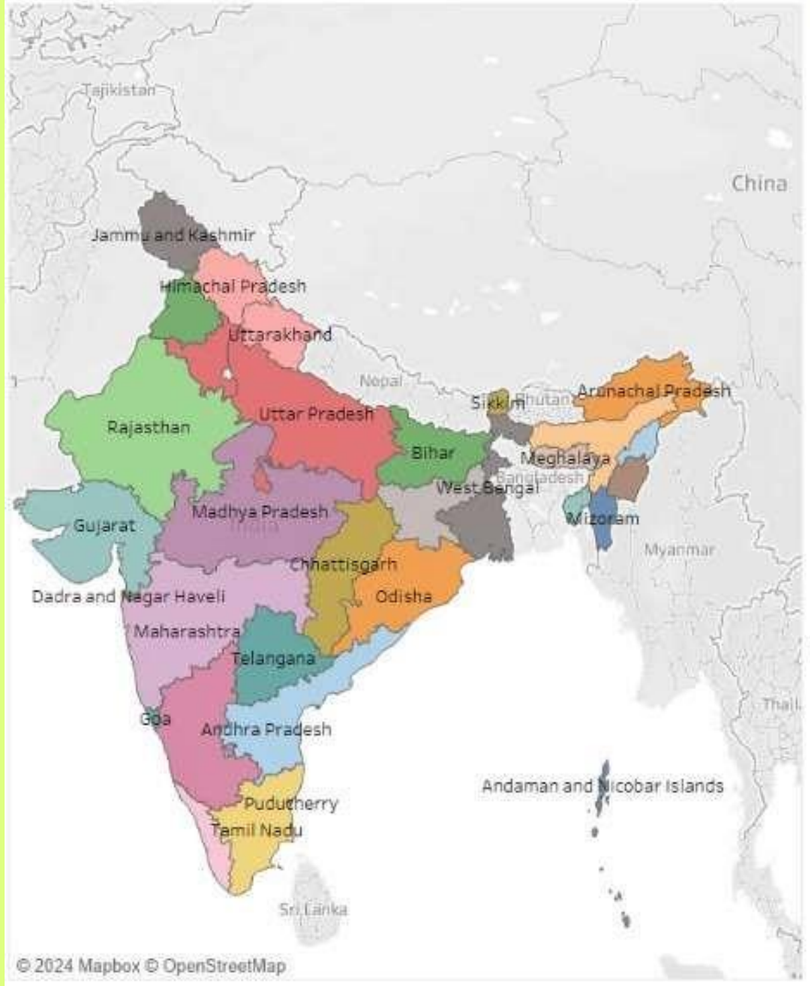
This collection of projects explores the application of data analytics and visualization across four key domains—agriculture, sports, human resources, and healthcare—each addressing unique challenges. The **Crop Production Prediction** project leverages historical agricultural data to forecast yields and analyze key metrics, supporting better planning and resource allocation. In sports, the **FIFA World Cup Analysis** uncovers patterns and performance metrics influencing tournament outcomes, offering valuable insights into football strategies and trends. The **IBM HR Analytics** project delves into employee data to understand the factors driving attrition and performance, helping organizations optimize their workforce. Lastly, in healthcare, the **Heart Disease Diagnostic Analysis** focuses on identifying critical risk factors using clinical data to aid in early detection and prevention. These projects demonstrate the transformative potential of data-driven insights in solving real-world problems across diverse sectors.

METHODOLOGY

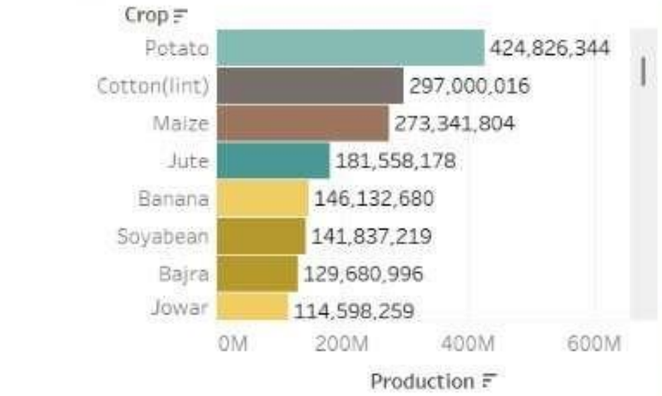
- Data Loading : Used pandas to load the dataset with error handling for missing or invalid files.
- Data Cleaning : Removed rows with missing values in the Production column to ensure data accuracy.
- Visualizations Tree map : Displays production by state and season using the squarify library.
- Geographical Map : Shows crop production by state with plotly.express choropleth.
- Bar Chart : Highlights total production for each season using seaborn.
- Pie Chart : Depicts area distribution across seasons using matplotlib.
- Histogram: Analyzes production distribution with frequency bins.
- Execution Functions modularized for tasks : data loading, cleaning, and creating each visualization.
- Outcome : Provides insights into crop production trends and geographical patterns.
- Tableau : can help anyone see and understand their data. Connect to almost any database, drag and drop to create visualizations, and share with a click.

Crop Production Prediction

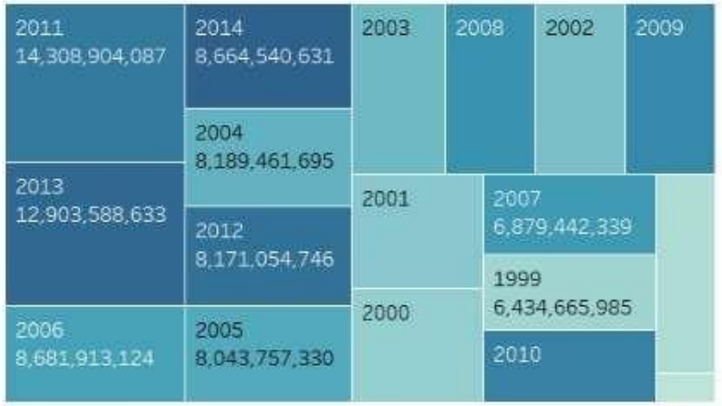
State



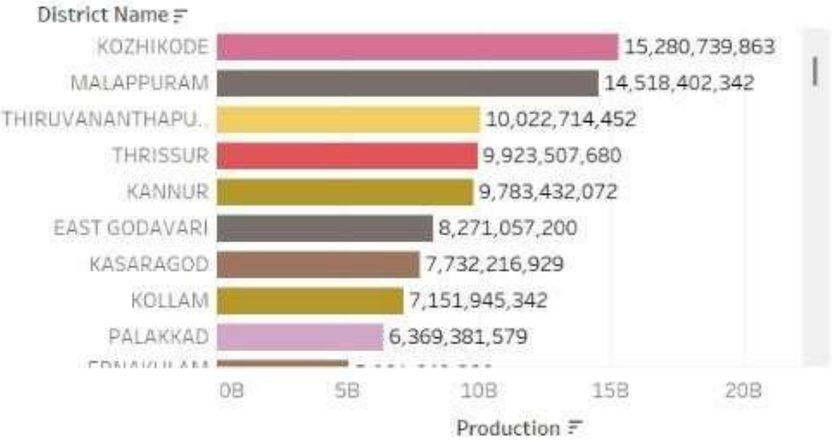
Crop Production Analysis by All State and All District



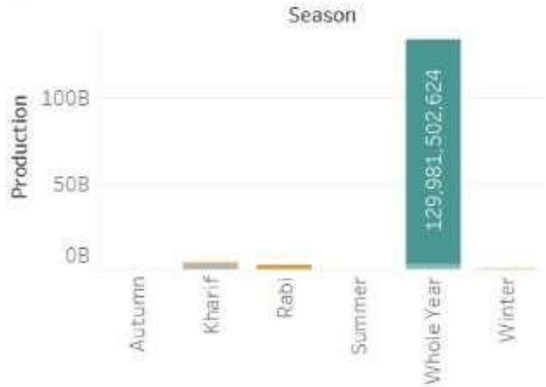
Year-Wise Cumulative Crop Production Analysis



District wise analysis All State and type of crop All



Seasons Wise analysis All State All District



FIFA Word cup Players Details

Year: All

Country: All

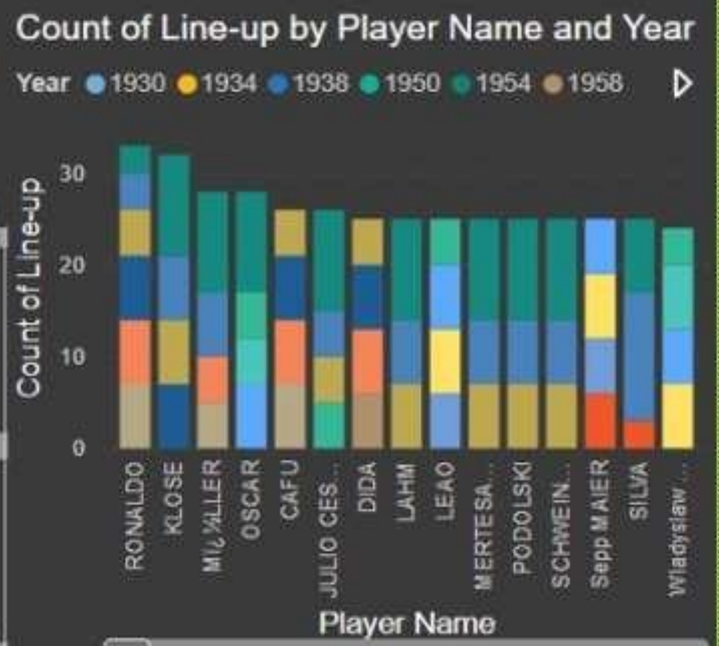
Count of MatchID and Sum of Shirt Number by Player Name

City	1930	1934	1938	1950
⊞ Udine				
⊞ Udevalla				
⊞ Turin		363.000		
⊞ Tshwane/Pretoria				
⊞ Trieste		363.000		
Total	590.549	363.000	375.700	1.045.24

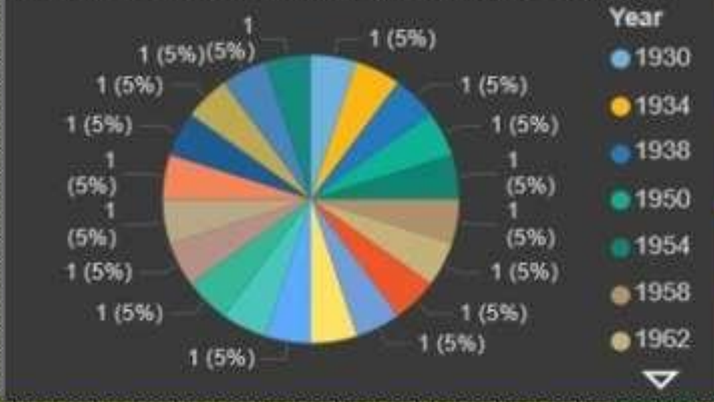
Count of GoalsScored by Country and Year

Player Name	Sum of Shirt Number	Line-up	Team Initials	Position	Cl
George EASTHAM	132	N	ENG		Lo
Roger HUNT	126	S	ENG		Lo
Gianluca PAGLIUCA	110	N	ITA		Ro
LEAO	110	N	BRA		Gu
LEAO	110	N	BRA		Gu
Manuel ASTORGA	110	N	CHI		Sa
Ove OHLSSON	110	N	SWE		Sc
Norman HUNTER	108	N	ENG		Lo
Guenther HERMANN	105	N	FRG		Mi
Total	405272				

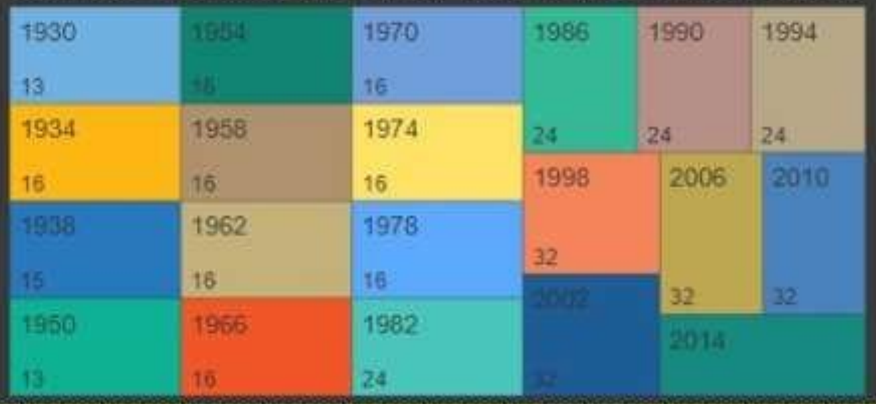
Count of Line-up by Player Name and Year



Count of Attendance by Year and Country



Count of QualifiedTeams by Year and QualifiedTeams



Year	Winner	Runners-Up	Third	Fourth
1978	Argentina	Netherlands	Brazil	Italy
1986	Argentina	Germany FR	France	Belgium
1958	Brazil	Sweden	France	Germany FR
1962	Brazil	Czechoslovakia	Chile	Yugoslavia
1970	Brazil	Italy	Germany FR	Uruguay
1994	Brazil	Italy	Sweden	Bulgaria
2002	Brazil	Germany	Turkey	Korea Republic
1966	England	Germany FR	Portugal	Soviet Union
1998	France	Brazil	Croatia	Netherlands
2014	Germany	Argentina	Netherlands	Brazil
1954	Germany FR	Hungary	Austria	Uruguay

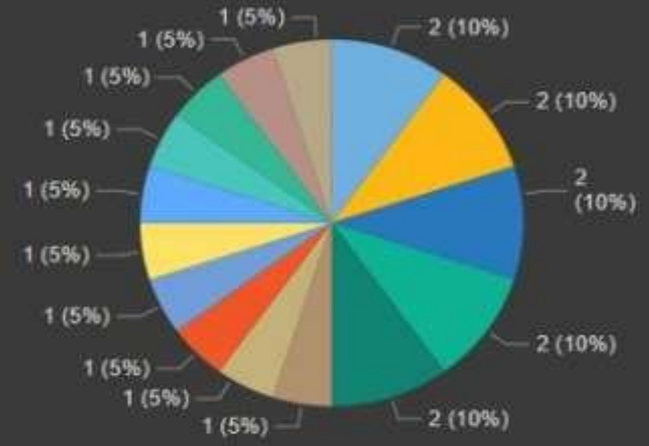
FIFA Word cup summary

Sum of Away Team Goals
871

Sum of Home Team Goals
2K

Country | Player Name | Stadium
All | All | All

Count of Attendance by Country



Ask a question about your data

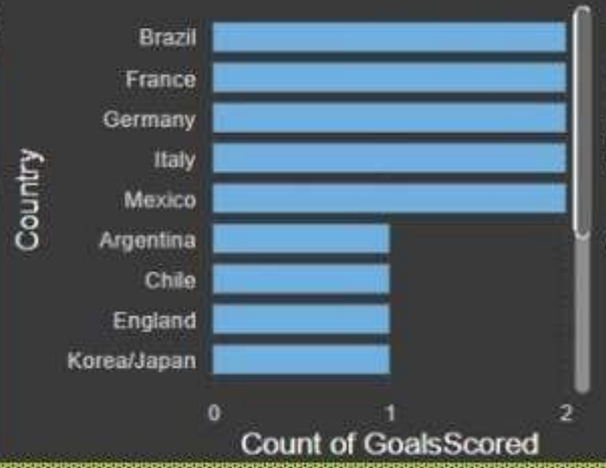
Try one of these to get started

- average shirt number
- maximum shirt number
- world cups sorted by year
- how many events are there

Count of Country by Player Name

Country and City

Count of GoalsScored by Country

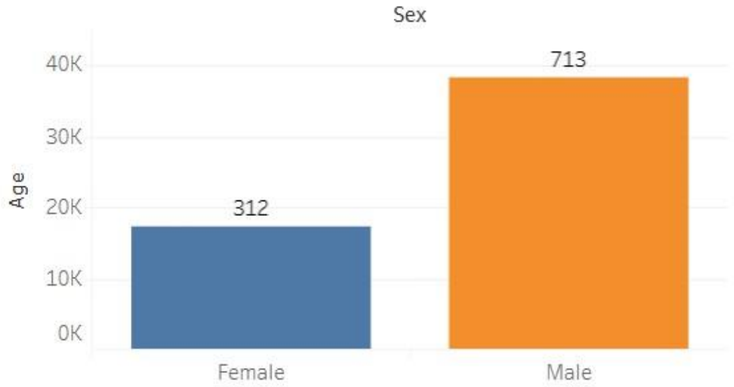


Sum of Shirt Number and Count of Position by Player Name

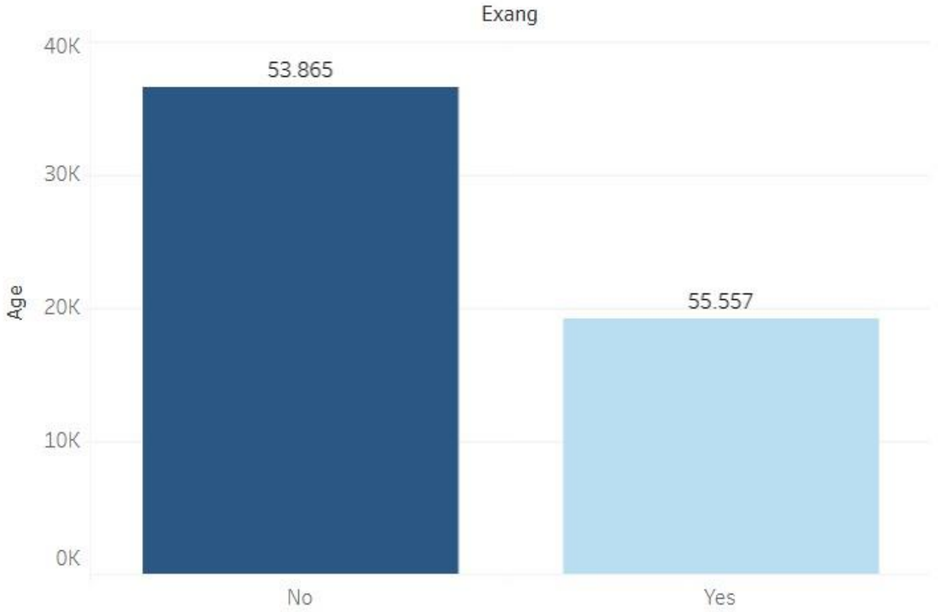
Heart Disease Diagnostic Analysis

Sex vs ST depression induced by exercise relative to rest

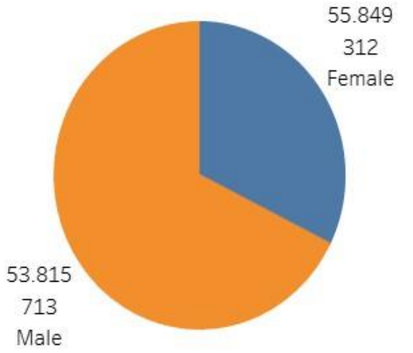
Age vs Sex



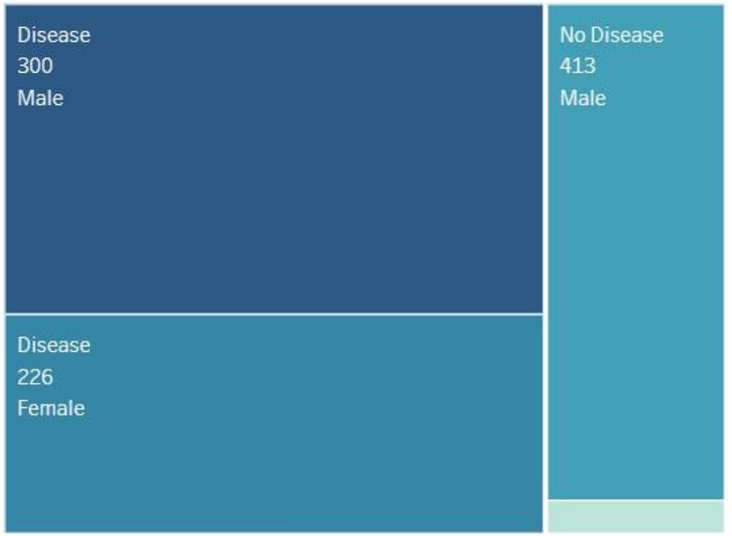
Age vs Exercise-induced angina



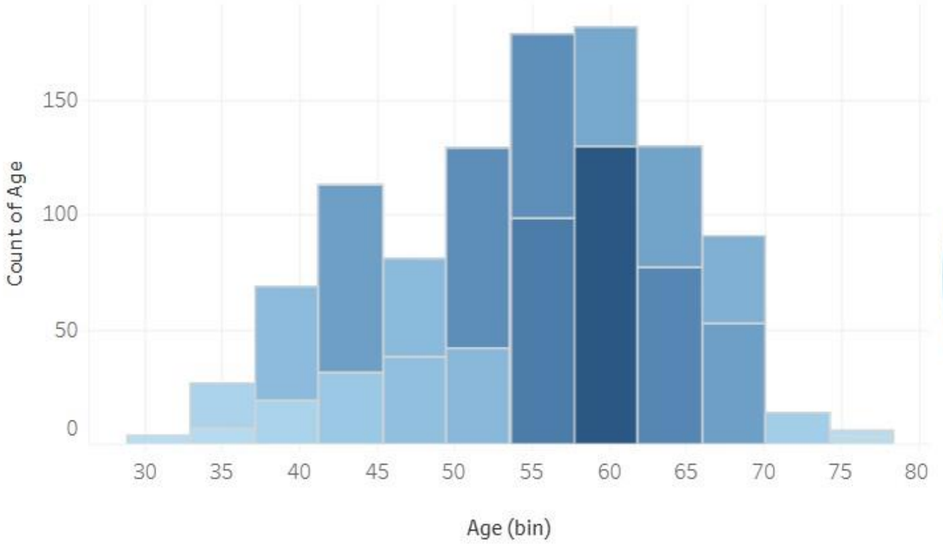
Serum cholesterol (mg/dl).



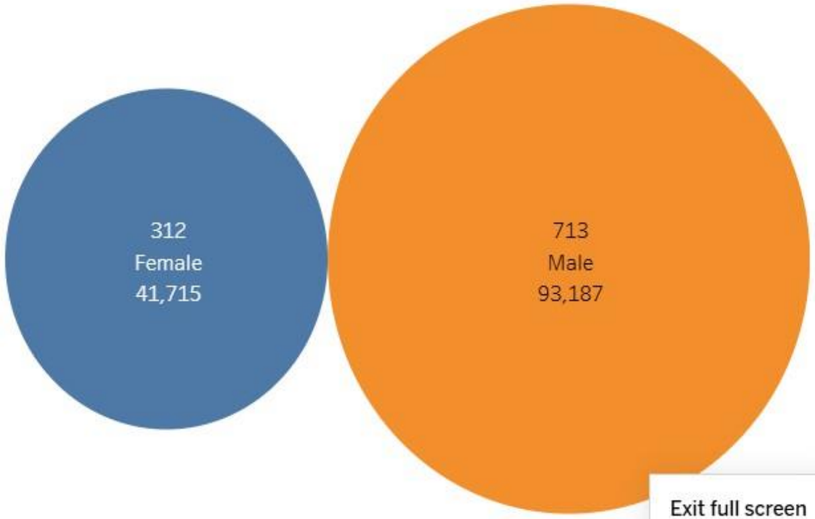
Chest pain type (categorical)



Age bin and Thalach(Maximum heart rate achieved)



Resting blood pressure (mm Hg).



Exit full screen

IBM HR

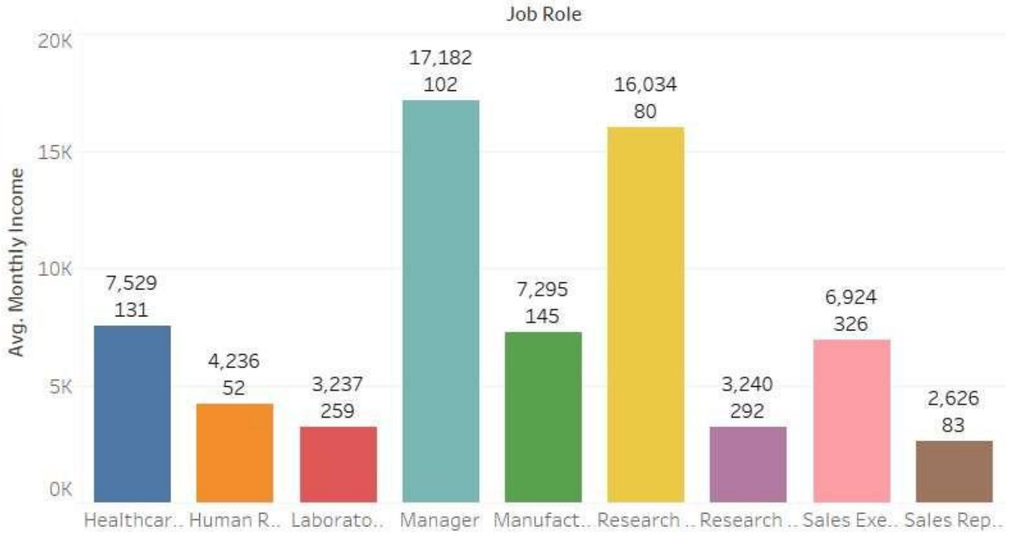
Dept vs job role vs count of gender vs maritial status

		Department / Job Role										
		Human Resources		Research & Development						Sales		
Marital S..	Gender	Human Re..	Manager	Healthcar..	Laborator..	Manager	Manufact..	Research ..	Research ..	Manager	Sales Exec..	Sales Repr..
Divorced	Female	4		10	17	8	18	7	23	2	23	5
	Male	10	2	24	38	6	18	16	39	5	46	6
Married	Female	8	3	24	38	12	32	16	45	13	67	14
	Male	20	3	37	78	17	35	22	77	8	84	20
Single	Female	4	1	17	30	4	22	10	46	4	42	19
	Male	6	2	19	58	7	20	9	62	5	64	19

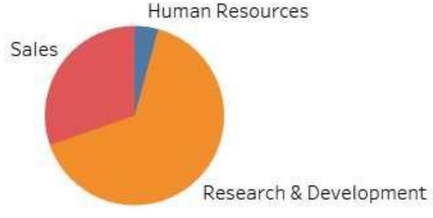
Education_Field vs dept, Role, Marital status and Overtime details

				Education Field					
Departm..	Job Role	Marital S..	Over Time	Human Resour..	Life Sciences	Marketing	Medical	Other	Technical Degr..
Human Resources	Human Resources	Divorced	No	4,772	4,770		4,936	4,071	
			Yes	16,635	5,936		5,021		2,696
		Married	No	47,191	24,734		34,695		2,742
			Yes	12,090			2,148	2,991	
		Single	No	3,886	12,947		4,286	7,988	6,887
			Yes		8,837				

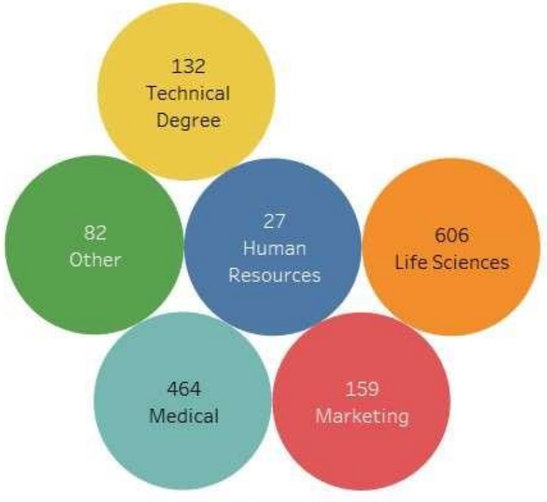
Job role vs Avg monthly salary



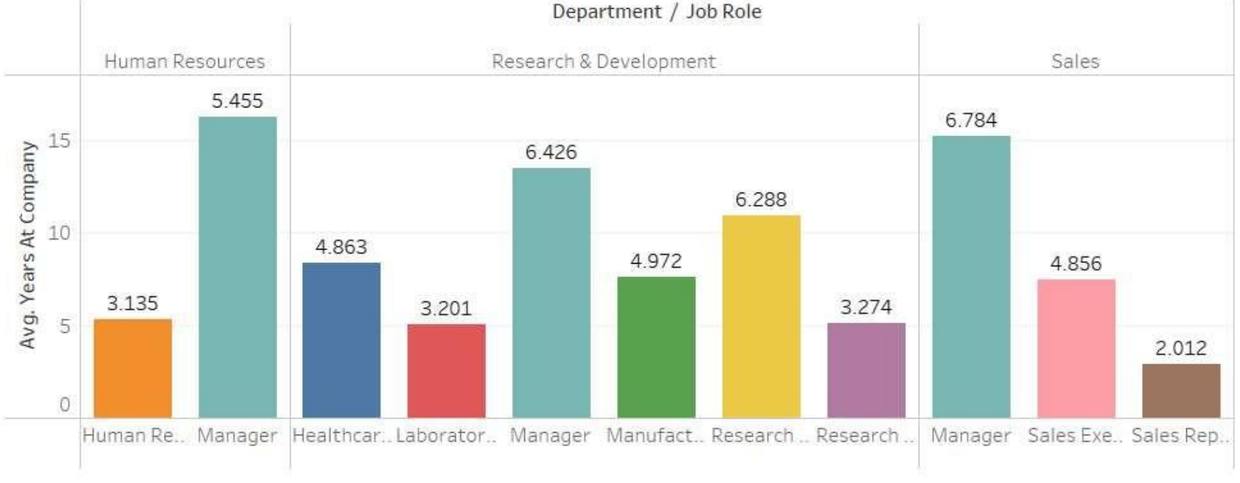
Dept Job Role Sum of employ



Education Vs standard working hours



Dept and role vs Avg year at company



CONCLUSION

This series of projects demonstrates the power of data analytics in addressing challenges across agriculture, sports, human resources, and healthcare. The **Crop Production Prediction** project provided insights into factors affecting crop yields for better planning, while the **FIFA World Cup Analysis** identified performance metrics influencing tournament outcomes. The **IBM HR Analytics** project explored key drivers of employee attrition and performance, and the **Heart Disease Diagnostic Analysis** highlighted critical risk factors, aiding in early detection and prevention of heart disease.

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NumPy: Charles R. Harris, et al., Array programming with NumPy, Nature, 2020.Visualization

Tools: Tableau Public, https://public.tableau.com.

Mentorship: Unified Mentor, Comprehensive Learning Resources, https://www.unifiedmentor.com.


THANK YOU