



BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL INSTITUTE OF TECHNOLOGY
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai – 400093-India
(Autonomous College Affiliated to University of Mumbai)

Department of Computer Science and Engineering

Course – Advanced Data Visualization (ADV)

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Aim :- Design Big Data Dashboards using Tableau on the datasets - Education sector

Objectives :-

- 1) To Create detailed visualizations to track and compare student performance
- 2) To Utilize bar charts and heatmaps to understand student participation
- 3) To Use line graphs and scatter plots to analyze attendance data
- 4) To Create heatmaps to illustrate staff availability across different departments.

Dataset :-

Student Details

Attendanc..	CGPA	Marks %	Age	Status	Max. Absen..	Contact Nu..	Nationa..	Extracurricular	Parental Education	Tuition .
93.68	9.6	96	16	Graduate	6	6132270935	India	Theater or Drama	Primary Education (Up to 5th ..	PAID
77.89	9.4	94	17	Graduate	21	6294735148	India	Music Instrument	Primary Education (Up to 5th ..	PAID
94.74	9.4	94	17	Graduate	5	6144029994	India	Creative Writing	Primary Education (Up to 5th ..	PAID
81.05	9.4	94	16	Graduate	18	6495691608	India	Creative Writing	Secondary Education (Up to Hi..	PAID
90.53	9.4	94	15	Graduate	9	9622208755	India	Dancing	Primary Education (Up to 5th ..	PAID
96.84	9.4	94	18	Graduate	3	9487644166	India	Painting	Secondary Education (Up to Hi..	PAID
73.68	9.2	92	17	Graduate	25	6812022308	India	Academic	Associate's Degree or Diploma	PAID
77.89	9.2	92	16	Graduate	21	9485378367	India	Singing	Primary Education (Up to 5th ..	PAID
91.58	9.2	92	16	Graduate	8	9554558642	India	Chess	Bachelor's Degree or Higher	NOT PA
87.37	9.2	92	17	Graduate	12	9433413444	India	Volunteer Service	Primary Education (Up to 5th ..	PAID

Dataset description :-

The dataset titled "Student Details" contains detailed information about various students. Here is an overview of each column and its meaning:

Column	Description
Attendance	The percentage of classes attended by the student.
CGPA	Cumulative Grade Point Average of the student.
Marks %	The percentage of marks obtained by the student.
Age	Age of the student.
Status	Current status of the student (e.g., Graduate).
Max. Absences	Maximum number of absences allowed for the student.



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Contact Number	Contact number of the student.
Nationality	Nationality of the student.
Extracurricular	Extracurricular activities the student is involved in (e.g., Theater, Music, Creative Writing).
Parental Education	Level of education attained by the student's parents (e.g., Primary Education, Secondary Education, Associate's Degree, Bachelor's Degree).
Tuition	Indicates whether the student pays tuition or not (e.g., PAID, NOT PAID).

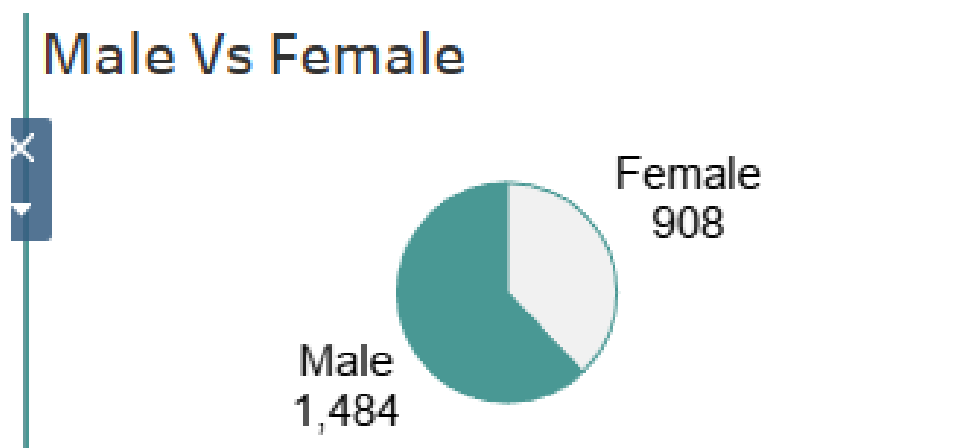
Implementation :-

1] Pie chart :- "Male Vs Female".

A pie chart is a circular statistical graphic that is divided into slices to illustrate numerical proportions. In this specific pie chart, there are two sections, each representing a different gender.

- **Male:** Represented by one section of the pie chart, with a value of 1,484.
- **Female:** Represented by the other section of the pie chart, with a value of 908.

The chart visually compares the number of males to females, indicating that there are more males than females in the dataset. Each section's size is proportional to the value it represents, providing an immediate visual comparison of the two groups. This visualization is useful for quickly understanding the gender distribution within the dataset.





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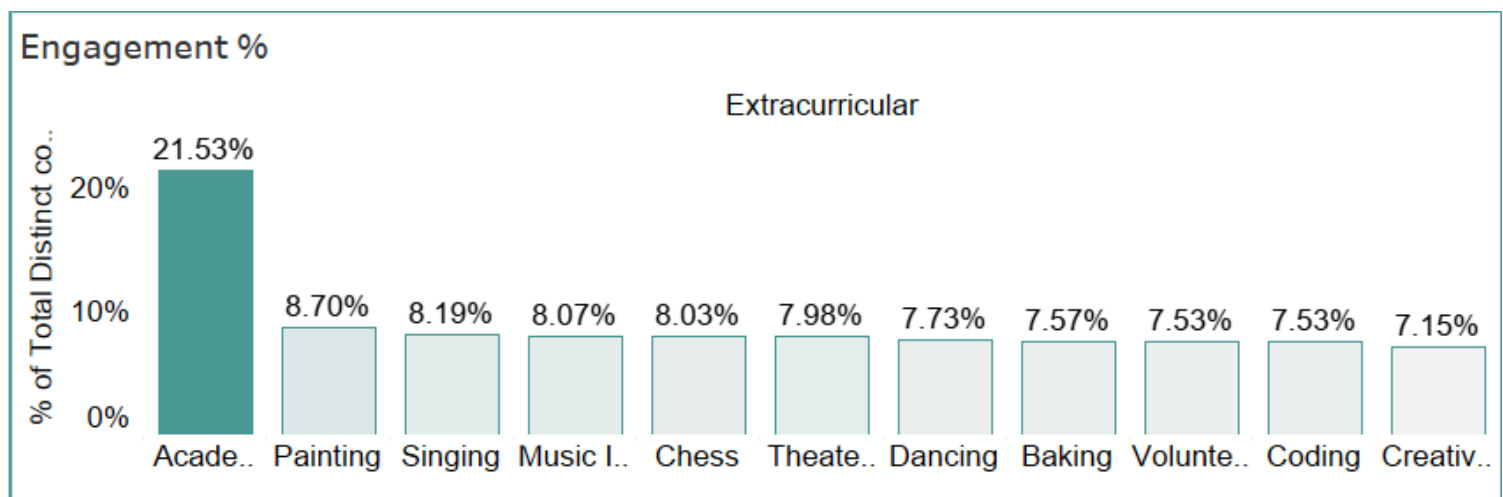
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2] Bar chart :- "Engagement %".

A bar chart is a graphical representation that uses bars to compare different categories of data. Each bar's height corresponds to the value it represents, making it easy to compare different values at a glance.

- **X-axis (Extracurricular Activities):** Lists various extracurricular activities such as Academics, Painting, Singing, Music Instruments, Chess, Theatre, Dancing, Baking, Volunteering, Coding, and Creative Writing.
- **Y-axis (% of Total Distinct Count):** Represents the percentage of total distinct counts for each extracurricular activity.

The bar chart displays the percentage of engagement in different extracurricular activities. The highest engagement is in Academics, with a percentage of 21.53%. Other activities such as Painting, Singing, Music Instruments, Chess, Theatre, Dancing, Baking, Volunteering, Coding, and Creative Writing





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3] heatmap :- "Dept wise Staff Availability."

A heatmap is a graphical representation of data where individual values are represented as colors. In this heatmap, the rows correspond to different departments, and the columns represent different time slots or availability periods. The color intensity in each cell indicates the level of staff availability, with darker shades representing higher availability and lighter shades representing lower availability.

- **Departments:** The rows represent three different departments: Computer Science, Chemical, and Civil.
- **Time Slots/Availability Periods:** The columns represent different availability periods.
- **Color Intensity:** The darker the color in a cell, the higher the staff availability for that department during that time period. Conversely, lighter shades indicate lower availability.

From the heatmap:

- The **Computer Science** department shows higher availability in the first two columns.
- The **Chemical** department has higher availability in the second column and lower availability in the third column.
- The **Civil** department shows moderate availability in the second column and lower availability in the third column.
- The fourth column for all departments shows the lowest availability.

Dept wise Staff Availability





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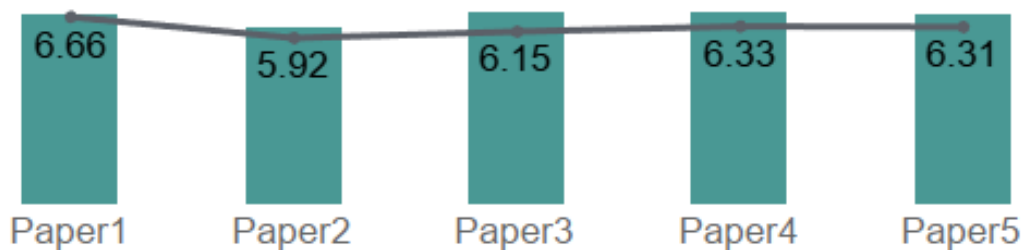
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4] bar chart with a line graph overlay:- "Academic Performance."

This combined plot uses both a bar chart and a line graph to represent the academic performance scores for five different papers, labeled Paper1 through Paper5. Each bar's height corresponds to the score for a specific paper, while the line graph connects these scores to show the trend over time.

- **X-axis:** Represents the different papers (Paper1, Paper2, Paper3, Paper4, Paper5).
- **Y-axis:** Represents the performance scores.
- **Bars:** Indicate the individual scores for each paper.
- **Line Graph:** Connects the scores to show the trend across the five papers.

Academic Performance

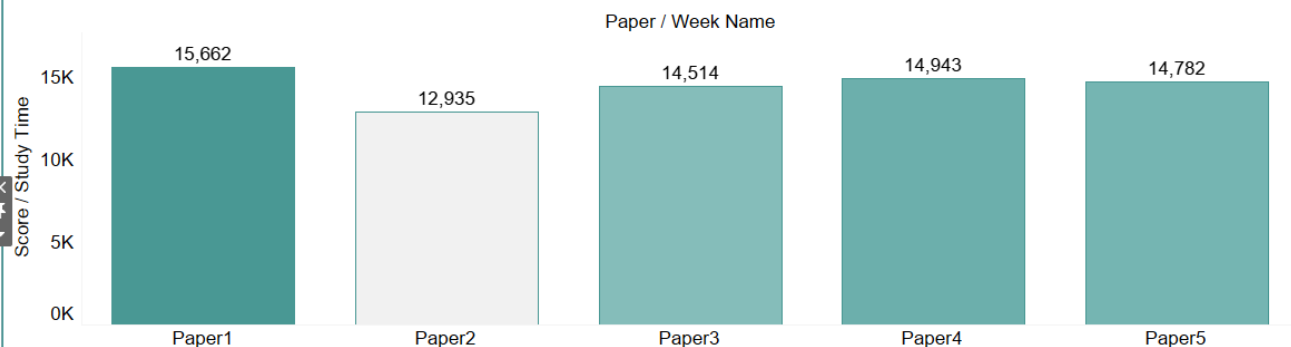


5] bar chart :- "Subject Wise Score."

A bar chart is a graphical representation that uses rectangular bars to compare different categories of data. The length of each bar corresponds to the value it represents, making it easy to compare various data points at a glance.

- **X-axis (Paper / Week Name):** Lists five categories (Paper1, Paper2, Paper3, Paper4, and Paper5).
- **Y-axis (Score / Study Time):** Represents the score, ranging from 0K to 15K

Subject Wise Score





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6] line graph :- "Study Time over the Week."

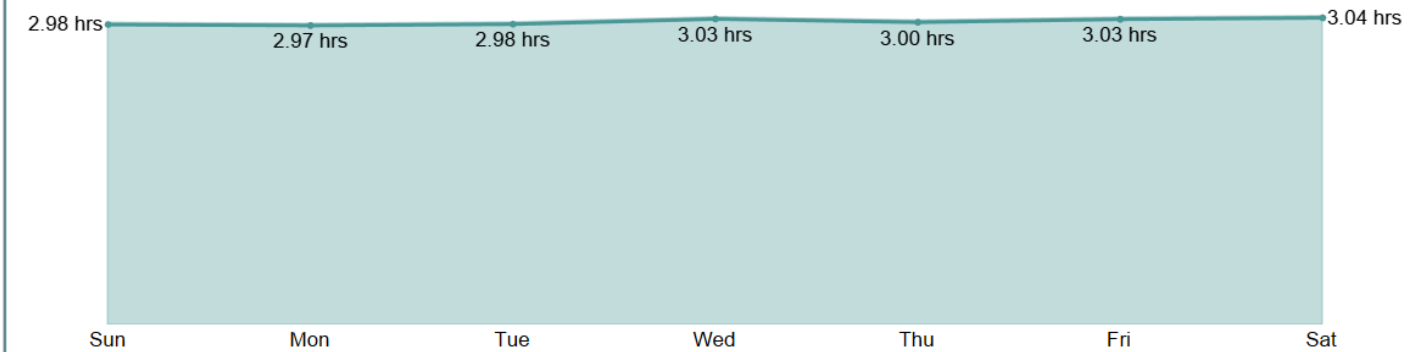
A line graph is a type of chart used to show information that changes over time. Each point on the line represents a value, and the points are connected by straight lines to highlight trends and changes over intervals.

- **X-axis (Days of the Week):** Represents the days from Sunday to Saturday.
- **Y-axis (Study Time in Hours):** Represents the amount of time spent studying each day.

The study times for each day are as follows:

- **Sunday:** 2.98 hours
- **Monday:** 2.97 hours
- **Tuesday:** 2.98 hrs
- **Wednesday:** 3.03 hours
- **Thursday:** 3.00 hours
- **Friday:** 3.03 hours
- **Saturday:** 3.04 hours

Study Time over the Week

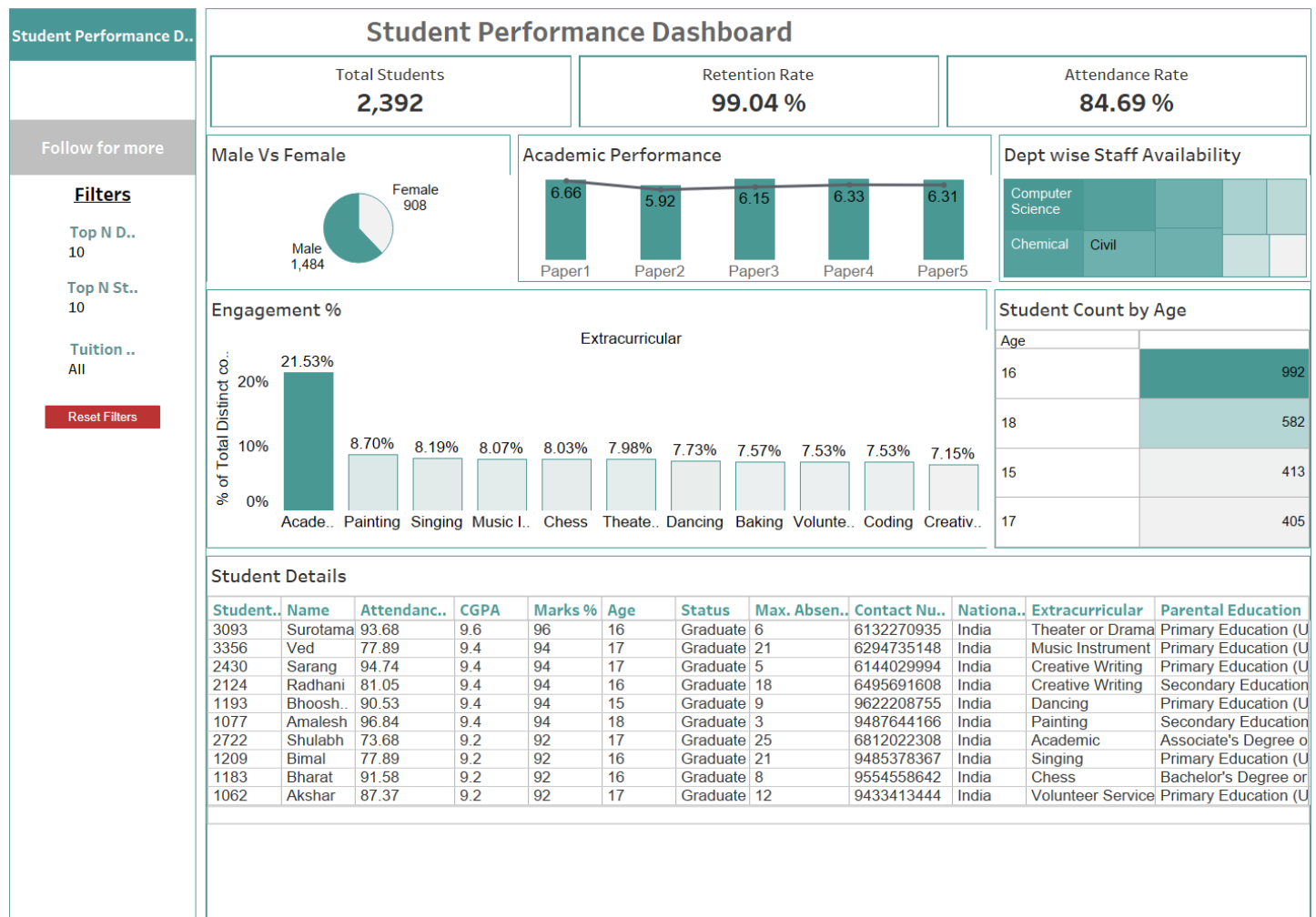




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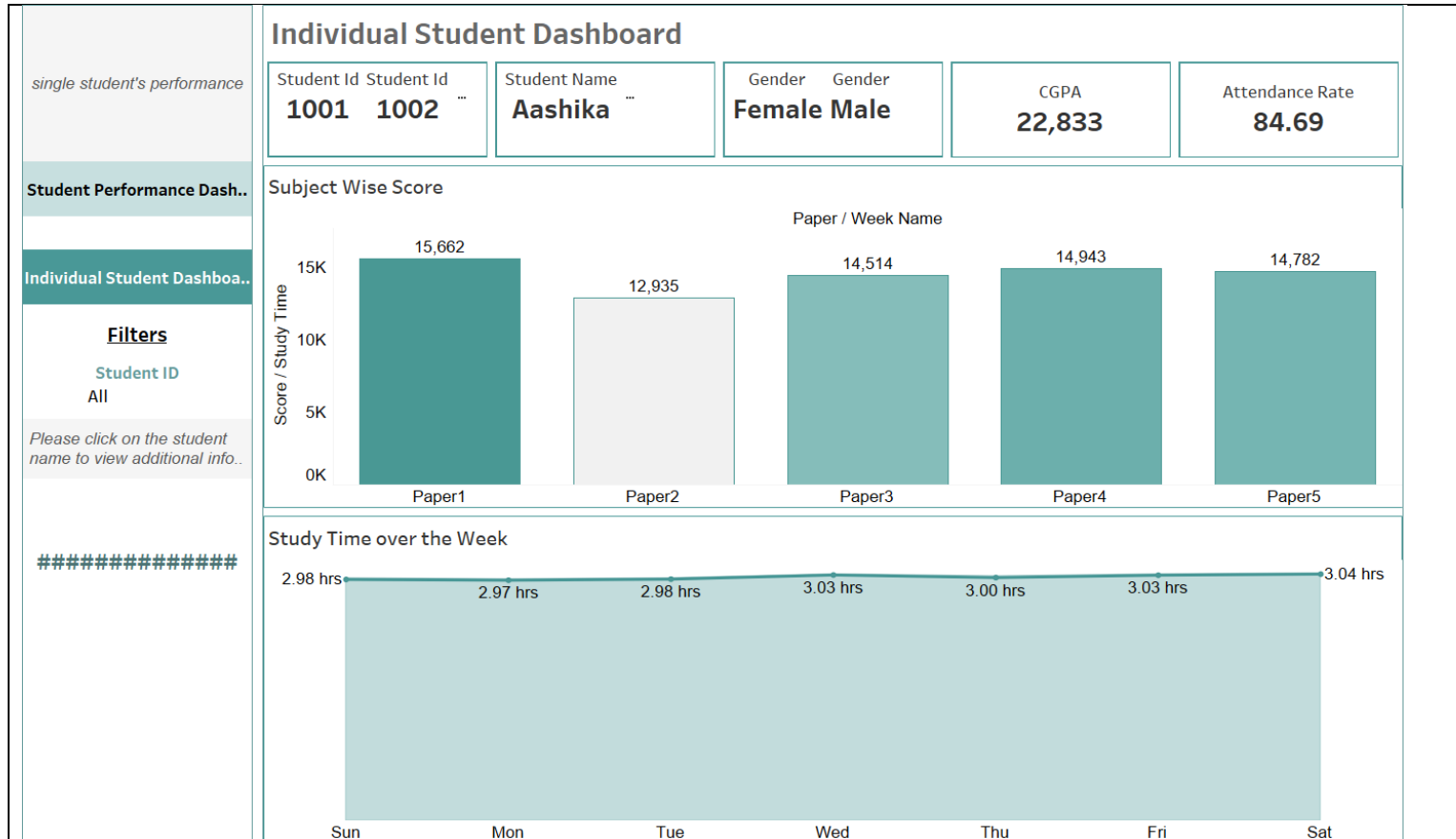
Tabelau Dashboard :-





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Conclusion :- In This experiment, Designed Big Data Dashboards using Tableau on the educational datasets has provided comprehensive insights into various aspects of the education sector. The visualizations have highlighted key trends and correlations, such as the consistent study times throughout the week and the varying levels of engagement in different extracurricular activities. The analysis of staff availability through heatmaps has provided valuable information for resource optimization.