



deti

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Visual Exploration of a Student Performance Dataset

Information Visualization 2024

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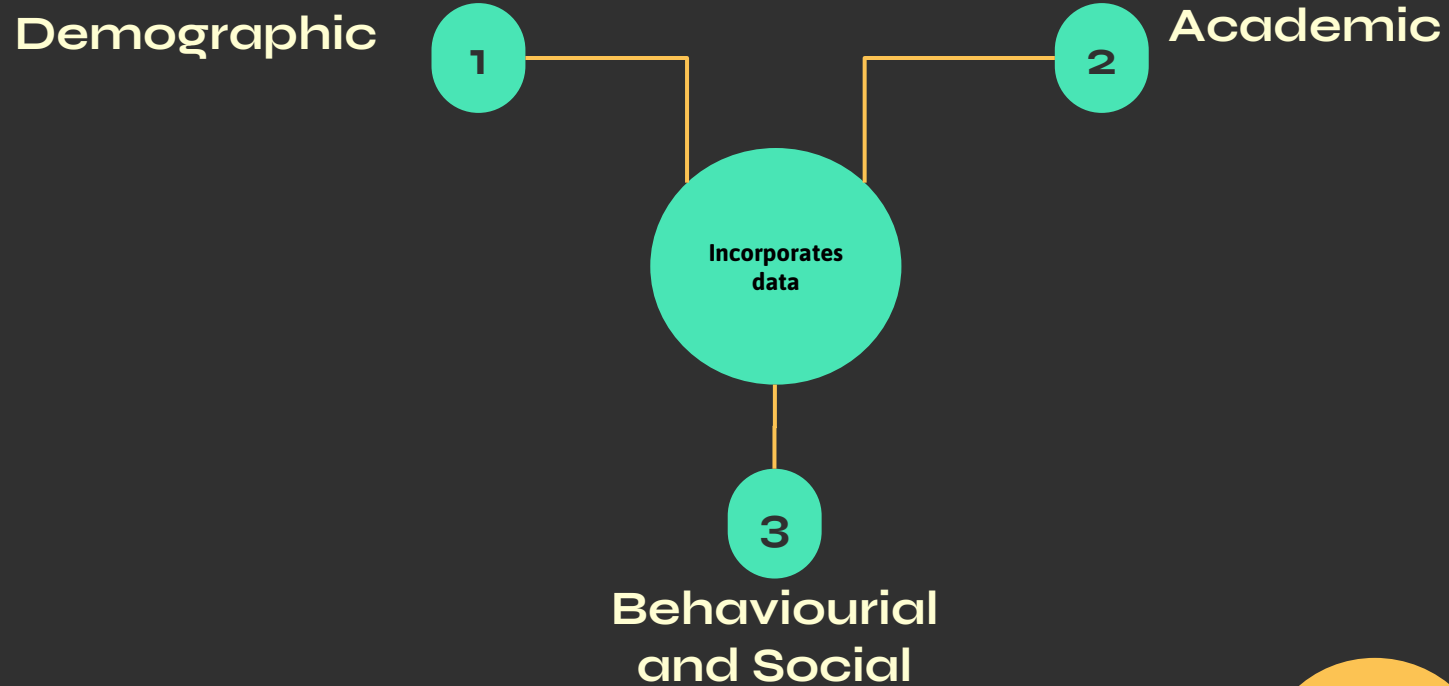


The dataset

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- **Dataset:** “Student Performance”
 - **Source:** UCI Machine Learning Repository
 - **Instances:** 649 observations of students from 2 Portuguese Secondary schools
 - **Features:** 33 (Family Status, Study Time, Failures, Freetime, Grades, etc...)



- **Groups of Data:**



| Demographic | Academic | Behavioral/Social |
|--|--|---|
| <code>sex</code> (Gender) | <code>schoolsup</code> (School support) | <code>freetime</code> (Free time) |
| <code>age</code> (Age) | <code>famsup</code> (Family support) | <code>goout</code> (Going out with friends) |
| <code>address</code> (Residence) | <code>paid</code> (Paid classes) | <code>Da1c</code> (Weekday alcohol) |
| <code>famsize</code> (Family size) | <code>activities</code> (Activities) | <code>Walc</code> (Weekend alcohol) |
| <code>Pstatus</code> (Parental status) | <code>nursery</code> (Nursery attendance) | <code>health</code> (Health status) |
| <code>Medu</code> (Mother's education) | <code>higher</code> (Higher education) | <code>absences</code> (Absences) |
| <code>Fedu</code> (Father's education) | <code>internet</code> (Internet access) | |
| <code>Mjob</code> (Mother's job) | <code>studytime</code> (Study time) | |
| <code>Fjob</code> (Father's job) | <code>failures</code> (Past failures) | |
| <code>guardian</code> (Guardian) | <code>schools</code> (School attended) | |
| | <code>G1</code> , <code>G2</code> , <code>G3</code> (Grades) | |



Objective



Exploring extracurricular and individual factors that influence academic success

- **Context Social and Educational:**

- School performance is influenced by internal factors, such as health and study habits, and external factors, such as family support and substance use



- This context is particularly relevant for the education system, which is looking for support methods to maximise student performance and well-being.



User/Persona



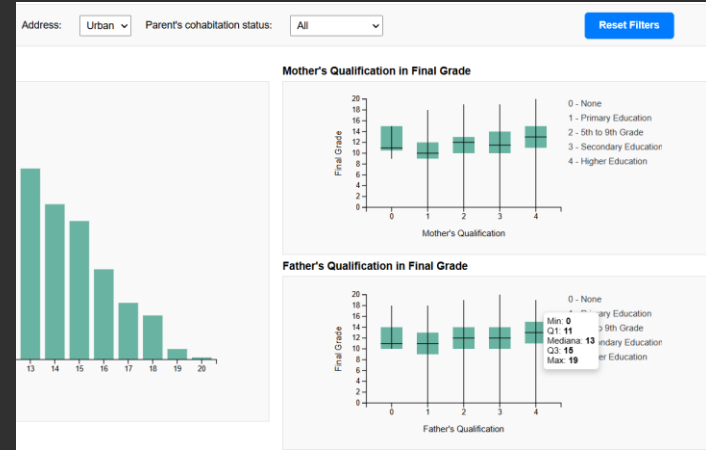
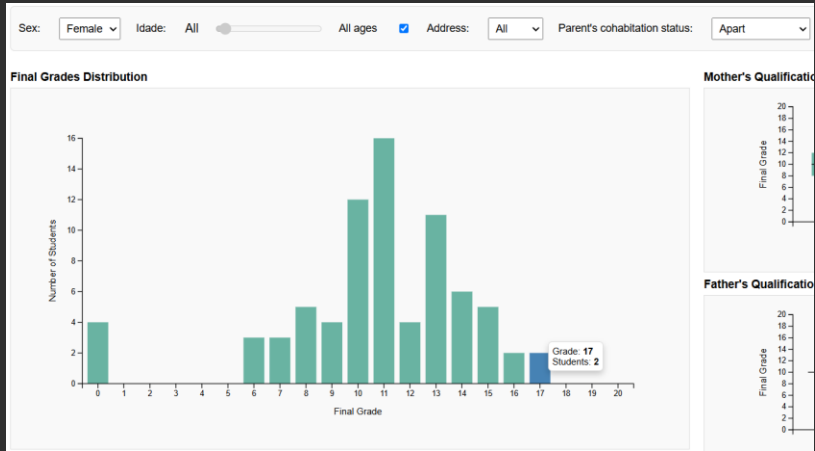
- **Teachers or Educational Advisors**

- **Objective:** Understand the impact of the social and personal context on students' academic performance and identify students at risk of failing.
- **They need** visualisations that highlight patterns, such as:
 - The distribution of the students' final grades.
 - The influence of parents' education levels on their children's academic performance.
 - The relationship between study time and final grades, or between school attendance and performance.
 - The impact of some behavioural aspects, like freetime or health status in final grades.

Visualizations

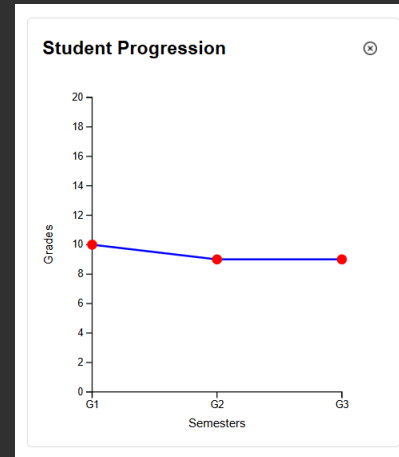
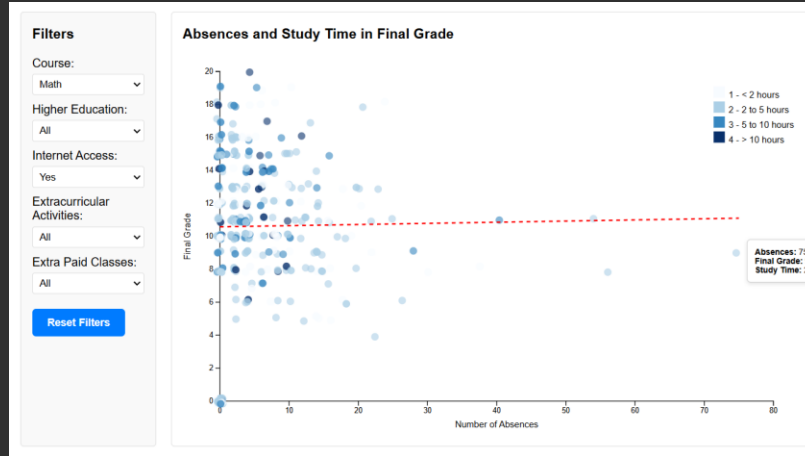


Demographic



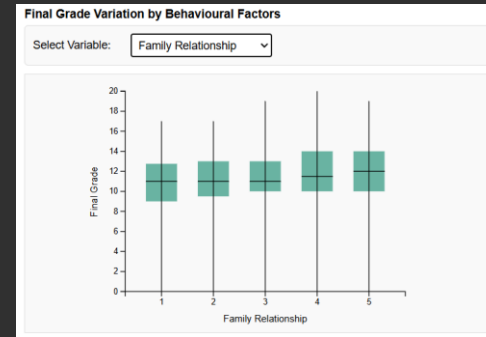
What was the best grade for female students whose parents live apart?
What is the median grade of students in an urban area whose father has an educational level of 4?

Academic



What was the final math grade of students with internet access and with the most absences?
What is their average study time per week?
How did they progress throughout the year?

Behavioural



Is it possible to infer the relationship between alcohol consumption and its impact on grades?
Does a good family relationship have a positive impact on students' final grade?

Demo

- The project was developed using:

- HTML
- CSS
- D3.js



Conclusions

- Regular Attendance and Consistent Study Habits Lead to Better Academic Performance
- Parental Education Positively Influences Student Achievement
- Strong Family Relationships Are Linked to Higher Grades
- Good Grades Can Sometimes Impact Health
- Alcohol Consumption Negatively Affects Academic Performance