

IDS 702: Modeling and Representation of data

Final Project Proposal

Vicki Nomwesigwa

OVERVIEW

The data for this project was obtained in a survey of students in math and portuguese language courses in secondary school. There are two datasets both containing interesting social, gender and study information about students. Note, that there may be students that belong to both classes.

RESEARCH QUESTIONS

Use a multi-level model to investigate factors related to the final grade. How does alcohol consumption influence the student's final grade? How did final grades differ between demographic groups like gender, address location (urban or rural), parental cohabitation status, family size for the different schools?

DATA

Attributes for both student-mat.csv (Math course) and student-por.csv (Portuguese language course) datasets:

1. school - student's school (binary: 'GP' - Gabriel Pereira or 'MS' - Mousinho da Silveira)
2. sex - student's sex (binary: 'F' - female or 'M' - male)
3. age - student's age (numeric: from 15 to 22)
4. address - student's home address type (binary: 'U' - urban or 'R' - rural)
5. famsize - family size (binary: 'LE3' - less or equal to 3 or 'GT3' - greater than 3)
6. Pstatus - parent's cohabitation status (binary: 'T' - living together or 'A' - apart)
7. Medu - mother's education (numeric: 0 - none, 1 - primary education (4th grade), 2 – 5th to 9th grade, 3 – secondary education or 4 – higher education)
8. Fedu - father's education (numeric: 0 - none, 1 - primary education (4th grade), 2 – 5th to 9th grade, 3 – secondary education or 4 – higher education)
9. Mjob - mother's job (nominal: 'teacher', 'health' care related, civil 'services' (e.g. administrative or police), 'at_home' or 'other')
10. Fjob - father's job (nominal: 'teacher', 'health' care related, civil 'services' (e.g. administrative or police), 'at_home' or 'other')
11. reason - reason to choose this school (nominal: close to 'home', school 'reputation', 'course' preference or 'other')
12. guardian - student's guardian (nominal: 'mother', 'father' or 'other')
13. traveltime - home to school travel time (numeric: 1 - <15 min., 2 - 15 to 30 min., 3 - 30 min. to 1 hour, or 4 - >1 hour)
14. studytime - weekly study time (numeric: 1 - <2 hours, 2 - 2 to 5 hours, 3 - 5 to 10 hours, or 4 - >10 hours)
15. failures - number of past class failures (numeric: n if $1 \leq n < 3$, else 4)
16. schoolsup - extra educational support (binary: yes or no)
17. famsup - family educational support (binary: yes or no)

18. paid - extra paid classes within the course subject (Math or Portuguese) (binary: yes or no)
19. activities - extra-curricular activities (binary: yes or no)
20. nursery - attended nursery school (binary: yes or no)
21. higher - wants to take higher education (binary: yes or no)
22. internet - Internet access at home (binary: yes or no)
23. romantic - with a romantic relationship (binary: yes or no)
24. famrel - quality of family relationships (numeric: from 1 - very bad to 5 - excellent)
25. freetime - free time after school (numeric: from 1 - very low to 5 - very high)
26. goout - going out with friends (numeric: from 1 - very low to 5 - very high)
27. Dalc - workday alcohol consumption (numeric: from 1 - very low to 5 - very high)
28. Walc - weekend alcohol consumption (numeric: from 1 - very low to 5 - very high)
29. health - current health status (numeric: from 1 - very bad to 5 - very good)
30. absences - number of school absences (numeric: from 0 to 93)

Grades related with the course subject, Math or Portuguese:

1. G1 - first period grade (numeric: from 0 to 20)
2. G2 - second period grade (numeric: from 0 to 20)
3. G3 - final grade (numeric: from 0 to 20, output target)

Math dataset has 395 observations, Portuguese dataset has 649 observations.

Data was found on Kaggle: <https://www.kaggle.com/uciml/student-alcohol-consumption>

PROJECT PLAN

Models: Hierarchical model, classes are nested within schools

Task	Date Due
Proposal	10/27/21
Proposal Feedback	10/30/21
Data Wrangling	11/05/21
EDA	11/12/21
Final Report v1, (Introduction, EDA)	11/16/21
Model Building and Selection	11/19/21
Model Validation	11/24/21
Final Report v2, (Model validations, results, limitations)	12/3/21
Final Project	12/12/21