ISSN: 2321-2152

IJMECE

International Journal of modern electronics and communication engineering

E-Mail
editor.ijmece@gmail.com
editor@ijmece.com

www.ijmece.com

ISSN 2321-2152
www.ijmece.com
Vol 10, Issue 2, 2022

Analyzing the Representation of Student Participation in Educational Settings

Mr.Bhanu Chander Pachimadla[1]., Nagavelli Sruthi[2]

1 Assistant Professor, Department of CSE, Malla Reddy College of Engineering for Women., Maisammaguda., Medchal., TS, India

2, B.Tech CSE (20RG5A0507),

Malla Reddy College of Engineering for Women., Maisammaguda., Medchal., TS, India

Abstract

In the realm of education research, comprehending college students' academic achievement is crucial. Among other things, instructors, program coordinators, and professors are curious about how students are learning particular subjects, how certain subjects may affect the learning of other subjects, and how students' attendance and grades in each course may serve as significant performance indicators. Education institutions are increasingly using data analytics and visualization to handle a range of data-related activities and get insights from the data. In this research, we provide a visual analytical tool to do some visual analysis of students' data from program courses by combining machine learning and data visualization approaches. The development of two educational data sets served as the basis for the following: i) predictive models that used a range of well-known machine learning techniques to try and predict students' future grades based on their attendance and grades from previous semesters; and ii) a set interactive layout that emphasizes the relationship between grades and attendance while also taking into account extra variables like gender and parents' educational attainment. We conducted a number of trials, using these data sets as well, to assess the layouts' capacity to draw attention to noteworthy patterns. Our encouraging findings indicate that this kind of analysis may be useful in assisting education specialists in comprehending course structure shortcomings.

Index Terms: - attendance, machine learning, data visualization, and design

I Introduction

Numerous research studies address the significance of analytics and predictive methods in higher education as well as the factors that influence academic performance. These discussions aim to enhance the attainment of learning objectives, present fresh, contemporary opportunities for enhancing the efficacy of educational systems, and enable personalized learning. Even though Ruffing et al. (2015) discuss the effects of learning techniques and gender differences on academic performance, educational psychology is still very interested in the variables that underlie academic success prediction. To get relevant data for analytical activities, a dependable job is to request anonymized student records from the institution. In this way, innovative analytic techniques aid in the understanding of learning situations including student performance and associated variables, assisting educators in making decisions. We provide a computational method for data analysis in education in this work. By giving educators and school administrators tools to recognize and investigate trends and patterns in this data and to understand the actual circumstances surrounding a particular educational scenario, we hope to show how predictive analytics and data visualization techniques can be extremely useful tools for supporting their decision-making. We think that a visual analysis tool that makes use of information visualization and machine learning methods enhances the understanding of students' behavior over the course of semesters by educational specialists, helping them to devise efficient plans to address associated weaknesses. Our primary objective is to find out how well the system's tools can answer the following research questions: Can one forecast a student's grade based on their attendance and grades from previous semesters? Does a student's attendance affect their semester grades? Studies indicate that a student's academic performance and accomplishment are significantly influenced by their attendance (Jones 2006; Kassarnig et al. 2017). We used a range of machine learning models, taking into account students' attendance, to forecast students' data patterns across several semesters. We then compared the predictions to the actual data to assess how accurate they were.

Does a student's gender have an impact on how well they succeed in certain subjects?

In a statistical assessment of performance, gender was taken into account. Due to this feature, several research additionally take into account racial/ethnic, educational, and psychological

ISSN 2321-2152
www.ijmece.com
Vol 10, Issue 2, 2022

characteristics (Dee 2005; King et al. 2002; Wilson and Shrock 2001). Do outside variables, including parents' educational attainment, affect how well their children succeed in school? Gooding also talks on the impact of outside forces (2001). We used a method called "Multidimensional Projection" to investigate the similarities in the structure of the relationships between the pupils. Finding profiles and/or outliers that might account for their success in the courses over the course of many semesters is the aim. We examined two educational data collections to assess our system: one contained student records from the Exact science programs at the Federal University of Uberlandia, Brazil's Faculty of Computing, and the other contained student records from two Portuguese public schools.

2 Literature survey

While a number of publications (Klerkx et al. 2014; Anaya et al. 2016; Thompson et al. 2013) discuss how instructors might utilize data visualization to improve learning, there aren't many that use visualization techniques to assess educational data. In order to understand the learning processes in complex learning environments, Thompson et al. (2013) addressed the selection, processing, visualization, analysis, and linking of numerous learning and learning environment aspects. Lacefield et al. (2018) investigate, in a small number of experiments, how data visualization, predictive analytics, and machine learning might be used to student information that is accessible to educational decision makers. More emphasis was placed on showcasing individual academic performance records in order to instantly identify students who are "at-risk" for academic coaching, advising, and other forms of help.

DeCotes (2014) represented the grade performance of the students for various course combinations using a heatmap representation. Three distinct course pairs are studied in this paper, and the findings demonstrate that various course pairings produce various behaviors. According to the research, students who do badly in a level one course are likely to obtain comparable low marks in a level two course. They may more easily perceive the change in grades from one level to the next using this graphic.

Regarding predictive analytics, Urrutia-Aguilar et al. (2016) also used a logistic regression model to predict characteristics that affect first-year biomedical students' academic success. In order to enhance prediction methods for future student performance in particular university courses, Soule (2017) also used multiple logistic regressions. His research revealed that, in every instance, the performance of logistic prediction models matched or surpassed that of the existing prediction methods while utilizing an equivalent or fewer number of explanatory variables.

A descriptive statistical analysis was conducted by Fernandes et al. (2019) in order to have an understanding of the academic achievement of the students. Random Forest models were used by Gutierrez et al.() to forecast students' academic achievement in various engineering courses. In our system, we used a few of these predictive analytics methods. Fernandes et al. (2019) demonstrated that "grades" and "absences" attributes were the most relevant for predicting the end of the year academic outcomes of student performance. They did this by using classification models based on the Gradient Boosting Machine (GBM) to predict academic outcomes of student performance. The examination of demographic characteristics showed that a student's "school," "age," and "neighborhood" may also be useful predictors of their success or failure in school. In our investigation, we also looked into the aspects of "age," "absences," and "grades" using machine learning and visualization techniques. In order to learn more from the data, we also carried out descriptive statistical analysis and used visualization strategies to highlight the important variations.

3 Implementation Study

The students must manually enter data into the current system. Here, handwritten registers will be used to record attendance. For the user, maintaining the record will be an arduous task. Here, human labor is more prevalent. Since the entries are kept in handwritten registers, retrieving the information is not as simple. For this application, accurate feed input must be entered into the relevant field. Assume the program refuses to function if the incorrect inputs are entered. Thus, the user finds it challenging to utilize.

3.1 The suggested approach

In this project, we get attendance information from a dataset and provide present, authorized, and non-authorized absentee pie charts. We are computing the attendance of students every semester, week by week, in the Histogram Chat.

3.2 Approach

1. Provide the Attendance Dataset.

This module allows us to upload a "sample.csv" file and import datasets by clicking the "Open" button.

2. Attended and Unattended Pie Chart

ISSN 2321-2152
www.ijmece.com
Vol 10, Issue 2, 2022

Calculate which students attended and which did not on this module screen, then present the results on a graph.

3. Attendance Wise Week Histogram Chart computes attendance of students by week and semester.

donning.

4 Results and Evolution Metrics

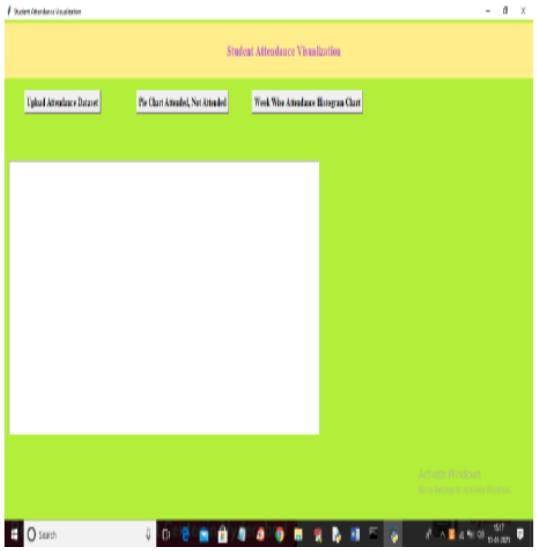


Fig. 1: To upload the dataset, click the "Upload Attendance Dataset" button on the above page.

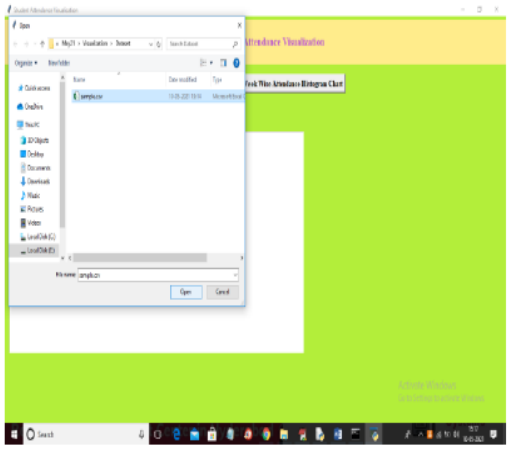


Fig. 2: To load the dataset and see the screen below, pick and upload the "sample.csv" file from the top screen, then click the "Open" button.

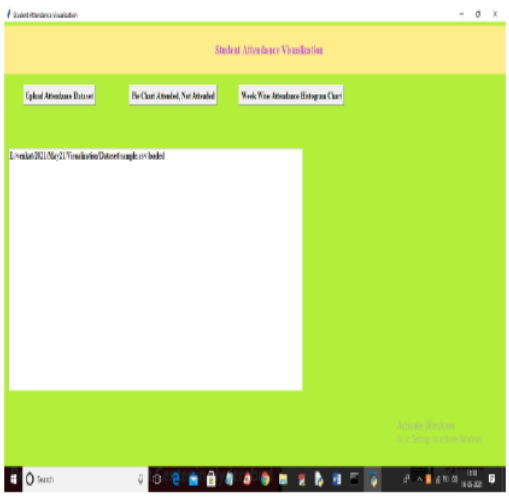


Fig. 3: To determine attended and not attended, load the dataset in the above page and select the "Pie Chart Attended, Not Attended" button.

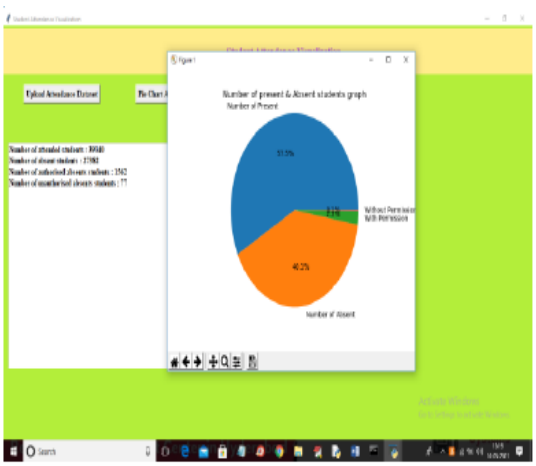
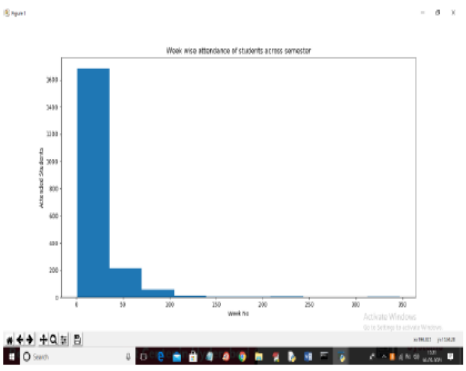


Fig 4:- We can see attended, not attended, with and without permission in the text field and graph above. Close the above graph, then click the "Week Wise Attendance Histogram Chart" button to compute the number of students who attended each week and each semester.



ISSN 2321-2152
www.ijmece.com
Vol 10, Issue 2, 2022

Fig 5:- The week no. is shown on the x-axis of the above graph, and the attended pupils are shown on the y-axis.

5.Conclusion

In order to examine academic data, we created a web-based visual analytics system with many visualization techniques. Our preliminary findings make sense of this kind of multivariate data, which enabled us to get knowledge for more insightful decision-making in the academic setting in the future. We were able to demonstrate the connections between student demographics and genders, grades and attendance, grades and parents' educational attainment. Furthermore, we developed a range of machine learning models that forecast students' performance based on their attendance (absence rate), and we used a visualization method to assess the precision of these models.

6.References

1. A. R. Anaya, M. Luque, M. Peinado, A visual recommender tool in a collaborative learning experience. Expert Systems with Applications. ***45:****, 248–259 (2016).*

2. L. Breiman, Random forests. Springer. ***1****(45), 5–32 (2001).*

3. P. Cortez, A. M. G. Silva, Using data mining to predict secondary school student performance (EUROSIS-ETI, Ostend, 2008).

4. M. B. DeCotes, Data analytics of university student records (2014). Master's Thesis, University of Tennessee.

5. T. S. Dee, A teacher like me: Does race, ethnicity, or gender matter?American Economic Review. ***95****(2), 158–165 (2005).*

6. H. Drucker, C. J. Burges, L. Kaufman, A. J. Smola, V. Vapnik, in Advances in Neural Information Processing Systems. Support vector regression machines (MIT PressCambridge, 1997), pp. 155–161.

7. R. Etemadpour, R. Motta, J. G. de Souza Paiva, R. Minghim, M. C. F. de Oliveira, L. Linsen, Perception-based evaluation of projection methods for multidimensional data visualization. IEEE Transactions on Visualization and Computer Graphics. ***21****(1), 81–94 (2015).*

8. E. Fernandes, M. Holanda, M. Victorino, V. Borges, R. Carvalho, G. V. Erven, Educational data mining: Predictive analysis of academic performance of public school students in the capital of brazil. Journal of Business Research. ***94:****, 335–343 (2019).*

9. E. Fernandes, M. Holanda, M. Victorino, V. Borges, R. Carvalho, G. Van Erven, Educational data mining: Predictive analysis of academic performance of public school students in the capital of brazil. Journal of Business Research. ***94:****, 335–343 (2019).*