

STUDY ON DECISION TREE ALGORITHM FOR DETECTION OF STUDENTS' PERFORMANCE

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Abstract : In Indian academics culture, there are two types of exams conducted during academic studies. First is theoretical exam and practical exam, performance of theoretical exam is dependent on how the student solve question paper. On the other hand practical exam performance is dependent on student's overall class performance i.e. regularity, attention in class, behavior etc. Sometimes it is very difficult for teacher to take decision while giving internal practical marks to each student. Therefore to solve this issue the propose work will be an automatic tool to recommend assessment marks for each student depending on his class test performance throughout the semester.

Index Terms – Decision tree, Dashboard, learning analysis, Data Mining.

I. INTRODUCTION

In the field of learning analytics, dashboards are viewed as an important way in which data about students' learning processes can be used to make instruction more effectual. Dashboards are frequently used in college-level online courses or blended courses. They have also been used to support computer-supported collaborative learning scenarios learning with mobile devices, and laptop instructional technology. Numerous papers describe dashboard designs and present evidence that users found these designs useful. However, there has been almost no factual work that shows how teacher dashboards influence students learning.

II. LITERATURE REVIEW

Literature review is the survey of existing information which is related to a current topic.

2.1 Dashboard:

[1] E. Hutchins proposed a theory states that instrussss/ments can support professionals when these instruments fit seamlessly into the activities of the professional.

[2] D. A. Norman proposed an extensive research in domains ranging from aviation to medicine shows that the connection between instruments and the professional's routine is of great importance for the successful uptake of new instruments. In classrooms a dashboard can be considered a 'new' instrument that supports the selection of effective pedagogical actions by teachers.

2.2 Learning analysis:

[3] K.Verbert had distributed cognition theory provides a research paradigm to frame the use of instruments in professional's work, learning analytics process model is used to investigate how teachers use dashboards in daily classroom contexts. This model will be applied to teachers and their use of dashboards in their teaching practices.

[4] E. Roelofs, P. Sanders proposed a translation of dashboard data into pedagogical actions during their daily practice teachers constantly make decisions leading to pedagogical actions. These actions are based on teachers' pedagogical knowledge base which consists of knowledge, skills, and perceptions of students and of the class. Important knowledge elements are an understanding of individual student's abilities and their current level of domain knowledge and skills, but also more general knowledge about developmental problems that students face and how these problems relate to their learning.

III. PROPOSED WORK

The proposed work includes student's assessment using learning analysis model in which it recommends assessment marks for each student depending on his class test performance throughout the semester. Here first student will login in their portal. After that they started the online Quiz, the system will automatically track their performance and action. During the quiz, system will track students click through data about attempted and non-attempted questions, time taken to attempt each question, no of attempts made on each question, no of correct answers, no of wrong answers and no of not attempted answers. Depending on this data, system will show live dashboard to display each student's performance and complete performance of all students while they are attempting the test. Basically dashboard will indicates in three division first is in green color which mean it is correct answer,

second is in orange color which mean student is confused, clicking randomly on the option, third is in red color which mean it is wrong answer. In this way the student performance is very useful to decide the assessment marks of the student using decision tree algorithm.

3.1 The proposed system includes three users are as follows:

3.1.1 Admin: In this module, admin add the staff, manage the Quiz and view student performance.

3.1.2 Staff: In this module, staff can view own allotted subjects, manage quiz, arrange quiz and view live students performance at the time of quiz.

3.1.3 Students: In this module, students can view quiz schedule, can appear quiz and view their own performance.

3.2 The proposed system contains the modules which are as follows:

3.2.1 Admin panel: Admin is the very first module in the system. It has all the authority of project. It manages users, project data, and modules and maintains the database of the system. In this project, admin first login into the system. Then as our work is on student's assessment it allows the students and staff for registration. After that it tracks all the user's activity and arranges their data. On the other hand, admin can also register branches and semester wise subjects. It can also approve pending request of staff and students. Then it also manages the quiz. Admin have the authority to view staff, view students and also view student's performance reports.

3.2.2 Staff panel: Staff is another module in the system. Firstly staff login into the system. Staff can view their own allotted subjects. Staff can add class details, arrange the quiz/class test and manage the quiz questions. Staff can manage all the students data related to their quiz. It will arrange class wise quiz. Staff can also view the student's performance. Whenever students giving their online quiz, staff can view their live performance from the database during the time of quiz depending on these activities, staff can find out category wise student performance using decision tree algorithm.

3.2.3 Student panel: Student is the most interactive module in this project. This module is for students only. All the exams conducted in this project is just for students. The idea behind this project is conduct the exams for students, analyse their performance and help them to enrich their level. To participate in the exams first student have to register into the system. After that student have to login from the portal of the exam. Then, student can view the quiz schedule which is declared by the staff. To give the exam student can view the quiz schedule according to that they will appear for the quiz. After appearing the quiz they can view their own performance. After this, if their performance is low they will try to improve. This way student will appear for the quiz and upgrade their knowledge.

3.2.4 Learning analysis panel: Learning analysis is the measurement, collection, analysis and reporting of data about learners and their contexts. A related field is educational data mining. This module is used to analyses the behaviour of learner. While solving the quiz questions, student's activities will be track in the database. For example-how many times they appear for the question, time taken for solving the quiz etc. And according to that activities students live performance will be display on dashboard. Staff will be able to view live performance of students. In this way learning analysis is used to show the students performance and using this information staff will understand the student level.

3.2.5 Decision supports system: The decision supports system is computerized information system which helps for decision making activity. In proposed Decision supports system all the activity of students will be track during the quiz period and depending on these activities system will find out the category wise students performance using decision tree algorithm. The categories of student's performance are sincerity, promptness, subject knowledge, question/answer confusion, basic concepts knowledge and last advanced concepts knowledge. According to this they differentiate the students into category. This way the decision supports system will help the staff for analyze the student's category. According to this data, it is easy to decide assessment marks that should be given to each student.

3.3 Working of System:

In this system there are three users: Admin, Students and Staff. To access the system student need to login the system. For login first student have to register. After completing the registration student can do login and then see whether quiz is schedule or not which is declared by staff. To give the exam student can view the quiz schedule according to that they will appear for the quiz. After appearing the quiz they can view their own performance. After that staff will login into the system. Staff can view their own allotted subjects. Staff can add class details, arrange the quiz/class test and manage the quiz questions. Staff can manage all the students data related to their quiz. Staff can also view the student's performance. Whenever students giving their online quiz, staff can view their live performance from the database during the time of quiz. Decision support system in which it will track all the activities of students during quiz period. Depending on these activities staff will find out category wise student performance using decision tree algorithm. According to this data, it is easy to decide assessment marks that should be given to each student.

3.3.1 Working Diagram:

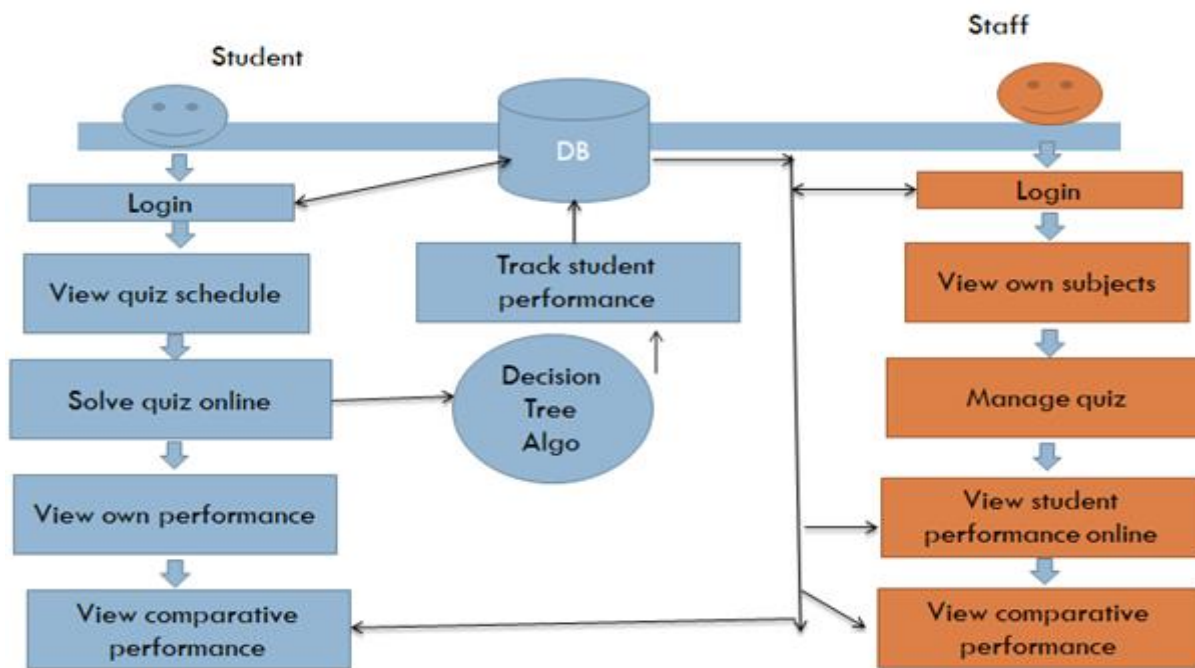


Fig.1 system flow diagram

3.4 Algorithm:

Decision Tree algorithm belongs to the family of supervised learning algorithms. Unlike other supervised learning algorithms; decision tree algorithm can be used for solving regression and classification problems too. The general purpose of using Decision Tree is to create a training model which can use to predict class or value of target variables by learning decision rules inferred from prior data. The comprehension level of Decision Trees algorithm is so easy compared with other classification algorithms. The decision tree algorithm attempt to solve the problem, by using tree representation. Each internal node of the tree correlate to an attribute, and each leaf node corresponds to a class label.

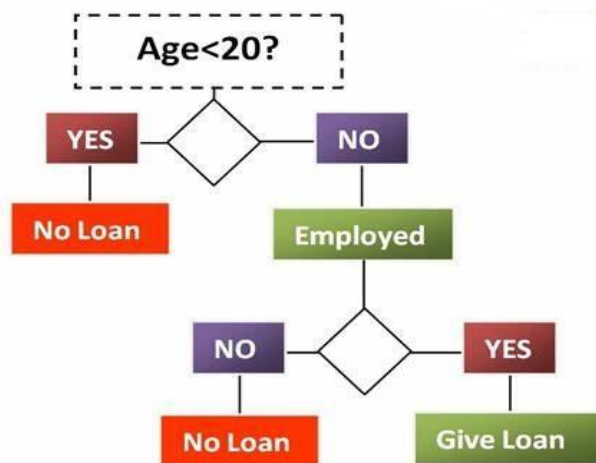


Fig. 2 decision tree diagram

3.4.1 Decision Tree Algorithm:

Step1: Place the best attribute of the dataset at the root of the tree.

Step 2: Split the training set into subsets. Subfield should be made in such a way that each subset contains data with the same value for an attribute.

Step 3: Repeat step 1 and step 2 on each subfield until you find leaf nodes in all the branches of the tree

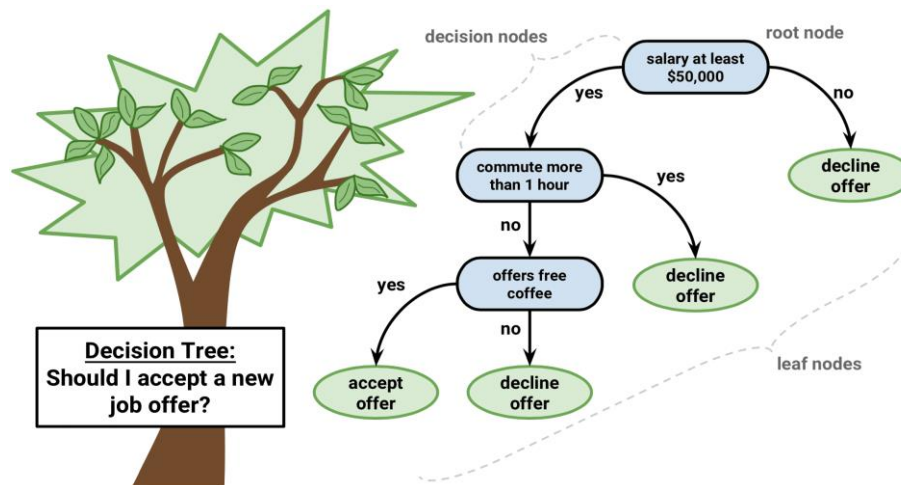


Fig. 3 flow of decision tree algorithm

3.4.2 Working of algorithm:

In decision trees, for estimate a class label for a record we start from the root of the tree. We contrast the values of the root attribute with record's attribute. On the basis of differentiation, we follow the branch corresponding to that value and jump to the next node. We continue comparing our record's attribute values with other internal nodes of the tree until we reach a leaf node with predicted class value. As we know how the modelled decision tree can be used to predict the target class or the value. Now let's comprehension, how we can create the decision tree model.

IV. CONCLUSION

The work is how teacher use the dashboard to analyse the students. The staff will aware about the dashboard. It is easy for teacher to judge the student's ability or performance on the basis of information available on the dashboard. As the students live activities are track on dashboard, teachers are updated about their work. And it is helpful to staff to give the assessment marks on the basis of information available on dashboard.

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