LEARNSURE: A MACHINE LEARNING BASED SMART COURSE EVALUATION SYSTEM FOR SKILL

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Abstract*—This paper presents Learn Sure, a course evaluation system. It helps users decide if a course is worth investing in. The system checks domain relevance, market demand, experience level and cost efficiency. It gives an evaluation score. This provides an effective decision support tool for learners.

Keywords*—Machine Learning, Course Evaluation, Skill Investment, Decision Support System, Educational Data Mining

I. INTRODUCTION

The advent of online learning platforms has resulted in rapid growth and has made skill-based education available for a variety of fields, such as Data Science, Artificial Intelligence, and Business Analytics. Therefore, learners have a significant challenge in selecting the appropriate course for themselves in highly competitive and rapidly changing fields. Learn Sure is designed to assist students who have doubts about selecting the best course from the various options available today.

A. Objective

The experience level of needed to qualify for jobs, and their cost to students. Many students do not have prior knowledge about whether a course will help them in their pursuit of a job. The creation of Learn Sure is motivated by the need to support learners by providing knowledge of the courses they are enrolled in and the potential impact a course may have on their career success as well as the affordability of the courses.

B. Motivation

The motivation for this work is the rapidly increasing number of courses available to learners, making the selection of a specific course from the multitude of course options available more challenging. Many people spend time and money training and/or obtaining a degree without truly understanding the value of the course, and this work is intended to provide a reliable source of information to help individuals make informed choices regarding skill investments.

II. BACKGROUND AND LITERATURE SURVEY

Data mining in the educational field is concerned with analyzing the data to improve the educational system and students' performance" Machine learning is also widely used to evaluate the performance of courses and make decisions in the educational field. Similarly, the role of the recommender system cannot be ignored, as it has the potential to recommend courses to the

students on the basis of the analysis of the data and the preferences of the students. Learn Sure is also based on the idea of incorporating the parameters of course evaluation along with the scoring system.

III. PROJECT DESCRIPTION

The Learn Sure system will evaluate all of these components and assign a score to the course. Based on the score, it will indicate whether the course is worth it or not worth it, and provide advice. The Learn Sure System is available on the Internet, so participants can access it when they want to evaluate a course.

A. Project Scope and Objective

This project is designed to create a mechanism for evaluating online courses to determine whether they are of value. The Learn Sure platform will evaluate the degree to which a given course will assist in the participant's future employment prospects, and whether the course is a reasonable use of the participant's money. The objective of the platform is to produce a reliable methodology for participants to identify courses that best meet their needs and are currently valued in the marketplace.

B. Key Project Deliverables

The Learn Sure project consists of key components that enable it to function:

- An internet portal to assess the quality of learning resources.
- An assessment methodology or scoring system for determining how "good" a course is.
- An interface for users to input their information and view results.
- A mechanism for assigning scores to courses so that the Learn Sure system can ensure accurate recommendations.

IV. TECHNICAL SPECIFICATIONS

The Learn Sure system is designed with components that include front-end applications for creating a user interface and back-end applications for creating, storing, and compiling the evaluation results.

A. Core Libraries and Frameworks

The following are some of the key libraries and frameworks used within the Learn Sure system for programming:

- Learn Sure used Python for their programming because it is simple to use and has support when you are working with data.
- Flask is something that helps you make a website. It is used to create the back-end server so it can talk to the user. When the user does something like send in an evaluation Flask figures out where to send the request. Then it sends the answer back to the user, which is usually some kind of report, about the course evaluation.
- NumPy provides assistance when working with numbers and performing arithmetic and logic operations.
- Pandas provides assistance when reshaping and preparing data; it also provides assistance for working with structured or organized data.
- Scikit-learning is used to develop and implement machine-learning algorithms for creating evaluation metrics.
- Matplotlib is used for creating charts and graphs, which provide a visualization of the results produced by the Learn Sure system's evaluation process.

V. PROPOSED METHODOLOGY

The Learn Sure online learning evaluation system is a step-by-step evaluation tool to verify the effectiveness of an online class through a series of criteria which provide an objective score indicating the value of an online educational course. The application of data-driven decision making is part of modern-day systems. The use of data-driven analytical methods to assess the effectiveness of courses and learners in terms of their learning results is used in education.

A. Approach Overview

The evaluation model produces a score that determines how relevant the course is to the course domain, how much demand there is for the course in the marketplace, how many years of experience the person taking the course has and how much the course costs to take. Based on this score, the course is identified as Worth It or Not Worth It, providing an efficient decision-making process.

B. Dataset Preparation and Preprocessing

The course parameters evaluate how relevant the domain is to the course; how much demand there is for the course in the marketplace; how much experience the individual taking the course has; and what the cost is to take the course. When inputting the data into the Learn Sure systems, the data is analyzed to ensure that the data is accurate. Pre-processing of the data will consist of converting the inputs from text to numerical values and normalizing those numerical values.

C. Hierarchical Model Development

Evaluation of the course is done using a hierarchical evaluation method, with the first level of the hierarchy evaluating domain relevance and demand for the course (i.e. demand in the marketplace) and evaluating the second level of the hierarchy based on experience to determine if the course will provide professional development opportunities taking the course

D. Training Strategy

The Evaluation Model is developed through a Training Method.

In Stage 1, the system performs Feature Learning by exploring the relationships between course parameters and their impact on the course's score.

In Stage 2, the Evaluation Model will be Improved for increased accuracy and enhanced model performance through Fine Tuning.

E. Analysis Framework

The analysis framework also evaluates performance trends by experimenting with various combinations of input parameters. Confusion Matrix Analysis assesses how the system makes predictions, such as how many Courses were classed correctly versus incorrectly.

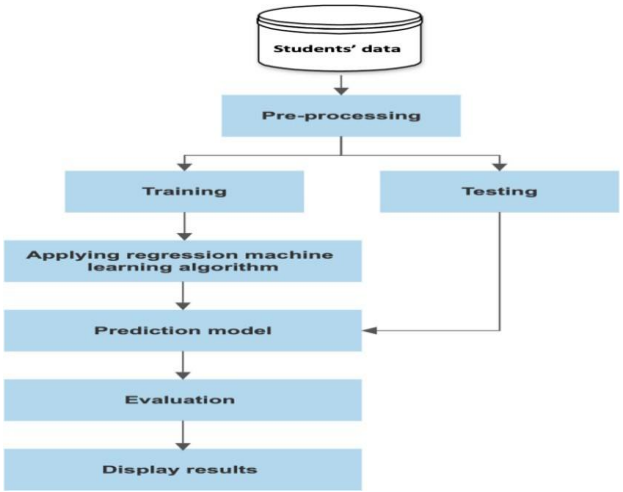

Fig 1: Methodologies

VI. ARCHITECTURE DIAGRAM

The Learn Sure system has been designed to examine course data and provide relevant recommendations.

A. Input Layer

This portion of the system is important, as it allows for the improved functionality of the system and significantly reduces the complexity associated with operating the system.

B. Feature Extraction Backbone

This portion of the system is important, as it allows for the improved functionality of the system and significantly reduces the complexity associated with operating the system.

C. Global Average Pooling

It summarizes the feature information into a format that allows for easier use by the system. This reduces both the complexity involved in evaluating the data and the duration it takes to evaluate the data, which is advantageous

D. Classification Heads

Classification heads are the final output of the system. They use features to calculate a score, then based on the score tell the user if that course is worth taking or not.

E. Dropout Layer

The dropout layer helps the system to consistently perform well by preventing it from becoming too proficient in one area of expertise.

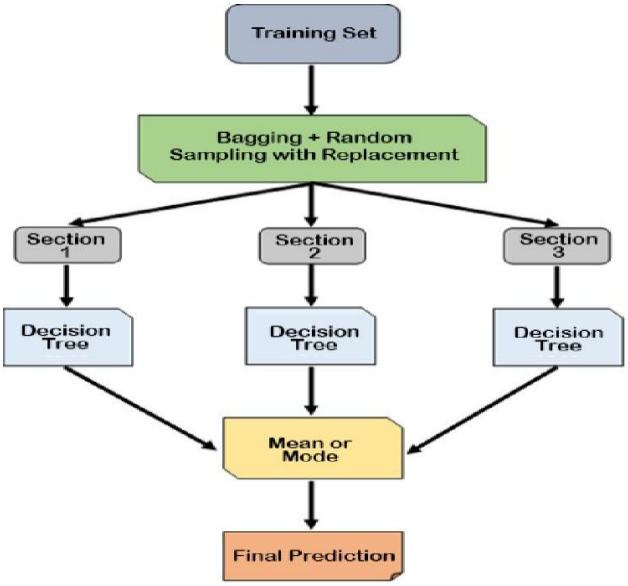

Fig. 2: Proposed Learn Sure System Architecture

VII. INPUT DATA DESCRIPTION

The Learn Sure system uses various pieces of data to evaluate how good an online course is. The various parts of the data help to determine how good a course is by including, but not limited to, course relevance, desire from consumers, amount of experience required and cost of the course. All of the data points mentioned above are critical to the Learn Sure system for making informed decisions and for giving the user feedback on the courses.

A. Dataset Overview

The Learn Sure system has a large amount of relevant data on the courses that we used to evaluate the courses. The data includes whether it is relevant or not, the desire of users to take that course, the effort needed to complete the course and what the monthly costs are.

B. Dataset Statistics

The data consists of individual records for each course with many individual attributes. The records that we are most interested in are:

- Domain Score
- Market Demand Score
- Experience Score
- Cost per Month
- Overall Evaluation Score

Analysis of these records provides information about the types and range of each of the individual attributes.

C. Class Distribution

The courses in the Learn Sure system can be divided into one of two categories:

- Worthwhile - These courses will help advance your career while acquiring new skills.
- Not Worthwhile - These courses are rated less than worthwhile due to either lack of popularity or being too costly.

D. Data Preprocessing Steps

Before evaluating courses, we validate the information and ensure it is accurate and consistent by changing the words into numbers, checking that all of the numbers are on the same scale, and calculating things like the total cost per month.

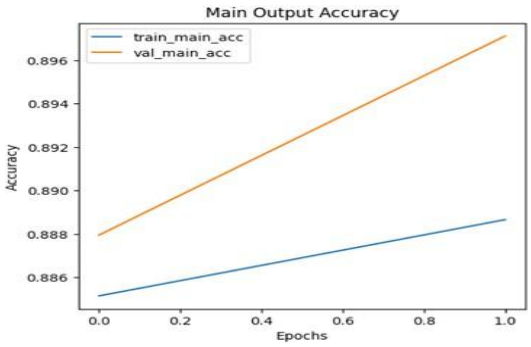

Fig 3: Training&Validation Accuracy Curves.

VIII. PSEUDOCODE & IMPLEMENTATION

The following section details how the Learn Sure system works and what it does. The Learn Sure system uses the user's input, applies a matrix to it, and outputs results, based on user input, in the form of acceptable course recommendations. When developing the Learn Sure system, its developers had many goals in mind, including: speed, handling multiple users at the same time, and being easy to use over the web.

Step 1: Begin the process.

Step 2: Get the information from the user about the course, the price, how long it will take, the amount of experience, etc., that they would like to take the course.

Step 3: Convert that information to numbers.

Step 4: Calculate the cost of the course on a monthly basis by dividing the course's price by the amount of time it takes to take the course.

Step 5: Use a formula to evaluate the course.

Step 6: Generate a score for the course.

Step 7: If the score is good enough, return the recommendation as Worth It. If not, return as Not Worth It.

Step 8: Display the results to the user. Give the reason for the recommendation. and End the process.

A. Dual Output Data Generator

The Learn Sure system returns two types of results for each course reviewed: A number that represents the quality of the course and a simple answer as to whether the course is Worth It or Not Worth It. Based on the information you provide us, our system generates both types of output so that you can make an informed decision regarding the viability of purchasing a particular course.

B. Model Architecture Implementation

The developers of the Learn Sure system utilized a basic model with a set of rules to evaluate the effectiveness of each course. This rule-based model is capable of evaluating input provided by users and producing an output score that will determine whether or not the course is acceptable or unacceptable. Although the model is fundamentally simple and provides a quick turn-around time, it is nevertheless capable of producing precise results. Most recommendation-based systems utilize rule-based models to evaluate multiple requests simultaneously.

C. Training Pipeline

Users provide us with information to apply rules and test methods. The steps would be:

1. Prepare information to be Used

2. Collect portions of the information

3. Obtain your score & determine if the course is Good/Not good

D. System Development

The Learn Sure System is implemented using Python with a web framework known as Flask. The end-user portions have been developed using HTML and CSS. The system has been designed for ease of use. As users enter their course information, they receive their results in a timely manner. The Learn Sure System has been developed so that it is easy to navigate, allowing users the ability to assess course quality quickly. Because it is internet-based, users can access it via any device, increasing the system's convenience for its users.

IX. OUTPUT ANALYSIS

In the output analysis section of the test of the Learn Sure system we assess how well it uses the information we provide to produce results. We have the output of the system in numerical and categorical form; we use these in various forms of analysis and visualizations to produce a better understanding of the results. We want to make sure the system works correctly so we will test the evaluation model to see how well it performs based on our data - and thus provide evidence of how well the evaluation model performs based on the input data we provided.

A. Metric of Training Performance

The training performance metric informs us of how well the Evaluation Model does with the input data. We will test the Evaluation Model using different combinations of data to determine how those combinations will affect the final score determined by the Evaluation Model. If the output scores produced by the Evaluation Model are consistent, this means that the Evaluation

Model is functioning properly. The Evaluation Model is trusted to provide good advice if it functions properly using different data.

B. Validation Performance

Performance Evaluation using validation test data measures how well the system can generalize to generally-unseen (i.e., test) course information combinations that are used to classify course pairs into their respective categories (i.e., whether course A is a prerequisite or not). Performance evaluation provides evidence of a fair model and gives us the ability to develop models that produce reliable results and therefore form an effective and trustworthy model.

C. Visualization Results

Data visualization graphs and charts will be created as visualizations of all performance evaluation data for all evaluations. Examples of data visualizations would be a graphical accuracy curve for all of the evaluated classification models to illustrate how the different sets of test data were evaluated and how the individual records were evaluated to produce their evaluations.

X. RESULTS AND DISCUSSIONS

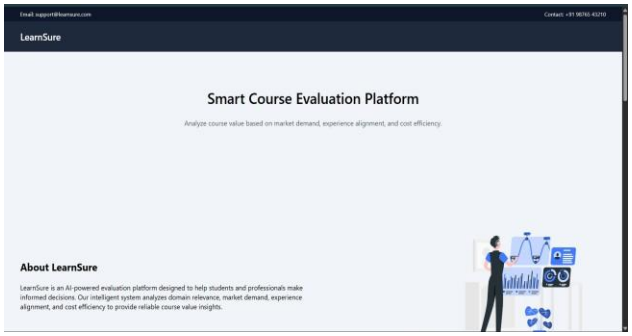

Fig 4: Home page

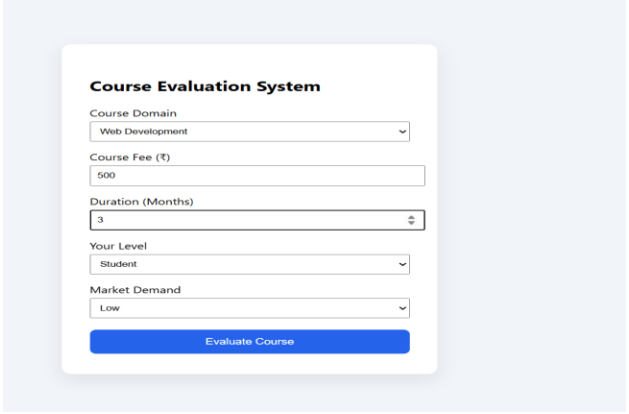

Fig 5: Course Evaluation Form

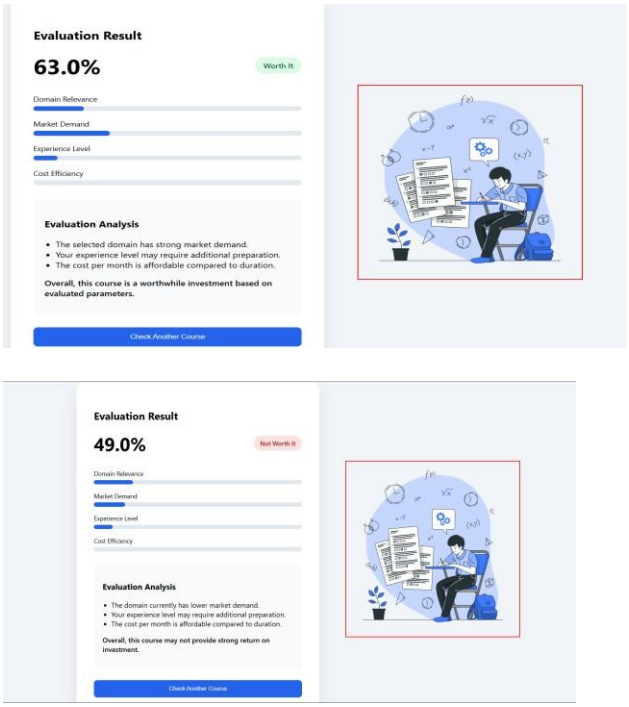

Fig 6: Result Pages

XI. CONCLUSION

This project will create a new approach, called Learn Sure, to assist people in choosing the best possible education courses when searching for online educational offerings. The Learn Sure system will review various criteria, including the content, popularity, and relevancy of each course being considered to determine whether that course is the correct "match" for an individual participant based on his/her present level of

education, prior work experience and financial resources. The Learn Sure system differs from similar systems already available because it considers two important factors: how likely the participant is to get hired because of completing the course and how effective it is in terms of financially preserving the participant's resources. Accordingly, this system will significantly reduce wasted money for participants based on inaccurate or out-of-date data. Furthermore, this system demonstrates how using data for decision-making can take place in education as well. As success occurs, improvements will include adding real-time job market analytics data to the foundation of the Learn Sure system and utilizing advanced machine learning algorithms to enable the system's overall ease of use to continuously improve over time.

XII. REFERENCES

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