International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 Impact Factor: 8.176 ISSN: 2582-3930

CAREER DENDOGRAM

Srushti ,Suhas M, Sunil Kumar S, Shivakumar A

ABSTRACT

Examining how career counselling aids students in making educated judgements about their professional careers is the goal of this study. The study suggests a career-focused educational model called "Map My Career" that makes use of a PowerBI and Python software programme to address issues like academic preparedness, workload management, and graduate employability in order to increase student satisfaction with their studies. The programme analyses information from both educational settings and job adverts in order to link coursework with pertinent skills and vocations. It seeks to find any gaps between the abilities that students learn via their university coursework and those that are required by the labour market in order to help students make better career decisions

INTRODUCTION

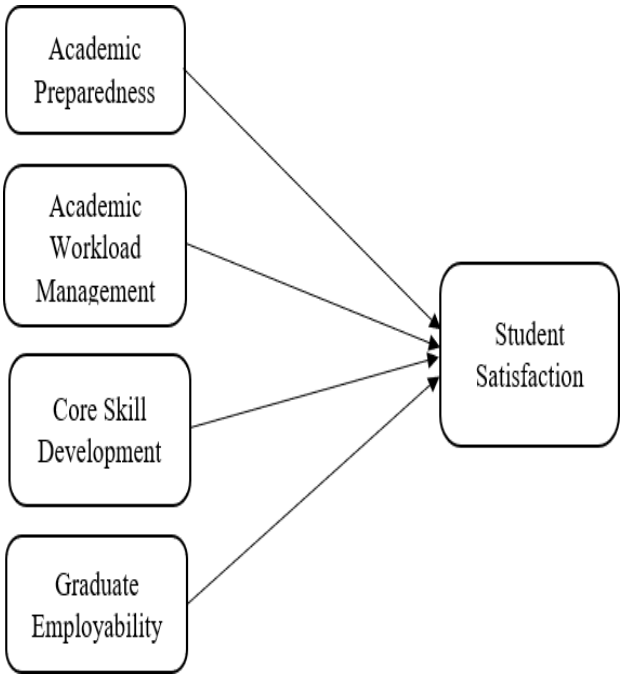
Through a specialised software programme, this career counselling system is intended to offer personalised professional development advice. In order to assist someone in choosing the best career route and making wise decisions regarding their professional development, it takes into account their interests, skills, personalities, and values.High school students who are just beginning to explore their career interests and may not be fully aware of their own talents and abilities will find the method particularly helpful. The method seeks to improve student satisfaction and professional success by tying education to relevant careers. From the viewpoint of the main recipients of highereducation, the application's effectiveness is assessed.

Many career prediction models have been created in recent years utilising statistical analysis of massive datasets and machine learning techniques. On the basis of a variety of factors, such as education level, work experience, and skills, these models provide precise projections of future career options, job market trends, and income ranges. Individuals can reduce uncertainty, optimise their career trajectories, and make well-informed decisions about their professional pathways by using these models.

However, despite the potential benefits of career prediction models, there are also significant challenges associated with their implementation. These challenges include the need for large datasets, the complexity of machine learning algorithms, and the potential for bias in data collection and
analysis.

Therefore, there is a need for further research to develop more accurate and reliable career prediction models that can effectively guide individuals in their career Reviewing the present status of career prediction models, highlighting their advantages and disadvantages, and proposing a new career prediction model based on a hybrid strategy combining machine learning algorithms with subject-matter expertise are the main objectives of this study. The suggested approach tries to address the shortcomings of existing models and give people more precise and trustworthy forecasts about their potential career paths in the future. Overall, this research intends to expand the field of career prediction modelling by offering a fresh method that gets beyond current drawbacks and gives people insightful information about their career paths.

Furthermore, students' self-awareness is also a significant factor in the issue of misalignment between their career goals and the subjects they study in college A organised method is required to assist students choose their professional path and make plans for how to get there in order to solve this problem. In order to solve this issue, this study suggests adding online visual consultation to the career advice application's login pages.



Overview

We employ a set of binary-valued latent states that monitor the mastery of abilities at various periods in a user's career to determine the talents that users need to develop in order to accomplish their intended career objectives. These states must not decrease with time in order to take into consideration the reality that users often pick up new talents as they advance in their jobs. Using big datasets from Linked In and Indeed, we illustrate how well our model predicts organisations, job titles, and skill levels, and we demonstrate that it frequently beats standard techniques. Many studies have been done on the subject of student satisfaction in higher education. These studies have identified a number of variables that affect student satisfaction, such as the university's reputation overall, the standard of instruction, the knowledge and enthusiasm of lecturers, the calibre and accessibility of IT facilities, and the likelihood that a degree will advance students' careers. Academic performance, time management, and connections made while attending university have also been proven to have an influence on student satisfaction. The curriculum's connection to the experiences, interests, and goals of the students should also be taken into account. There have been numerous models developed, but generally speaking, the major focus of student satisfaction is on how students view their course and manage their academics.

The topic of student satisfaction in higher education hasbeen the focus of several research. The reputation of theuniversity as a whole, the quality of instruction, the expertise and enthusiasm of lecturers, the standard andaccessibility of IT facilities, and the likelihood that a degree will advance students' careers are some of the factors that these studies have identified as having an impact on student satisfaction. It has also been demonstrated that other factors, such as time management, relationships developed while in school, and academic success, may affect how satisfied students are. It is important to consider how the curriculum relates to theexperiences, passions, and objectives of the pupils. Therehave been many models established, but generally speaking, how students evaluate their course and managetheir academics is the main emphasis of student happiness The Plan My Career model seeks to provide students withthe skills they need to excel in all facets of their lives byoffering an evidence-based strategy to help them on their academic path.

The Map My Career approach is made to assist students in mapping out their academic and professional trajectories. It has components that offer details on courses, subjects, career alternatives, workload, and assessments and aids students in understanding the abilities required for various employment jobs and matching their course subjects to those talents. By involving students and assisting them in properly managing their academic burden, the approach also seeks to increasestudent happiness.

R is used for text processing and data analysis, while PHP and MySQL are used to construct the model as a web application. It offers details about work trends and career alternatives in Australia and is meant to be used in the educational system there. The goal of the model is to give students a useful and evidence-based planning strategy. succeeding in theiracademic careers

METHODOLOGY

The PHP, MySQL, and Apache servers are used to build the Map My Career model as a web application, while R is used for text processing and data analysis. Visualizations and validations are produced using JavaScript, jQuery, and Ajax. Students may access interactive information about their courses and vocations using the application's user interface, which also enables them to better comprehend the qualifications needed for particular jobs. Also, it provides an organised picture of each course in terms of the skills learned, along with simple visualisations, which may be useful for course assessment. The user interface enables students to evaluate their existing skill set in light of what the labour market requires and pinpoint any possible gaps. Moreover, it gives pupils a pictorial representation of their academic trajectory,

DATA COLLECTION

The authors used two degrees from an Australian institution, a Master of Information Technology and a Bachelor of Computer Science, to illustrate the Plan My Career concept. They retrieved data on the abilities, testing procedures, and course specifics for each of these courses from the course manuals. Also, they gathered 1200 IT jobs and 300 job adverts from employment websites, using text analysis and assistance from industry professionals to compile a list of competencies. They extracted skills with the aid of a domain expert and established a skill mapping taxonomy by storing the linked skills in the database after processing and filtering the raw data using R libraries. The objective was to map out the ability gaps for these courses and examine them.

USER INTERFACE

Readers will have an intuitive and user-friendly experience using this study paper's user interface. The user interface is simple and modern in design, making it simple to explore and get the information you need. It is suited for both desktop and mobile devices. There is a navigation bar at the top of the interface that gives you access to the abstract, introduction, methods, findings, discussion, and conclusion as well as other parts of the article. To get directly to any of these parts, all you have to do is click on it. The UI includes a search option that enables you to look for particular words or phrases inside the paper in addition to the navigation bar. This might be especially useful if you're trying to rapidly locate a certain portion of the publication or are seeking for information on a particular subject.

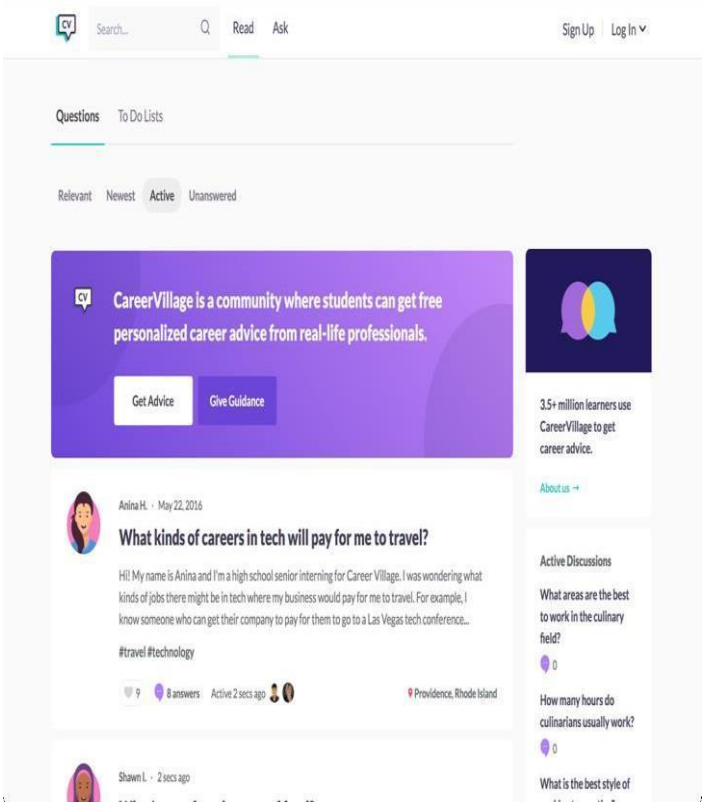
The document is provided in a single-column format to improve reading, and it has distinct headings and subheadings to assist organise the information. To make the text readable on a range of devices, the font size and line spacing have also been improved. Moreover, the interface has a number of interactive elements that improve content display and provide readers more context, such as tables, figures, and hyperlinks. You can just To get more information or to view a bigger version of the table or figure, click on any of these elements.

Overall, readers should find it simple and fun to access and interact with the material offered in this study report thanks to the user interface. Whether you are a student, researcher, or professional, the interface offers a fluid experience that enables you to concentrate on the paper's content and get insightful knowledge about the subjectmatter.

By knowing the options accessible to them and how the abilities they acquire via their academic studies fit with the skills needed in their selected profession, this is meant to assist students make educated decisions about their careers. By involving students, assisting them in managing their academic burden, and raising their understanding of the skills necessary for particular jobs, the approach seeks to increase student happiness Users should be able to engage with a career dendrogram and thoroughly study the data with the help of UI elements like zoom, pan, and hover-over tooltips. Although the pan function enables users to move about the dendrogram to examine various areas of the data, the zoom feature enables users to zoom in and out of the dendrogram to observe certain clusters and nodes.

A. INTERFACE FOR COURSE COMPONENTS

The purpose of the course interface is to make it easier for students to comprehend the courses that are offered each



semester, particularly those that have prerequisites and the core courses in their programme. It offers a thorough overview of the complete course, including the range of disciplines offered during the length of the academic career. In addition to the general course structure, the interface gives students the option to select a subject or stream to specialise in. Students can use this information to decide what to study based on the job they want to pursue. To aid in this process, the UI further uses a distincthue to indicate topics in the selected stream.

Students should be knowledgeable about their career and the courses given each semester.

any requirements for those disciplines, as well as the academic program's main subjects. Students can gain a broad understanding of the whole curriculum thanks to the course format. Students are given the chance to choose a particular subject or field of study in addition to their necessary curriculum because of this. Students may use the interface to check which courses are offered in their selected field of specialty, which can help them decide ona career path.

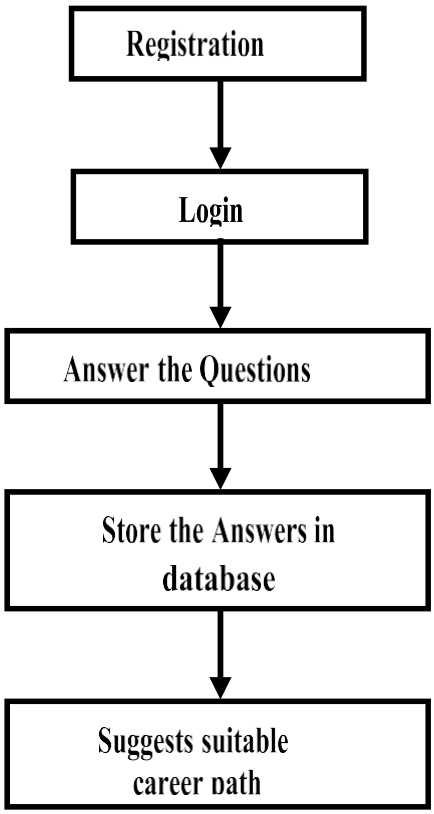
Application of the System

This system's objectives are to organise students and inform them about the university's academic offerings. The system has an administration module that, among other things, has a student database and a course database. Students can take part in a variety of sessions with various modules to gauge their proficiency. The system gives students a list of branches they can register for, allowing them to select a programme that suits them.

The system gives students a list of branches they may register for, allowing them to select a programme that suits them. The system may recommend a career route for pupils and provide success assistance by asking them questions. Data about students, including their secondary school accomplishments and interests, is kept in a database. Under the profession field on the login and registration pages, students can input their chosen field.

The server and client are merged into a single user interface where the system runs. The system's workflow is described in pseudocode, and it walks the user through the process of choosing a professional path. Registration and login are the first steps in the procedure, which is then followed by answering questions and entering the data into the database. And last, the system recommends

Modern decision-making models were created as a result of the time-consuming nature of decision-making procedures in the past for managers and employers. While making decisions, an individual or group of individuals frequently uses resources with the goal of selecting the best option.



mapping out appropriate branching

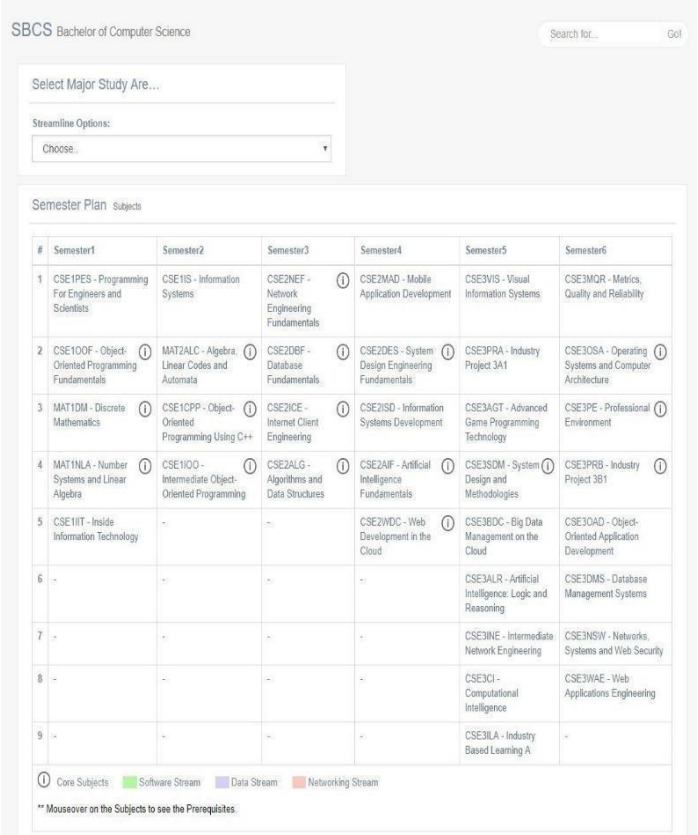
There are several methods for helping students select a subject of study. In the past, parents or instructors would frequently choose a student's major based on their results in secondary school. While making this choice, it's crucial to take the student's interests and subject knowledge into account. In addition to other things, students could be interested in understanding mechanics, developing novel software, or playing with electrical equipment. In the past, a counsellor would speak with the student and probe them to assist them choose the best area of study. As students are ready to apply to graduate schools, a new strategy has been devised employing an expert system that poses precise questions to them.

A table is created based on their replies and proposes an appropriate branch for the student based on their shared characteristics with other students.

The correlation between the student's secondary school grades and the expert system analysis is displayed in Table
2.0. The student interactions are examined by the expert system, which then calculates a grade. The proper subject of study is chosen based on this score and the student's academic %.
A table is created based on their replies and proposes an appropriate branch for the student based on their shared characteristics with other students.
The correlation between the student's secondary school grades and the expert system analysis is displayed in Table
2.0. The student interactions are examined by the expert system, which then calculates a grade. The student's proper subject of study is chosen based on this score and their academic percentile. The student could already be interested in a certain topic and be able to enrol in a course that is relevant to that field based on this knowledge.

S.No.	Analysis score (Expert sys- tem)	Percentage of higher secondary education	Suggested branch
1	>10	95	Computer related
2	<=10 & >8	97	Computers/electronics related
3	<=8 & >3	89	Any other

A table is created based on their replies and proposes an appropriate branch for the student based on their shared characteristics with other students.
The correlation between the student's secondary school grades and the expert system analysis is displayed in Table
2.0. The student interactions are examined by the expert system, which then calculates a grade. The student's proper subject of study is chosen based on this score and their academic percentile. The student could already be interested in a certain topic and be able to enrol in a course that is relevant to that field based on this knowledge.
gui for the semester configurer
Instead of reacting reactively to assignment due dates, which might frequently occur concurrently, students can spread their academic workload over the course of the semester with the help of time management and careful preparation. Effective time management considerably improves students' ability to handle the pressure of studying [27]. Preparing ahead and arriving early will greatly help students get better achievements. For each of the specified disciplines, weekly assessments are shown in interactive visualisation of abilities and important weeks on the dashboard interface for the semester planner. Students can choose topics from the various disciplines to gain a complete grasp of the abilities. a timetable determined by the workload, deadlines, and expectations.
The skills section is meant to help students comprehend the knowledge they have gained from the topics they have chosen as well as how those skills connect to one another. The essential skills and related abilities that are included in the skill taxonomy database table and displayed in the skills section of Fig. 6 will be projected after the student has chosen their topic. With the aid of this image, the student may select their subjects. By contrasting the skills obtained in the topics with those needed by industry, we use reverse engineering in this case and suggest courses accordingly.



SKILL MAPPER UI

The identification of an individual's strengths and limitations in particular areas is made possible by skill mapping, which is a crucial component of career prediction models. Analysis of a person's competences and skills in order to match them to the needs of a certain work function or sector is known as skill mapping.

A tool used in career prediction models to streamline the skill

mapping process is called a skill mapping interface. People may enter their experiences, talents, and competencies into the interface, which analyses and maps them to certain employment roles and industries. The interface may also offer suggestions for training and growth to improve a person's abilities in potential weak areas. Many technologies, including machine learning, natural language processing, and data analytics, can be used to create the skill mapping interface. With the aid of these technologies, the interface is able to examine a vast quantity of data and spot patterns and trends that can be used to improve the career prediction model.

There are various advantages to employing a skill mapping interface in a career prediction model. It can assist people in determining the areas in which they need to improve their skills and competences in order to accomplish their professional objectives. It can assist companies in finding qualified individuals for a certain employment role or sector.

However creating a talent mapping interface for career prediction models is not without its difficulties. The quality and completeness of the data supplied by individuals is one of the major problems. The interface must be created in a way that motivates users to give accurate and pertinent information about their knowledge and experiences.

Making sure the skill mapping interface is adaptable enough to take into account changes in the labour market is another difficulty. New employment positions and industries are continually developing as a result of the work market's ongoing evolution. To accurately anticipate career outcomes, the talent mapping interface must be ableto keep up with these changes.

In conclusion, career prediction models must include the skill mapping interface. However, there are difficulties involved in creating a skill mapping interface, and care must be taken to guarantee that it is accurate and flexible enough to adapt to changes in the labour market.

This application's goal is to make it clear to pupils how their qualifications fit with particular job descriptions. It contains a visual (Fig. 7) that relates the knowledge and talents the student has gained via courses to the capabilities required for a software engineering employment. This might help the student choose their area of study and increase their awareness of the abilities required for their desired vocation. The institution may also use the tool to evaluate the success of its course and subject offerings and pinpoint areas for improvement.

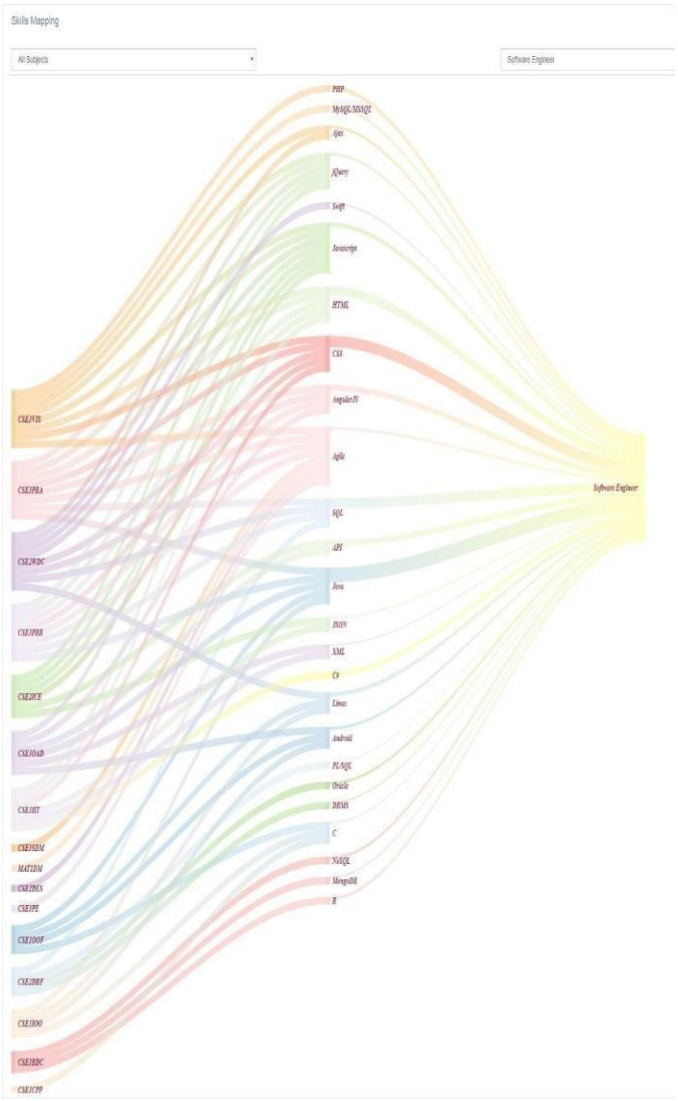
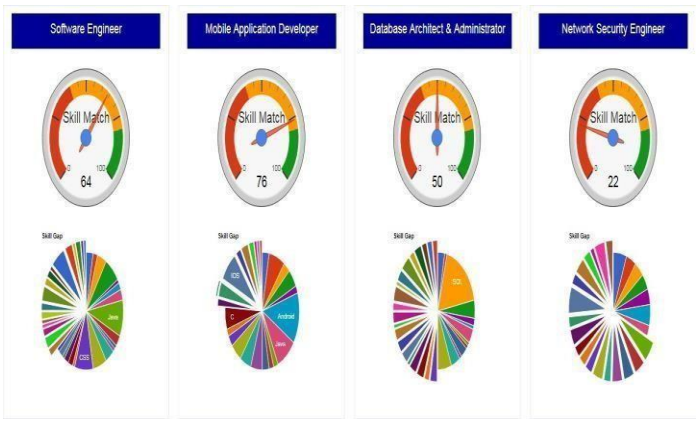


Figure :illustrates various job roles and skills which are being matched according to skillset of the user

Users may choose subjects and target jobs to assess how well their abilities fit with different job titles by utilising the skill gap and map analysis function. The computer analyses the data using a weighted model and presents a summary of the



matching score for each job the user has chosen. The proportion of abilities that each chosen job title matches with the chosen topics is displayed in the charts in Fig. 10. The skills that match and those that are lacking for the student are also shown in an interactive pie chart. Users may use this data to see how well their abilities match up with various job titles and spot any areas that require improvement.

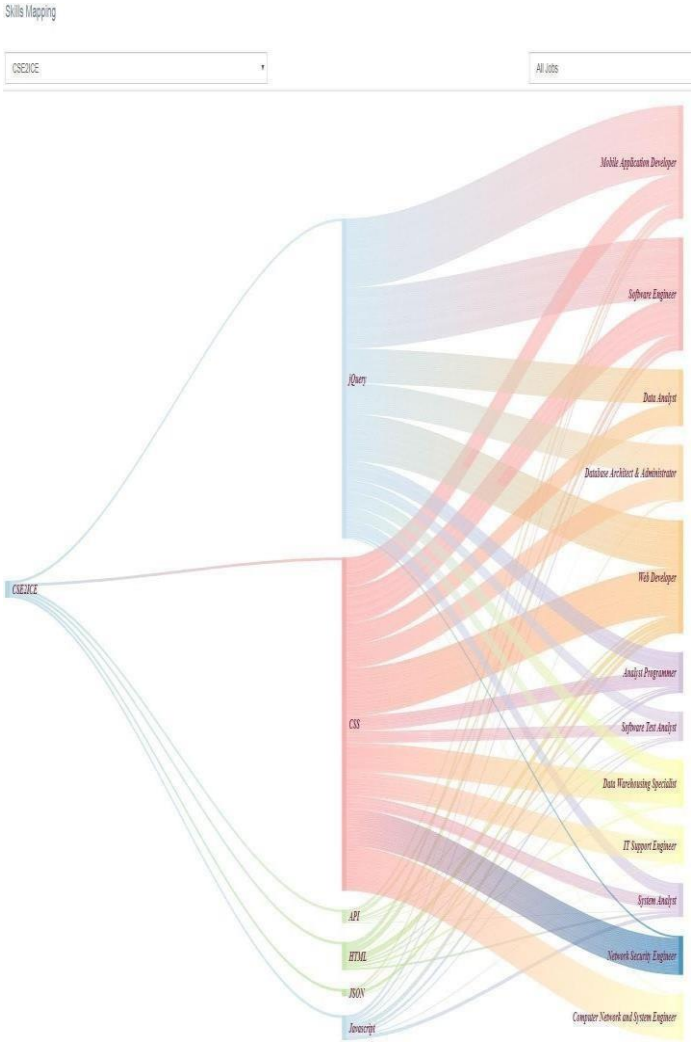


Fig:illustrates different subjects and predicted job roles

The choice assistance system is intended to assist students who have finished high school in selecting an appropriate career route. In order to evaluate which subject of study would be a suitable fit for the students, it accomplishes this by giving practise examinations and examining the replies. The system asks the students questions and then utilises their responses to suggest which area of study they should focus on.

RESULTS EVALUATION

S. No.	Register number assigned	Percentage of marks in higher sec-ondary edu-cation	Analysis based onthe expert systems output	Suitable Branch
1	15030072	90	9	Computers /electronics related
2	15030078	95	10	Computers /electronics related
3	15030158	89	7	Any other
4	15030168	91	11	Computer related
5	15030258	97	15	Computer related
6	15030264	85	8	Any other
7	15030274	96	14	Computer
8	15030562	88	5	Any other
9	15031004	87	8	Any other
10	15031267	94	10	Computers /electronics related
11	15031321	95	12	Computer related

A group of high school graduates who were getting ready to start college participated in this study. By responding to questions posed by the decision support system, the students engaged with it. The system offered suggestions for the students' chosen fields of study based on their replies. To display the findings, a graph (graph 1.0) was made with percentages on the y-axis and markings on the x-axis. The expert system created in this study takes into account the students' interests when recommending which field of study they should follow, despite the fact that students in this circumstance often aren't free to pick their college coursesbased on their interests.

College students, who are the primary users and beneficiaries of the

tool's capabilities, are the focus of this study as they assess the usefulness of the My Career tool for career planning. A survey was carried out using the Qualtrics software to evaluate the tool's efficacy in improving academic preparedness, academic workload management, core skill development, and graduate employability.

There were three parts with 15 questions each, including an optional textbox for comments. A survey participation form and instructions were attached to an email sent to a chosen set of students enrolled in undergraduate or graduate programmes at an Australian institution. 189 records were utilised for the data analysis out of the total 206 replies that were received after incomplete responses were excluded. 189 records were utilised for the data analysis out of the total 206 replies that were received after incomplete responses were excluded. According to the survey's findings, 97% of respondents think choosing a job is crucial in life, and 81% think getting a college degree is the best approach to get employment in a sector they are passionate about. The motives for choosing the respondents' present course of study are also questioned in the survey's initial part. SPSS was used to examine the data. The assessment of outcomes is a crucial component of career prediction models since it establishes the model's efficacy and precision. Analyzing and contrasting the predictions generated by the career prediction model with the actual career outcomes of people constitutes result assessment.

Many methodologies, such as statistical analysis, machine learning algorithms, and data visualisation techniques, can be used to evaluate the results. These techniques aid in spotting patterns and trends in the data as well as evaluating the precision and potency of the career prediction model. The use of measures like accuracy, precision, recall, and F1 score is one of the frequently utilised techniques in result evaluation. These measures aid in assessing how well the career prediction model performs in foretelling accurate career outcomes for specific individuals. For instance, accuracy assesses the proportion of accurate predictions provided by the model, whereas precision assesses the proportion of accurate forecasts that are positive.

Confusion matrices are another another tool utilised in outcome assessment. A confusion matrix is a table that is used to assess a career prediction model's performance by contrasting its forecasts with the actual results. The amount of true positives, true negatives, false positives, and false negatives predicted by the model is shown by the confusion matrix. The assessment of results can also make use of data visualisation techniques including scatter plots, line charts, and histograms. These methods aid in finding any outliers or anomalies that can compromise the accuracy of the career prediction model by helping to visualise patterns and trends in the data.

For career prediction algorithms to become more accurate and efficient, findings must be evaluated. It offers insights into the variables that affect career success and aids in identifying any areas where the model may fall short. Determining the findings' applicability for particular sectors and job categories is another benefit of the results review.

In conclusion, a key component of career prediction models is the evaluation of findings. It offers insights into the variables that affect career outcomes and aids in evaluating the model's accuracy and efficacy. Metrics, confusion matrices, and data visualisation approaches may all be used to assess the performance of career prediction models and enhance their precision and potency.

CONCLUSION AND FUTURE ENHANCEMENT

An important part of a research paper on career prediction models is the conclusion and future performance section, which summarises the main findings and offers suggestions for more study and advancement in this area.

The research paper's conclusion section should sum up the study's key results and offer a concise response to the research question. The study's career prediction model's advantages and disadvantages should also be highlighted in this section.

Also, suggestions for how to improve the career prediction model's accuracy and efficacy should be included in the conclusion section. This might involve ideas for enhancing the data collecting procedure, enhancing the model's algorithm, and adding fresh characteristics or data sources.

The research report should provide information about potential directions for further study and advancement in this area in the section on future performance. This might include ideas for fresh research questions, possible uses for career prediction models, and new tools or information sources that could improve the precision and potency of these models. Also, the section on future performance should go through potential difficulties and constraints that could emerge in subsequent research and development. This might involve concerns over data privacy, moral issues, and any biases that might be incorporated into the model.

A research report on career prediction models shouldconclude with a section on future performance thatsummarises the study's important results, offers suggestions for refining the model, and offers informationon what the field's future research and development willentail. The obstacles and restrictions that can exist shouldalso be highlighted in this section, along with advice onhow to handle them. Their academic readiness, timemanagement, development of fundamental skills, employability after graduation, and general course satisfaction all increase thanks to My Career. The use ofpath search algorithms that take into account duration in addition to occupations when assisting users in achievin1g1. their professional goals within a certain time frame are just12. two of the many areas that need further investigation13. Another is the development of a career path planning algorithm that takes into account real-life constraints such as geography, transportation, and family considerations. According to a research, those who got career advice found it simpler to make decisions about their careers.

Future research should replicate this study in order to learn more about the variables that affect career counselling, particularly during adolescence when many crucial career decisions are made.

The expert system is a rule-based system that enables interaction from students and provides suggestions for a particular subject of study. The suggestions are made based on comparisons of the students' scores with predetermined percentages, and the students can opt to follow the proposed course of study or pursue a different one in accordance with their own preferences. Instead of just following a preset plan of study, the expert system's main objective is to help students choose a college major that fits their interests and ambitions.

REFERENCES

[1] Map my career: Planning tool to improve student satisfaction.(.sarah tommy and eric parede (2019-20))

[2] Decision taking system for student career selection for accurate academic selection(guram narendra santosh kumar,syed imthiyaz,ahemad shaik(2019-20)

[3] A new approach model of new e-visual career Application in distance education(Mustafa tunay-(2020-2021))

[4] Seek for success:A visualization approach for understanding the dynamics of Academic careers Yifang wang,tain quan peng(2021-2022).

[5] Slicing and dicing scholarly data for interactive evaluation of academic performance(zhi chun chao,Jun tao,simeng chen ,chaoli wang (2022)

[6] Career development and self efficacy through industrial working practice in vocational studies

[7] Skill based career path modeling (2022)