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AI Assist User Interface: To Achieve Personal and Professional Goals

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ABSTRACT

This study proposes an AI-based career guidance app. The app will use machine learning algorithms to predict job suitability based on student education and skills. The application collects student data, preprocesses it, and uses advanced machine learning to train a predictive model. The model helps explain how education, skills, and job eligibility relate. Guidance systems have many academic and business uses. Guidance system evaluation has traditionally focused on precision. Most students worldwide are confused after high school. They must choose a career path now. Students' immaturity hinders their ability to understand career selection criteria. As we progress through the stages, we realize that each student has a series of post-high school planning uncertainties or cognitive processes. This question is difficult. Then they must decide if they're cut out for the chosen field. Based on skill set, our computerized career counseling system can match an individual to the right department. An objective exam will assess these skills, taking into account the individual's selected areas of interest and their 12th-grade grades in their top two subjects. After completing our online assessment, a person will be guided to a suitable course. Incorrect career choice failures are reduced by this process.

Keywords: Interaction; Personalization; Efficiency; Navigation.

1. Introduction

Establishing a career profile is the initial stage in utilizing the Online Career Guidance System. There will be a laundry list of pros and cons for each potential career path that college students will be presented with. Users will be able to peruse company profiles and read about the experiences of individuals working in the industry [1]. Professional profiles from many different fields are available to users on LinkedIn and Glassdoor. For each job, you'll find a link to a website with official government employment statistics. Students thinking about applying to universities can use the data shown here to make educated choices [2]. Deciding on a college to attend is the next step following deciding on a career path.

Figure 1. Benefits and use cases of AI in Education

Through teamwork, students applying to colleges through the system will be able to share their unique viewpoints and experiences. College admissions officers and guidance counselors will meet to discuss the admissions process [3]. When the system gets the go-ahead from the administrator, it will search the web for articles that are pertinent to the current topic and then give students links to those articles.

A person's level of expertise can be ascertained through the administration of various tests. You have the option to complete the tests we previously discussed. Once you feel prepared, you can save the results to your profile and access them at your convenience for review. Counselors in the area have the ability to advertise and receive feedback from users on the platform [4]. Figure 1 provides a visual representation of the advantages and disadvantages of implementing artificial intelligence (AI) in educational settings. While navigating college websites, students can compile a database by storing relevant information that may be useful in the future. Furthermore, users have the option to categorize the reviews based on the respective educational institutions, enabling them to identify the most suitable university for their needs.

1.1. Study Objectives

Opting to pursue an undergraduate degree is a significant decision, usually made by the majority of students upon completing high school. Although the present day is highly confusing, we genuinely believe that this online career guidance system will function as an introductory guide [5]. Students have access to a vast amount of information on any topic of interest through the Internet. Nevertheless, only a small number of students possess the sufficient time to carry out the essential research. Students will derive advantages from this system as it will centralize all of these resources and pieces of information in a singular location.

2. Literature Survey

There has been no word to describe how revolutionary the advent of AI has been. Because of this, everything has changed, from people's daily lives to the way companies function. The foundation of this revolution is the idea of an AI-assisted user interface (UI), which efficiently merges human and technological interaction [6]. The goal of creating user interfaces for this new technology is to make it easier and faster for people to accomplish their professional and personal goals in a way that is unique to them [7].

The phrase "AI-assisted user interface" describes a user interface that is built and designed with the help of algorithms generated by artificial intelligence. This user interface design surpasses the standard methods of customer interaction by utilizing artificial intelligence (AI) tools like machine learning and natural language processing (NLP) [8]. It can anticipate user needs, tailor recommendations to them, and do repetitive chores without human intervention. The end product is a more refined user interface that can adapt its features based on the goals and preferences of each unique user. Its overall efficacy and usability are both enhanced as a result of this [9].

The area of user interface design is seeing continual change, with the most recent innovation being AI-assisted user interfaces. Users had to memorize long lists of commands because most user interfaces back then were text-based [10]. The original intent of graphical user interfaces (GUIs) was to make using computers easier by focusing on the visual elements of the interface. There has been a dramatic shift in how people interact with technology since the advent of smartphones and touchscreens [11]. It is critical to make things simple, straightforward, and easy to understand.

At present, AI-driven user interfaces (UIs) are elevating this procedure to a new level. I am thrilled by this new turn of events. By incorporating AI capabilities, these interfaces can gain insight into user behavior, spot trends, and

customise their experience based on that data [12]. For users to achieve their goals—whether that's improving the efficiency of a company or their own task management—the ability to adapt is extremely important.

2.1. Problem Statement

Many young professionals and recent grads have expressed dissatisfaction with their jobs and an inability to determine their future careers. Campuses often lack specialized services for advisors and have low student-to-advisor ratios. Because of this, students face obstacles when trying to get the career guidance they require [13]. Many people end up dissatisfied with the careers they pursued while in school, particularly if they did not receive any sound guidance or if they listened to their parents or teachers and went with their gut. A lack of interest and personal fulfillment are two of the many negative outcomes that can result from employing someone for a job that doesn't align with their interests. The affected individual and their industry are both impacted by these issues [14]. Considering all of these factors together, they may be detrimental to the person's well-being and happiness. A dissatisfied worker is more likely to waste time and energy than one who loves what they do for a living. The corporation ends up losing money because of this. A high turnover rate is another consequence of dissatisfied employees [15]. When a large number of workers quit a firm in a short period of time, it is said that the company is experiencing employee turnover.

As a result, the business will be less productive and will incur higher recruitment costs.This research set out to address these issues in a way that would benefit companies and their employees.Given that the chatbot can handle numerous users simultaneously, it may prove useful in addressing the issue of insufficient student-to-advisor ratios [16]. If users can access a system that provides crucial career information, they will also be well-prepared for the professional world.The user types their text into tags.

2.2. Existing System

The existing system, referred to as "Manual Career," is deemed inadequate on account of its antiquated design and malfunctioning features. It relies on human counselors for operation. Numerous problems plague the existing system, including the subsequent:

- Consider only those skills that are versatile and applicable in a variety of situations. Conversely, focus your attention on the particular domain that most intrigues you.
- Furthermore, an undisclosed private agenda is present, which is devoid of transparency and clearly defined objectives.
- The third factor is social pressure, which includes conformity to societal norms and influences from family and peers.
- The findings of the research indicated the existence of ambiguity, inadequate understanding, and insufficient skill.
- It is critical to acknowledge and resolve the underlying concerns that are presently inherent in the career guidance systems.

3. Proposed System

The structure and functionality of the proposed Online Career Guidance System will enhance students' ability to access essential information in a streamlined manner. Students will have straightforward access to reliable resources and will be able to easily follow the steps. Students will have an easier time locating and organizing all pertinent information through the use of the system. Furthermore, students are granted access to testimonials from their peers and articles authored by counselors, both of which can serve as extremely beneficial resources. The Career Guidance Application, as proposed, has the capacity to fundamentally transform the procedure of synchronizing the academic credentials and proficiencies of students with prospective employment prospects. This objective will be achieved through the implementation of cutting-edge artificial intelligence technology. Presently under development within the realm of education sciences is a web-based application with the objective of augmenting existing approaches to career counseling. The studyemploys cutting-edge technologies, including optical character recognition (OCR) and machine learning algorithms, to determine for each individual the most direct and appropriate career trajectory. The career guidance application under consideration employs artificial intelligence (AI) technology to deliver personalized and customized career suggestions to students. An assortment of facets pertaining to every student are evaluated by the system, including but not limited to their extracurricular engagements, personal interests, and academic achievements. This capability empowers it to make informed judgments concerning its compatibility with diverse job requirements. By employing sophisticated algorithms, this system aids pupils in making well-informed choices concerning their prospective professional trajectories by matching them with employment prospects that are highly compatible with their capabilities and ambitions.Employers can discern candidates who possess exceptional qualifications by utilizing the services of students. This methodology improves the overall satisfaction and effectiveness of the recruitment procedure for every participant.

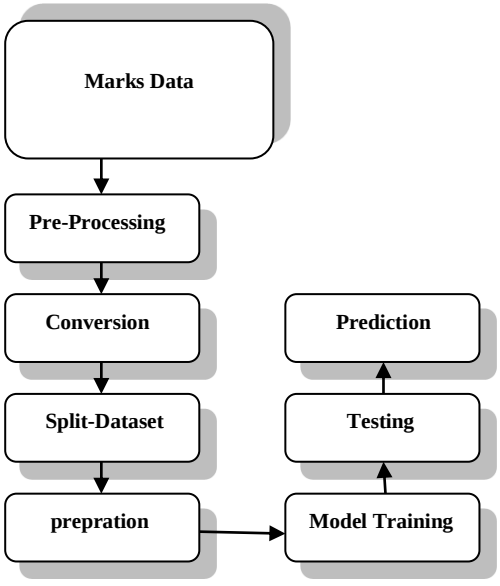

Figure 2. Block Diagram of Machine learning in AI predicted

A web interface that lets you access career guidance resources is a very useful tool. For starters, its layout and ease of use are simple and require little effort from you. Second, it gets rid of the need for physical assets or capital,

which saves time and money. In the end, the system provides a more effective and satisfying experience for career guidance compared to traditional one-on-one counseling methods. In addition, it gives almost accurate predictions and suggestions based on a full evaluation of the user's skills and performance. Using assessment data, the platform can make real-time predictions about careers and find trouble spots. Ultimately, it could help young people get over their worries about finding work in the future by giving them a clear path to follow.

3.1. Pattern Layer

Inputting students' details and information, such as academic performance, skills, interests, and extracurricular activities.

3.2. Marks Data

Through sophisticated algorithms, it matches students with positions that align with their strengths and aspirations, facilitating informed career decisions**.**

3.3. Pre-Processing

Gather relevant data from users, such as their goals, tasks, progress updates, preferences, and any other information necessary for the assistant to provide personalized recommendations and support.

3.4. Matrix- Conversion

Perform matrix operations such as addition, multiplication, inversion, and decomposition to analyze the data and derive insights [6]. For example, matrix multiplication can be used to calculate weighted sums or dot products for recommendation systems [5].

3.5. Split Dataset

Splitting a dataset is a common practice in machine learning and data analysis. It involves dividing a dataset into multiple subsets for different purposes, such as training models, validating performance, and testing generalization.

3.6. Model Preparation

Assess the performance of the trained models using appropriate evaluation metrics and validation techniques. This may involve techniques like cross-validation, holdout validation, or time-based validation, depending on the nature of the task and available data.

3.7. Model Training

To effectively train the model, it is advisable to utilize the training data and employ the appropriate optimization algorithm, such as gradient descent or stochastic gradient descent, along with the suitable loss function. Monitor the performance of the model on a distinct validation set to prevent overfitting, and adjust the hyperparameters accordingly.

3.8. Testing

Test the integration of different components or modules within the AI assistant interface to ensure they work together seamlessly. Verify that data flows correctly between components and that interfaces are properly connected.

3.9. Prediction

Recommend the prioritization of tasks based on their importance, deadlines, and user preferences. Machine learning algorithms can learn from past task completion patterns and user feedback to suggest which tasks should be tackled first to maximize productivity and goal attainment [4].

3.10. Modules

A. Administrator: The administrator will be responsible for creating user accounts and ensuring that the system is regularly updated with new articles and relevant links.The responsibility for maintaining the site's current status lies with the administrator.

B. Student: The student will have full access to all the functionalities of the system and will be able to create a personalized database of colleges. Users have the ability to complete personality assessments through the system and save the outcomes in this location.

C. Mentor: Any mentor who can offer valuable insights, such as counselors, university students, psychologists, and others. Users will have the capability to utilize this module for generating testimonials and articles.

D. Link - checker: This module will verify that every link on the website directs to the accurate site. If any discrepancy is detected, it will promptly notify the administrator regarding the presence of an outdated link.

It is critical that both the hardware and software satisfy the bare minimum requirements for the establishment of the system. A 64-bit operating system, a minimum of 8 gigabytes of random access memory (RAM), and a processor equivalent to an Intel i3 or higher are required. The hardware requirements are as follows. Furthermore, it is critical that the hard disk capacity of the system is a minimum of 128 gigabytes.

The bare minimum version prerequisite for the software is 3.6, with Python serving as its principal interface technology. The bare minimum requirement for the operating system in use is Windows 7, 8, 10, or 11. NumPy and Pandas are two Python libraries that are especially noteworthy, with Flask functioning as the underlying framework. Server-side scripting is implemented on the client side via the implementation of HTML, CSS, and JavaScript.

In the realm of integrated development environments (IDEs), PyCharm is the foremost recommendation. The satisfaction of these stipulations guarantees a resilient and reliable configuration that has the capacity to oversee intricate procedures and provide users with an uncomplicated experience.

4. Results and Discussion

During the preliminary analysis, the main focus was on how the groups were spread out based on their jobs. By using a count plot, we were able to make a clear picture of how often each group appeared in the dataset.

The graph made it clear that there were big differences in the number of people in each group, which meant that the dataset as a whole was not distributed evenly. This difference could mean that the needs of the job market have changed, which could then change how positions are distributed across different groups.

4.1. Types of Groups Distribution

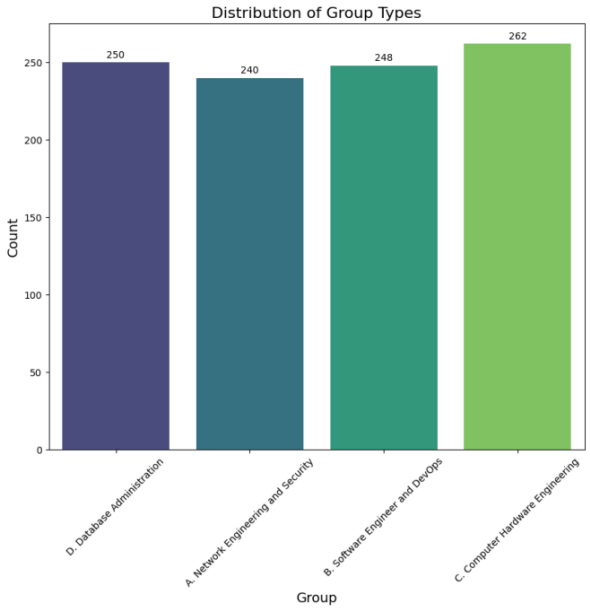

Figure 3. Distribution of group in job roles

 # Plotting the distribution of 'Group' types

plt.figure(figsize=(10, 8))

ax= sns.countplot(data=data, x='Group', palette='viridis')

plt.title('Distribution of Group Types', fontsize=16)

plt.xlabel('Group', fontsize=14)

plt.ylabel('Count', fontsize=14)

 # Add annotations

total = len(data['Group'])

for p in ax.patches:

height = p.get_height()

ax.text(p.get_x() + p.get_width() / 2.,

height + 3,

'{:.0f}'.format(height),

ha="center")

To make the visualization more useful, you could add notes that show the exact number of items in each group and rotate the labels along the x-axis. The data was easier to read because of these two factors. We were able to better prioritize our workforce planning by getting a more complete picture of how different demographic groups were spread out by using this method.

 # Rotate x-axis labels for better readability

plt.xticks(rotation=45)

plt.show()

IN[ ]: data['Suggested Job Role'].value_counts

OUT[ ]: <bound method IndexOps

Mixin.value_counts of 0 Database Developer

1 Cloud Security Engineer

2 Containerization Engineer

3 Manufacturing Engineer

4 NoSQL Database Administrator

...

995 Penetration Tester

996 Manufacturing Engineer

997 Software Release Manager

998 Full-Stack Developer

999 Field Service Engineer

Name: Suggested Job Role, Length: 1000,

dtype: object>

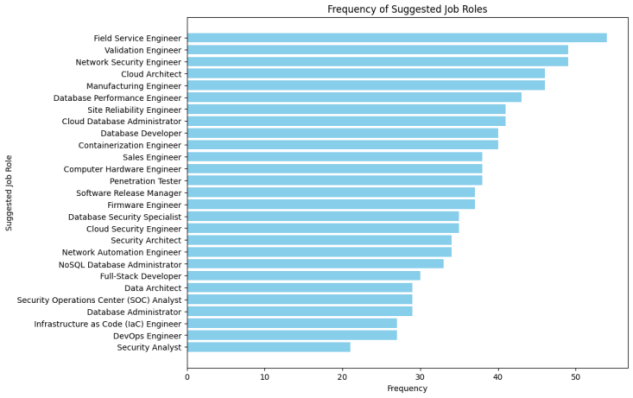

Figure 4. Frequency Plot

In Figure 4, the suggested job roles and how often they should be done are shown. By showing suggested job roles, the frequency plot gave us important information about how common different professions are. These facts came to light when distributions were looked at. The horizontal bar graph showed a number of roles, with the best ones at the top and the worst ones at the bottom. It's likely that the company was very interested in the highest-paying jobs at the top of the chart, which were good indicators of possible career paths.

```
plt.figure(figsize=(10, 8))

plt.barh(job_roles, counts, color='skyblue')

plt.xlabel('Frequency')

plt.ylabel('Suggested Job Role')

plt.title('Frequency of Suggested Job Roles')

plt.gca().invert_yaxis()  # Invert y-axis to display the highest count at the top

plt.show()
```

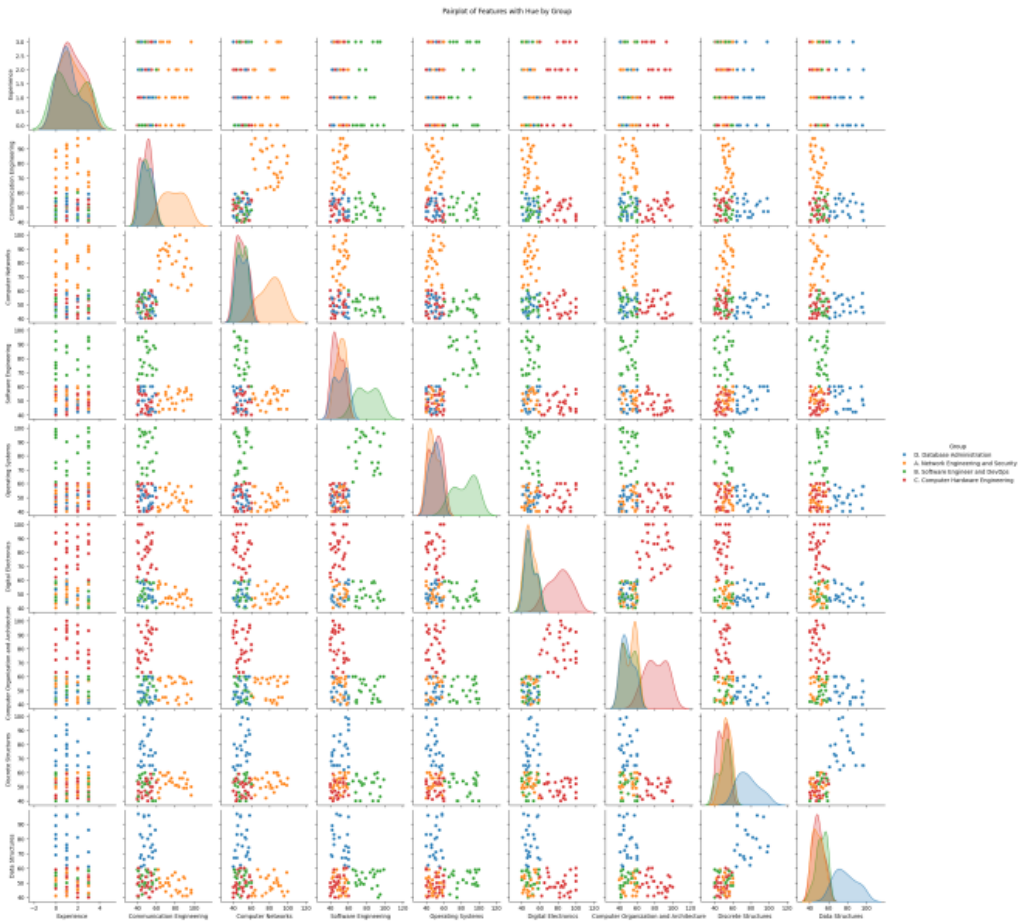

Figure 5. Pair Plot

The vertical axis of the graph was switched around so that it would be easier to read and spot changes in the job market. The most common positions were put at the top. If you need help with your career, this visualization can show you the areas where people are most interested in working.

The figures for the pair plot and the correlation analysis are 6 and 9, respectively. Using the "Group" hue in the pair plot, the features were put together to find patterns in the data that had been hidden before. Because of this method, we were able to find possible connections between traits, which could help us figure out why people in different groups behave in different ways. Using Kernel Density Estimation (KDE) for the diagonal elements made the pair plot show the data's distribution more accurately and smoothly, which made it easier to find patterns.

```
sns.pairplot(subset_data, hue='Group', diag_kind='kde')
plt.suptitle('Pairplot of Features with Hue by Group', y=1.02)
plt.show()
```

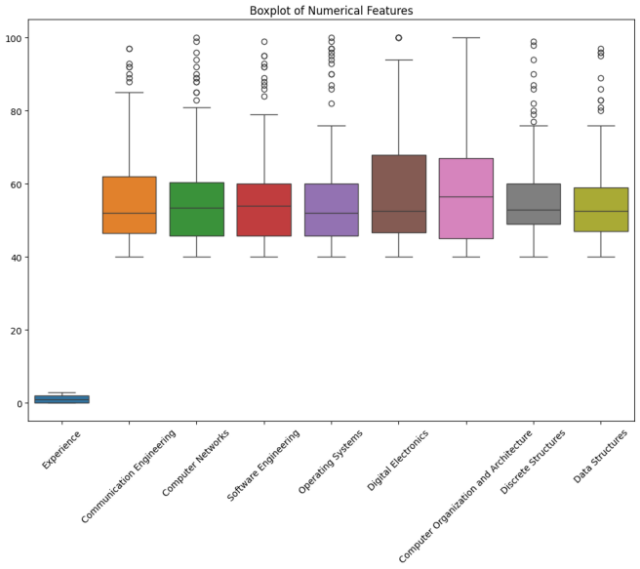

Figure 6. Boxplot of Numerical Features

Figure 6 shows a boxplot that shows the numerical attributes. One way to better understand the range of numerical characteristics is to see an example of their distribution that includes any possible outliers. This goal is met by boxplots. To give a full picture of the variation in the feature, the visualization showed "outliers," or ranges that were unusually wide. These kinds of differences could mean that there are possible problems or unique traits present. The labels on the x-axis were changed to make them easier to read and to make it easier to find attributes that need more research.

```
plt.figure(figsize=(12, 8))
sns.boxplot(data=subset_data.drop(['Group', 'Suggested Job Role'], axis=1))
plt.title('Boxplot of Numerical Features')
plt.xticks(rotation=45)
plt.show()
plt.figure(figsize=(10, 8))
sns.countplot(data=subset_data, x='Certificate Course', hue='Group')
plt.title('Distribution of Certificate Course by Group')
plt.xlabel('Certificate Course')
plt.ylabel('Count')
plt.show()
```

Figure 7. Distribution of Certificate Course by Group

Figure 7 shows how certificate programs are set up in an organization based on the user groups they serve. The different groups were given different certificate courses, which showed the range of possible educational goals. You can use the group-by-group count plot to find out which professional fields are most often linked to certain certificate programs. By putting more emphasis on popular majors, colleges and training programs could better meet the needs of each student's specific career goals by combining this data.

 # Apply label encoding to convert categorical data to numerical values

label_encoder = LabelEncoder()data['Suggested JobRole'] = label_encoder.fit_transform(data['Suggested Job Role'])

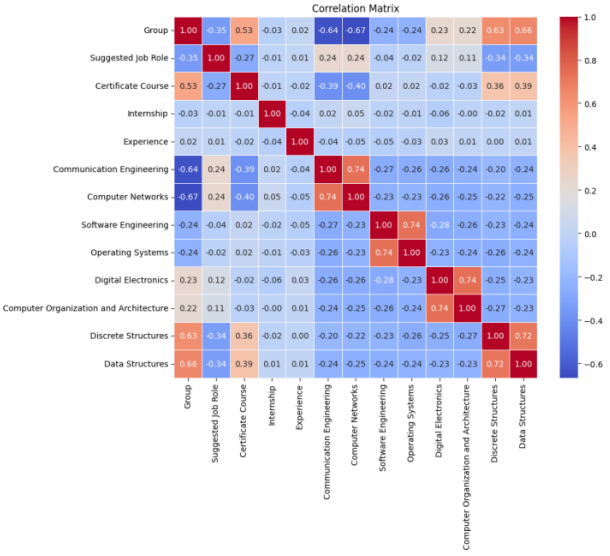

Figure 8. Correlation Matrix

The correlation matrix in Figure 8 was a very important analysis. This matrix looked at the relationships between a number of different attributes. This matrix can show important connections that are needed to get a better grasp on the parts that make up job role recommendations. Strong correlations between features can give us useful information and help us plan future research and model development. These connections might show the patterns in the data that are used to make career suggestions.

X=data[['Certificate Course','Suggested Job Role', 'Internship','Experience', 'Communication Engineering', 'Computer Networks', 'Software Engineering', 'Operating Systems', 'Digital Electronics','Computer Organization and Architecture', 'Discrete Structures','Data Structures']]

y=data[['Group']]

4.2. Suggested Job Roles

suggested_job_roles =

{

"A. Network Engineering and Security": ["Network Security Engineer", "Cloud Security Engineer", "Security Analyst", "Security Architect", "Penetration Tester", "Security Operations Center (SOC) Analyst", "Network Automation Engineer"],

"B. Software Engineer and DevOps": ["Full-Stack Developer","DevOps Engineer", "Site Reliability Engineer "Cloud Architect", "Infrastructure as Code (IaC) Engineer", "Containerization Engineer","Software Release Manager"],

"C. Computer Hardware Engineering": ["Field Service Engineer", "Computer Hardware Engineer", "Firmware Engineer","Validation Engineer", "Manufacturing Engineer", "Sales Engineer"],

"D. Database Administration": ["Database Developer","Database Administrator", "Data Architect","Database Security Specialist", "Database Performance Engineer", "NoSQL Database Administrator","Cloud Database Administrator"]

}

Based on user feedback, recommendations and job roles are made. When the user entered information and the system used a predetermined vocabulary to make a list of suggested job positions. After the user picked a group, the next set of suggestions were shown to them. By handling errors caused by wrong group inputs well, users were led to valid choices, which let them explore possible career paths in an interactive way. Because the users were good at using this method to analyze data, they were able to make smart choices about their future careers. After carefully looking at all the factors, the presented findings and commentary give a full rundown of the important insights in the dataset. These insights are very helpful for both planning one's own career and figuring out what the current trends are in the field.

4.3. Get User Input for the Group

user_input = input("Enter the group (e.g., A. Network Engineering and Security,B. Software Engineer and DevOps,C. Computer Hardware Engineering,D. Database Administration): ")

 # Check if the input group exists in the dictionary

if user_input in suggested_job_roles:

```
# Display the suggested job roles for the input group
print("Suggested job roles for", user_input, "are:")
for job_role in suggested_job_roles[user_input]:
print("-", job_role)
else:
print("Group not found. Please enter a valid group.")
```

OUT[ ]:

Suggested job roles for A. Network Engineering and Security are:

- Network Security Engineer
- Cloud Security Engineer
- Security Analyst
- Security Architect
- Penetration Tester
- Security Operations Center (SOC) Analyst
- Network Automation Engineer

5. Conclusion

We have developed a web-based application that utilizes this system to assist individuals in locating employment opportunities. The objective of this tool is to assist candidates in identifying the department that aligns most closely with their needs and preferences. The suggested improvements in the system provide more precise recommendations compared to the current system's guidance on professional paths. The K-Nearest Neighbor algorithm was employed to categorize the candidates' skills into clusters and predict the departments that would enhance their performance. In our analysis, we utilized the K-Means Clustering algorithm to segment the students' scores based on their skills. This allowed us to determine the success rate for each department within each cluster.

Declarations

Source of Funding

This study did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Competing Interests Statement

The authors declare no competing financial, professional, or personal interests.

Consent for publication

The authors declare that they consented to the publication of this study.

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