Smart Intership and Skill Gap Analysis

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Abstract: The job market is really competitive these days. This is because the world of technology is changing fast. As a result there is a difference between the skills that students have and the skills that companies want when they are looking for new employees. This makes it hard for students to figure out what they are good at learn skills and find an internship , that is right for them. To make this system work we will use intelligence, machine learning and natural language processing to compare a students resume, education and skills with the requirements of available internships. We will use methods like Cosine Similarity to find the best match between a students profile and an internship. The AI-based Skill Assessment and Internship Recommender System will allow students to upload their resume and take a skills test online. It will also have features to manage student profiles and track recommended internships in one easy-to-use place. Overall this tool will help students find internships quickly and make better decisions about their future careers. The AI-based Skill Assessment and Internship Recommender System will help students by providing accurate recommendations and preparing them for the job market. This will help bridge the gap, between what students learn in school and what companies want from their employees.

KEY WORDS: Artificial Intelligence (AI), Skill Gap Analysis, Internship Recommendation System

1. Introduction

To eliminate this problem, an AI Instructional Management System has been proposed as part of the Human Resources (HR) software suite available to students at the undergraduate level. The AIMS is designed to identify the qualifications and skills of a student through the use of AI technologies and recommends internships to the student, based on their resume, skills, academic performance, etc. Using machine learning (ML), natural language processing (NLP), and cosine similarity algorithms, the AIMS compares the student's qualifications and skills with the internship specifications. Based on this comparison and the calculated similarity of the two, the AIMS will provide an accurate list of recommended internships for the student and also identify which skills the student must improve in order to be competitive against those students who do meet the internship specifications of that employer. The proposed HR software will provide a

comprehensive resource for a student to upload a resume, create a profile, assess their skills, receive guidance about their career options, all from within one interface that does not require multiple log-ins to separate websites. The adoption of the AIMS will therefore drastically reduce time spent searching for internships, improve the accuracy of internship recommendations made to students, and ultimately help students improve their chances of obtaining employment by preparing for the employment demands of their field of study.

2. Literature Review

The recent rise in technology and the demand for professionals who have the skills necessary to be successful in an organization has given rise to the need for intelligent job-seeking systems that assist individuals to gain access to valuable career opportunities. Internships are a critical way for individuals to gain the relevant skills and experience they need to succeed in their career, based on their knowledge, interests and skills. The development of smart recommendation systems using AI, ML and NLP has gained tremendous attention in the last few years. The creation of smart internship and job recommendation systems is an essential focus for research because they increase the success of an organized approach to making accurately effective internship and job recommendations. Traditionally, internship and job recommendation systems have used manual searching and basic filtering processes to provide recommendations. Therefore, students looking for internships had to manually search through each of the different sites to identify opportunities, apply to the various sites without the benefit of a formalized system. This has the potential to be a time-consuming, inefficient, and non-personalized process. As a result, most traditional systems were limited in their ability to use analytics to provide a deep level of analysis of student profiles and provide general recommendations without taking into account the uniqueness of each student's profile and how the particular student is capable of achieving their career goals. AI Job Recommendation systems were created to reduce some of these limitations. They utilize intelligence by providing an intelligent analysis of student so personalized recommendations can be provided. These systems utilize machine learning algorithms to identify and analyze large amounts of data and identify patterns related to student profiles and internship/job specifications. These algorithms improve the recommendation process from previous seasons by learning from previous user behavior and historical data on students that have applied for internships/jobs. Using Natural Language Processing (NLP), job recommendations and job descriptions can be matched through complex searching and advanced matching capabilities.

3. Problem Statement

Many students struggle to find quality internships that align with their capabilities, interests, and education in today’s hiring process. Applicants often look for these within multiple internship sites through manual searching, and although this provides useful results, it can be very time-consuming and often produces applications that are unrelated to the position. Therefore, they do not have any clarity regarding their level of skill nor if they will qualify for the internships being applied for. Most of the recommendations provided by traditional methods only use basic keyword searching and manual filtering to narrow the locations.

These methods do not give anyone personalized recommendations and do not effectively analyze a candidate’s profile, resume, or skills. Intelligent analysis is lacking, so students are uninformed of their strengths and weaknesses as well as the skill

gaps which exist between their abilities and the skills that an employer wants. The large divide between education and employer expectations is another challenge students face as too many students only have theory knowledge to a greater degree than having the actual applied or functional skills as employers demand. Systems that are presently used for this purpose do not typically provide any skills gap analysis or do not provide any career direction for students so they can gain the skills needed to have a greater potential for employment. Additionally, employers or people who are searching for employee/buyer who has the desired skills from a large number of applications also experience difficulties in finding someone who is suited to them. There are numerous third-party platforms that provide listings of internships or recommend an internship but these platforms generally provide an insufficient number of recommendations and/or do not provide recommendations for a specific person in a specific position within an organization.

5. Existing System

Not long ago, the majority of students mainly relied on online job and internship search websites to find their own internships - using different criteria such as domain of work, geographic location, or level of qualifications and experience with the skills required (for example, an applicant could look for internships in the marketing field based on whether they have qualifications or experience in the marketing field). While these internship search tools provide many opportunities, they also have limitations in terms of helping students identify the ideal internships that align with their skills and career goals.

Currently, most of the internship search sites utilize a simple keyword search technique. These sites compare the keywords in the student's resume with the keywords in the internship descriptions to identify the student's qualifications and experience against what the intern employer is looking for in an intern (i.e., an internship will be recommended based on a match between the keywords).

Unfortunately, this method does not accurately reflect the true knowledge or skill of a student because the employee may have endless variations on how to describe their skills or knowledge. Therefore, students may have at least one skill/knowledge area that is not included on their resume, thus causing inaccurate returns of qualified interns be recommend to students. Another major issue with the current internship search systems is the lack of personalization in providing students in recommendations—they do not consider how different students have different interests, strengths, or abilities to learn. The majority of internship search sites provide students with generic recommendations for internships, rather than analysing the individual's student profile or providing the student with appropriate internship recommendations to match his/her skill set or career goals.

4. Proposed System

The system proposed is designed to assist students with their search for a suitable internship and greatly enhance the use of the internship search process. Many of today's students are confused about which internship to pursue, as they cannot determine if they possess the necessary skills required by the potential employer. Generally speaking, all internship websites post and showcase their internship positions requiring students to take the initiative themselves and do a search and apply, resulting in wasteful time spent by students applying for positions that may be inappropriate for them. This system provides a means for students to receive assistance with the internship matching process by identifying their skills and offering recommended internship placements based upon each student's skill set. Students sign up for an account on the site, enter their academic information, and upload their resume into the internship search support system. The internship search support system compares the student's skills as documented in the student's resume, projects completed, certifications completed, and technical skills and attributes uploaded to the system prior to the student applying for an internship. The internship search support system provides each student with a list of recommended internships that closely match the individual student's identified skills and attributes. Additionally, if an applicant lacks a specific skill necessary for an internship opportunity, the internship support search system also identifies those skills necessary for the internship. Another benefit of the internship search support system is that the students will not have to search multiple sites to locate internship opportunities; instead, the site generates

recommendations for the student.

6. System Architecture

The Smart Internship and Skill Gap Analysis System is made up of parts that work together to give students good career advice and internship suggestions.

A. Presentation Layer : Students and recruiters and people who manage the system use it through a website. They can sign up upload their resumes look at suggestions and manage their profiles.
B. Application Layer : We built the application layer using the Flask Framework. It takes care of things like signing in managing profiles looking at skills making suggestions and talking to the database.
C. AI Processing Layer : This part of the system looks at resumes finds skills figures out what skills are missing and suggests internships. It uses algorithms to make smart decisions.
D. Database Layer : We use a database like SQLite or MySQL to store information about users, resumes, skills, internships, suggestions and applications in a way.
E. Analytics and Reporting Layer : This part of the system makes reports about what skills students have what internships they might like, what skills they are missing and how their applications are doing. It helps students and the people, in charge see how things are going.

7. Methodology

The methodology used to develop this system consists of steps taken to analyze student skills and facilitate the recommendation process for appropriate internships for students. The development of the system was done in a structured manner, so that it would be very easy for both students and companies to use the recommendation process accurately and efficiently.

Step 1: A User Account Is Created After creating an account, students enter basic information such as their name, department, academic background, technical skills, certifications and areas of interest into the system. Students can also upload a copy of their resume to the system. The uploaded resume becomes the primary source used by the system to evaluate the student's profile.

Step 2 - Resume Analysis After students upload their resumes, the system processes the data contained within the resume and extracts key pieces of information related to the student's profile such as technical skills, educational qualifications, programming languages, tools, and projects. This gives the system a better understanding of the student's profile and uses that information to store in the database.

Step 3 - Collecting Internship Data After being collected, internship data should include internship position, job description, required technical skills and education/experience. The system will compare the student record with available internships to determine the appropriate internship match for the student.

Step 4- Making Intern Match Recommendations All matches between students and available internships will be generated through an analysis of the similarities between the student's technical skills and those of the internships being considered.

8. Working Process

The AI-Based Skill Analysis and Internship Recommendation System is utilized in a way that begins with a new student registering for the platform. The system then saves this extracted data to a database for future processing. As this process is happening, the system is also keeping track of many different companies and positions internship data that will be then be compared with the student profile. Comparing the skills of students versus the skills needed for a specific position is accomplished through a comparison of the students' skill sets to the skills needed for the internship companies or positions. After this is done the system identifies a recommendation score for each of the internships based on the student being a valid candidate for employment with the internship company. Therefore, those internships with higher recommendation scores will be displayed to the student before internships with lower recommendation scores. In addition to the comparison of students' skills versus internship company/position skills, the system will also examine if the students have any major skills missing.

Dataset Overview

The Smart Assessment and Skill Gap Analysis (SISGA) System is made up of a large set of student profiles and resumes which provide comprehensive information about students' qualifications, programming skills, projects completed, interests and requirements for internships. The internship dataset contains internships, internship titles, companies offering internships, required competencies, position descriptions, duration and eligibility requirements. By overlaying the student data and internship data together, and comparing them to the last one we compiled for the interning companies against the internship requirements, we can be more accurately identify appropriate and available opportunities or vacant skill gaps for students who have completed the data preparation of all of the internship data required to enable implementation of the recommendations for students to be provided with realistic internships or to identify any deficiencies in the skills which will allow them to be employable and/or prepared for their next career step.

This dataset will be used to train and validate the recommendation model to provide the student accurate recommendations for internship opportunities and to identify skills deficiencies. By collecting structured, relevant data, the SISGA system will use this data and the data from the other data sources will provide students with more accurate and tailored recommendations to enhance their employability and readiness for the next step in their careers.

Attribute	Description
Student_ID	Unique student identifier
Student_Name	Name of the student
Skills	Technical and non-technical skills
Certifications	Completed certifications
Projects	Academic and personal projects
CGPA	Academic performance
Internship_Title	Internship role
Company_Name	Organization offering internship
Required_Skills	Skills required for internship
Duration	Internship duration
Recommendation_Score	Matching score generated by system

10 . Implementation

Data Acquisition: Data is gathered via voice and text interaction. User emotions can be identified using the gathered data. It is used as a foundation for the next process.

Data Preprocessing; It involves cleaning and normalization of the data. For voice-based data, noise removal is done, while text-based data involves eliminating irrelevant words.

Feature Extraction & Feature Selection: Critical features such as tone, pitch, and sentiment are extracted. Relevant features are selected in order to minimize complexities.

Model Selection and Training: A Machine Learning algorithm like Decision Tree or SVM is chosen. The model is then trained through labeled data in order to learn the patterns of various emotions.

Model Validation: The model undergoes validation through the use of evaluation criteria such as accuracy and precision. This will help ensure that the model is working properly.

Sentiment Prediction and Response Generation: The validated model uses the input data to predict the sentiment of the user. Depending on the prediction, responses are generated by the system. The voice companion responds in real-time.

System Implementation: The system is implemented on platforms such as mobile or Web. The system can be conveniently accessed by the users. Real-time usage is facilitated in the system for better user experience .

In general, there is a systematic process in which the implementation process begins with collecting data, followed by the training process of machine learning models until deploying them into the application itself. Every step serves its purpose in helping to detect the mood accurately and interact smoothly. Furthermore, implementing Machine Learning models in this case increases prediction accuracy, and

adding the voice companion creates a more pleasant experience. Thus, the whole implementation process serves to help develop mood monitoring system.

11 . Tools and Technology

The new system has been created using various technologies and tools so that the application can run properly and efficiently. The user interface of the system will be designed using HTML, CSS, and JavaScript for a user friendly and easy to use interface for both students and recruiters to access. Python will be the backend programming language as it provides ease of use and includes support for many functions used in AI. The backend programming will provide functionality to process student data, analyze their resumes, and recommend internships for them. The system uses an external database such as My SQL or Postgre SQL to store student details, internship details, and the results produced when recommendations are made to the students for a secure and reliable environment for the data. Artificial Intelligence and Machine Learning will be used within this project to analyze student skills and recommend better internship opportunities. The system will use Natural Language Processing (NLP) to read and parse resumes in order to obtain the necessary information from students such as skills, projects, and certifications listed on a resume. Cosine Similarity will be used to compare student profiles against the requirements of an internship to determine the degree of compatibility and accordingly will recommend students to appropriate internships based upon the obtained scores for each student. The developing technologies of the project include Visual Studio Code for development and frameworks like Flask or Django to manage the application's functionality efficiently and gain reliable and efficient internship recommendations.

12.Challenges

The AI-Based Skill Analysis and Internship Recommendation System encountered multiple issues during its development. A major challenge was successfully interpreting the resumes' content; students format their resumes differently, and obtaining detailed information from unstructured resumes (skills, projects, certifications) was often difficult to accomplish. Another challenge was making accurate internship recommendations. Students may have similar skills, but their interests and career goals aren't necessarily the same, so personalized recommendation generation requires thorough profile analysis and matching method.

Frequent changes in internship opportunities company requirements make it difficult to keep the internship information current. Therefore, ongoing updates are mandatory for the system to provide appropriate recommendations to students. Another challenge was performing accurate skill gap analysis, which requires appropriately identifying the missing skills of students by comparing student profiles with industry standards. In some cases, students know certain skills but do not clearly identify them on their resumes. This makes an accurate analysis of skill gaps difficult.

Handling large volumes of student data and internship data quickly was another challenge; the database and recommendation methodology must be properly managed so that the user experience is not negatively impacted through slow performance. Another issue is data privacy or the security of individual user data, which the system maintains (resumes).

13.Future Work

Future developments will continue to improve the current system by adding additional student and recruiter functionality. Currently, the main functionalities of the system are focused on analysing skill-set and accessing internship recommendations; however, there are many other functionalities that may be added to create greater ease-of-use and practicality on the platform. For instance, integrating other internship sites and company portals into the system could provide students with new, updated internship opportunities without requiring them to search through many different platforms.

Future functionalities may also include aptitude practice tests, coding tests, interview question tools and recommendations for improving the student's resume. All of these features will better serve students' needs and ultimately help them to be better prepared when they begin their internship/placement search.

14.Conclusion

The AI-Based Skill Analysis and Internship Recommendation System has been created to streamline the process of searching for an internship by providing students with an easier and more impactful method to search for internships. Many students are unsure of which internships are best for them since they do not know if their skills align with those required by the company.

Therefore, this system was created to analyze the skills that students have and to recommend appropriate internships to them. By receiving skill recommendations, students will also have the ability to understand which skills they need to develop in order to qualify for particular jobs and to help them improve their chances for successful placement in future employment opportunities. Additionally, the system will assist students in recognizing any deficiencies in their skill set so they can target their skill development efforts accordingly. By doing so, students will become more confident and prepared for both placement and internships.

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