ISSN No. 0976-5697

VOLUME 17 SPECIAL ISSUE 1, JULY 2026
International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

SKILL SYNC: ONE STOP PERSONALIZED CAREER AND EDUCATION ADVISOR

Upasana Ameta
Department of Computer Science & Engineering
Geetanjali Institute of Technical Studies
Udaipur, India
ametaupasana@gmail.com

Harshita Singh Dulawat
Department of Computer Science & Engineering
Geetanjali Institute of Technical Studies
Udaipur, India
harshii.xdxd@gmail.com

Sumedha Tanwar
Department of Computer Science & Engineering
Geetanjali Institute of Technical Studies
Udaipur, India
sumedha1414@gmail.com

Mahi Lavti
Department of Computer Science & Engineering
Geetanjali Institute of Technical Studies
Udaipur, India
mahilavti@gmail.com

Abstract: The main goal of this research paper is to develop a platform for students to make well-informed career decisions. Deciding on one's career is almost like deciding on our future and is therefore an important decision in one's life. Many students face difficulties during this phase. And to identify these issues, we conducted a survey on 69 students; these students were from different streams and levels of education. According to the survey, we found out that a large percentage of people lack clarity while deciding on their career, as they lack the right guidance and resources required to decide. Thus, we are developing a comprehensive software solution that gives students the ability to decide their career based on their interests.

Keywords: Career Counselling, Artificial Intelligence, Psychometric Test, Large language Models, Interest, Decision.

I. INTRODUCTION

In the past, choosing a career was relatively simple — you could choose a career path that you like, and stick it out; however, today, picking a career has become such a complicated process because of how fast AI is advancing and changing the job market. Nowadays, the job market resembles more of a moving target than a stepping ladder. In addition, you cannot just choose a career title and assume it will be there in five years — there is a good chance a bot will be performing the job better than you within that timeframe.

Finding a career path is only half the battle; finding the path that gets you to where you want to go is where most people struggle. There is simply so much noise online; with literally thousands of courses, and "gurus", how do you know what to invest your valuable time in? You need a roadmap that not only outlines different subjects but also allows you to test to see if you have the skills necessary to pursue those subjects before investing the time and money into them. Lastly, if you plan to devote a considerable amount of effort, you want to make sure the potential salary and job stability, in the long run, justify that effort.

Therefore, the developed system SkillSync, Think of it as your all-in-one advisor.

II. RELATED WORK

- **"Obstacles in Career Development: An Indian Students perspective (2018)":** According to the study conducted by the S. K. Singh [1], the study presented was aimed to research the career decision readiness of the Indian students and the available decision-making-support to these students, and incisiveness of the government policies related to the career-development policies. The findings of study indicate that the sources of career related information are largely compromised, as the available sources are not prepared well.
- **"Ayati: A Career Counselling Application (2014)":** According to the article by U. Ameta et.al [3], the evolution of an AI-powered career counselling platform for students holds symbolic promise in altering the scene of career guidance in India. Assimilation of a psychometric test with the advanced natural language processing capabilities, the prospective platform offers a custom made and intriguing approach to career analysis.
- **"Intelligent Career Guidance System Using Machine Learning (2022)" :** According to the article by A. Dahanke et.al [6], students are in a dilemma after higher secondary education about their career decisions. The article suggests an automated computer-based career guidance system relying on an interest-based test and high 12th-grade courses to suggest areas that are a good fit. Based on unbiased parameters, the system advices students to the right courses, avoiding fault in career choices.
- **"AI-based career counsellor: An AI driven career**

advisor (2025)" : According to the article by Y. A. Thakare et.al [4], the career counselling system serves as a compelling upgrade in leveraging technology to back students in making versed career decisions. The career counselling platform is a valuable asset that can significantly improve the career decision process, especially when used with traditional career counseling methods. It empowers users to understand their potential and make well-informed resolutions about their careers.

- **"Magnitude of career confusion among college students in India: An empirical report (2020)":** Authors Mini T. C. et.al [2] highlights in their research the current career confusion of students. Psychology clearly insists that aptitude, interest and personality variables play an important role in the success and failure of any career, but the thought has not penetrated the Indian society. Educational institutions do not offer necessary testing and guidance services to students. This adds to the confusion of the students and pulls down the overall job performance and job satisfaction over time.

III. SYSTEM ARCHITECTURE

SkillSync has built its system architecture upon a multi-tiered (service oriented) infrastructure enabling it to efficiently process data, utilize modular functions, be scalable, and provide a logical separation of responsibilities among four layers of the entire system; presentation layer, application layer, data layer, and machine learning/AI layer.

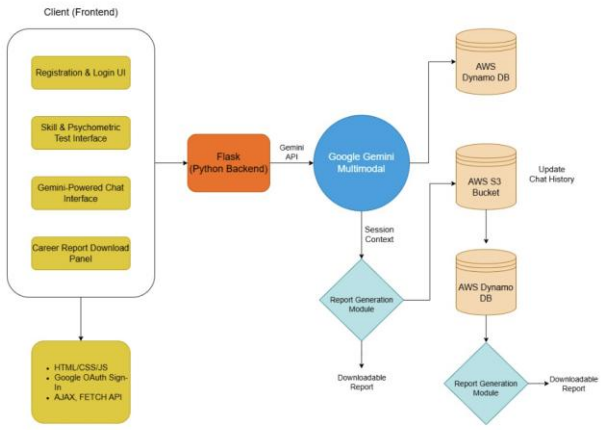

Figure 1. System Architecture

A. *Presentation Layer (Client-Side)*

The client side of the system is made up of an HTML5/CSS3/JavaScript based React.js app that is both responsive and has a dynamic (continually changing) user interface. It also allows users to interact with the application through the use of input forms and psychometric and aptitude assessments.

The presentation layer communicates with the backend via RESTful APIs over standard HTTPS/HTTP channels thereby providing a modular design that creates easy decoupling of the client and server. Each client will maintain session state information on the client side of the application for the purpose of presenting a better User experience and performance across the entire Hardware/Software stack.

B. *Application Layer (Backend Services)*

This layer provides the means to process business logic and provide workflows for Skill Sync through a set of Python based frameworks (Django/Flask) where they act as `middleware` between the presentation layer and the underlying data/machine learning components.

In summary, there are four primary functions of the application layer:

- Processing/API request handling and routing
- User Authentication/Authorization
- Collection/Processing of psychometric and aptitude inputs
- Machine Learning Model Orchestration/Control
- Data Aggregation from both internal database and external data sources.

C. *Database layer (Data Layer)*

Relational databases such as MySQL and PostgreSQL implement the data layer, providing structured data storage as well as efficient querying.

The database schema is structured for:

- Users' profiles and demographics
- Responses and scores of assessments
- Courses, skills and careers datasets;
- History and feedback of recommendations

Redundant data is minimized using techniques called normalization while query performance is improved by using indexes. All data in this layer meets the ACID properties ensuring data consistency and integrity.

D. *Artificial Intelligence and Machine Learning Layer (AI/ML Layer)*

The AI/Machine Learning (ML) layer gives the system its intelligent behavior. It uses ML algorithms developed with the help of Pandas, Scikit-Learn and numpy for preprocessing data, feature extraction, and using predictive analysis.

The following are the key components of the AI/ML layer:

- Psychometric Analysis module that assesses user personality traits and interests.
- Multi-dimensional point scoring system utilizes weights based on skills, preferences and aptitudes.
- Recommendation engine ensures that users get mapped to appropriate career paths based on greatly improved classification/regression models.
- Predictive modeling will allow for estimating where the job market is likely to be in the future.

To improve the user's experience (increased contextual awareness) requires natural language processing (NLP) to interpret user input.

E. External Third-Party API Integrations Layer

The system integrates with third party APIs in order to pull information about:

- Educational courses
- Educational Institutions and colleges
- Industry trends and employment opportunities

IV. IMPLEMENTATION

A survey was conducted for students as part of the "One-Stop Personalized Career and Education Advisor" project where a total of 69 students participated, where each response provided valuable feedback to brief us of the issues that students face while making decisions about their careers, existing career advice landscape and the expectations from an AI-based career counsellor

The data below is shown according to the theme of the survey:

Table I. Demographic Statistics

Age Range - 14 - 22 years	Mean Age = 20
Academic Standing	Number of Students
High School (Class 9-10)	4 (6%)
Senior Secondary (Class 11- 12)	11 (16.4%)
Undergraduate	35 (52.2%)
Graduate/Postgraduate	16 (23.9%)
Others	1 (~1.5%)

The data as shown in table-1, the mean age is 20 with the range being 14 to 22 years. From a total of 67 participants, majority were Undergraduate student which is 52.2%, with 6% being High school students, 16.4% being Senior Secondary students, 23.9% being Graduate or Postgraduate students, and around 1.5% being others.

Table II. Stream chosen in Senior Secondary education (Class 11-12)

Stream Chosen (Class 11-12)	Number of Students
Science (PCM)	32 (47.8%)
Science (PCB)	14 (20.9%)
Commerce	10 (14.9%)
Humanities/Arts	9 (13.4%)
Other/Not decided	2(~3%)

As shown in table-2, most of the participants chose Science as their core during their Senior Secondary education with 47.8% being PCM and 20.9% being PCB, while 14.9% chose Commerce, 13.4% chose Humanities/Arts and around 3% hadn't decided.

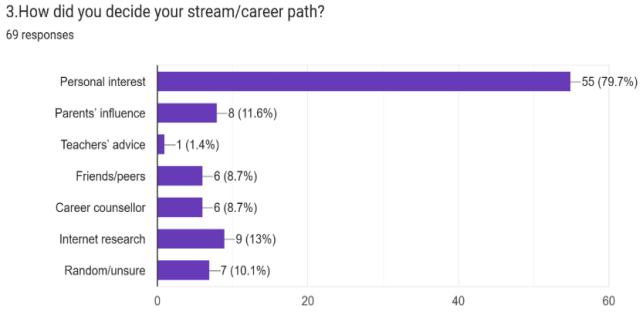

Figure 2. Factors Affecting career Decisions

The results from figure 2. reveal that majority of the students chose their subjects and streams based on their personal interests, making 79.7% of the poll while 11.6% were influences by their parents, 8.7% by their peers/friends, 13% did internet research while making their decisions and around 1.4% took their teacher's advice. While 10.1% were unsure and only 8.7% were able to consult a career counsellor. This indicates that while majority of students chose career paths based on their personal interests, only a minority had consulted a professional while making their decisions.

Table III. Career Decision Confusion and Student Sentiment

Level of Disorientation	Number of Students
Very Confused	13 (18.8%)
Somewhat Confused	31 (46.4%)
Not Really	15 (21.7%)
Negative	8 (13%)

The results from Table-3 reveal that the majority of students were confused in regard to their career decisions, 46.4% were somewhat confused, and 18.8% were very confused. While 21.7% weren't really confused and 13% weren't confused at all. This deduces that a lot of students are disoriented about their career choices.

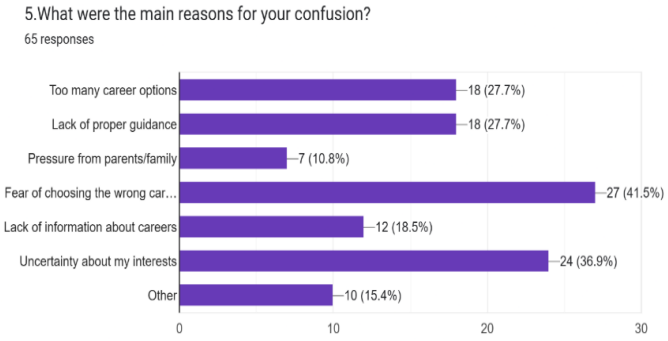

Figure 3. Reasons Leading to Confusion

The data from Figure 3. deduces that bulk of the poll feared choosing the wrong career path, making 41.5%, while 36.9% were uncertain about their interests. 27.7% felt that there are too many career options and a lack of proper guidance; 10.8% felt pressured from their parents and family. While 18.5% recognized the lack of information about careers and 15.4% sorted out other reasons.

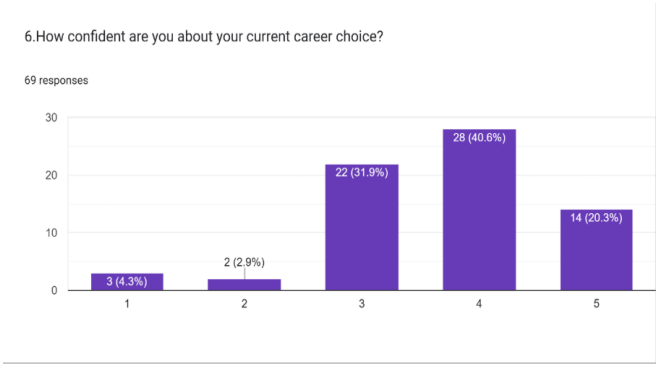

Figure 4. Reasons Leading to confusion

The outcome of Figure 4. reveals that the mass number of students were not confident about their career choices, given a scale of 1-5 where 1 being the most confident while 5 being the least confident. Only 4.3% were doubtless, and 2.9% were somewhat confident with their career choices. The majority 40.6% were barely confident, 31.9% were medial, and 20.3% weren't confident about their career choice at all.

Table IV. Students who Consulted a Career Counsellor

Counsellor Consultation	Number of Students
Yes	16 (23.2%)
No	45 (65.2%)
Wanted to but couldn't	8 (11.6%)

The outcome of Table-7 infers that majority of 65.2% students did not consult a counsellor while 11.6% wanted to but couldn't. Only 23.2% were able to commune a career consultant.

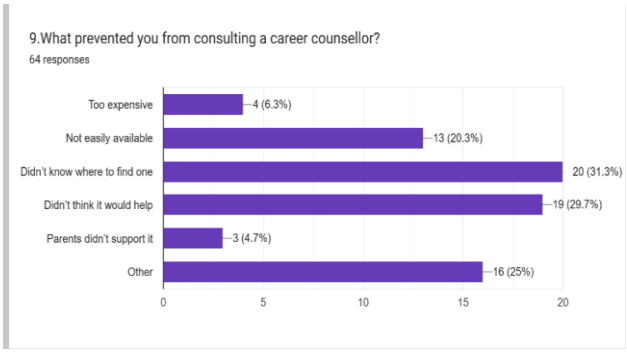

Figure 5. Reasons Preventing Students from Career Counselling

The results from Figure 5. reveal that the majority of 31.3% didn't know where to find career counselling, 20.3% heed that it's not easily available, 6.3% found it too expensive and 4.7% were not supported by their parents. While 29.7% remarked that it wouldn't help them and 25% elected other reasons. This concludes that a lot of students are obliviated from career counselling because of reasons like lack of availability, lack of knowledge about counselling, absence of support and financial dilemma.

Table V. Consideration for a Need for Career Guidance Tools

Need for Career Guidance Tools	Number of Students
Yes	52
Maybe	13
Not really	2

The data from Table 5. acknowledge that the majority of 77.6% felt that there is a need for a Career Guidance Tool, 19.4% thought it was feasible and only 3% found no need for such tool. Clearly there is a compulsion for a Career Guidance Tool.

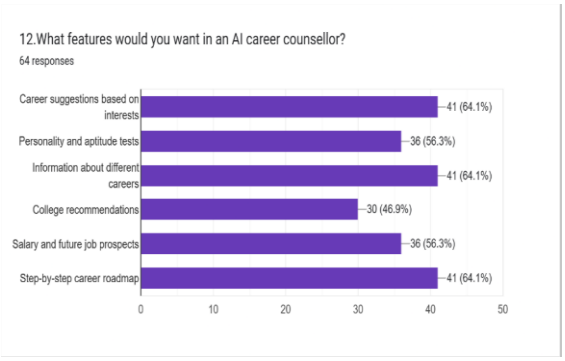

Figure 6. Features needed in an AI career counselor

The outcomes from Figure 6. reveals that there is a common consensus by students for an AI career counsellor where features like Career suggestions based on interests, Personality and aptitude tests, Information about different careers, College recommendations, Salary and future job prospects and Step-by-step career roadmap were expected.

When asked about the biggest challenge they face when choosing a career, students replied with diverse feedback. Several admitted that there is a lack of guidance and information about different career options, while others explained that they felt societal pressure and feared choosing the wrong career path. Some acknowledged lack of clarity and not knowing what's right for them while others stated financial constraints, peer pressure and lack of support. All these reasons are very familiar and frequent among students, thus there is an immense need for a Career Guidance Tool for students to help them with their dilemma.

When asked about if they had access to better guidance earlier would their career decision would have been different and why. A majority of students acknowledged that they would have made different career choices, and regret making their former career decisions. They remarked that they would've made better decisions if they had access to proper guidance, it would've helped them understand their strengths, explore their interests, analyse future scopes and they would be more confident about their decisions.

RESULT & CONCLUSION

By analyzing the different issues faced by students, we came forward with SkillSync: a web app that assesses students' interests and personality through psychometric tests. This provides the backend with relevant data, which is further analyzed using ML algorithms, predictive validity models, AI pattern recognition, multi-dimensional scoring, etc. This analytics, along with an LLM (OpenAI, Gemini, LLaMA) validating the response, gives a well-structured output that includes recommended career options, along with future prospects, career roadmap, and average package for that career.

A. Survey Data Collection and Analysis:

We conducted our survey through Google Forms and obtained a response sheet with analytics for each question. The survey was conducted on a diverse category of students to get an overall perspective; it included high school students as well as undergraduate and postgraduate students from different streams like Science, Commerce, and Arts.

The relevant analytics were already generated by the Google Forms response sheet and were used throughout this paper.

B. Requirement Identification and System Planning:

Based on the survey conducted among students, we interpreted the current requirements and came up with system specifications consisting of 5 widely required features:

- A psychometric assessment based on RIASEC and Big Five Personality Factors
- A recommendation engine to suggest 2–3 career options using a smart quiz builder
- A roadmap generation feature that provides a structured path to follow
- Additional features such as prospects of the job and average salary

C. Design of Interest Assessment Module:

The interest assessment module is prepared using predefined models like RIASEC and Big Five personality factors. Here, predefined weights are assigned to every question across different categories. After that, a cumulative total is calculated, and based on the top-performing categories, careers are suggested.

D. Development of AI-Based Recommendation System:

The base of this recommendation system was to develop a web app, which was built using HTML, CSS, and JavaScript to provide an interactive UI. For backend development, we used the Python-based Flask framework to handle the application logic.

The user data collected through the quiz is sent to the backend via RESTful APIs. These inputs are then processed and converted into a structured dataset, which is analyzed using predefined logic and ML algorithms. We also used Python libraries like Pandas and NumPy for data handling and processing.

The recommendation engine applies a scoring mechanism to evaluate choices and filters out the top view of their choices.

E. System Testing and Evaluation:

The system was tested using both functional and usability testing. Functional testing was carried out to verify that every component, including input handling, data processing, and recommendation generation, works as expected.

For evaluation, different input scenarios were also created using test data to check whether the system performs well.

Additionally, usability testing was conducted to evaluate responsiveness and ease of interaction between web components.

V. REFERENCE

[1] S. K. Singh, "Obstacles in Career Development: An Indian Students perspective", 2018 JETIR November 2018, Volume 5, Issue 11.

[2] Ameta, Upasana and Patel, Mayank and Rathore, Narendra Singh, Fusing Artificial Intelligence with Scrum Framework (April 25, 2023). Available at SSRN: https://ssrn.com/abstract=4428286 or http://dx.doi.org/10.2139/ssrn.4428286

[3] U. Ameta, L. Sarupria, K. Shrimali, K. S. Rathore, "Ayati: A Career Counselling Application", JETIR, ISSN: 2349-5162, 2014

[4] Y. A. Thakare, R. R. Satote, S. A. Kenkar, S. R. Nathile, S. A. Watane, S. C. Hade, "AI-based career counsellor: An AI driven career advisor", International Journal of Science and Research Archive, eISSN: 2582-8185, 2025

[5] Ameta, Upasana, Mayank Patel, and Ajay Kumar Sharma. "Scaled Agile Framework Implementation in Organizations', its Shortcomings and an AI Based Solution to Track Team's Performance." 2022 IEEE 3rd Global Conference for Advancement in Technology (GCAT). IEEE, 2022.

[6] A. Dahanke, S. Nilesh, DD. Anirudh, S. Huzaif, P. V. Nagare, An Intelligent Career Guidance System using Machine Learning, International Research Journal of Modernization in Engineering Technology and Science, Volume 4, Issue 3, 2022