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VISTA:(Virtual Interactive Skill and Talent Advisor)

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ABSTRACT :-

Choosing the right career path can be a daunting task for both students and working professionals, especially when most existing guidance tools offer one-size-fits-all suggestions that don't account for individual differences in skills, interests, or educational background. This project proposes the development of a smart, web-based platform that offers personalized career recommendations tailored to each user.

The platform will gather user information through a structured input form and will also support resume uploads to automatically extract relevant skills. Based on the collected data, the system will use either a machine learning model trained on curated career data or a rule-based engine to suggest customized career pathways. These suggestions will include recommended job roles, required skill sets, and potential career growth trajectories.

A key feature of the system will be a Skill Gap Analysis, which identifies areas where the user lacks essential competencies. It will then recommend appropriate online courses from providers like Coursera and Udemy to help users bridge those gaps and enhance their employability.

For implementation, the frontend will be built using HTML, CSS, and JavaScript or Streamlit, while the backend will be powered by Flask or Django. User data will be stored securely using SQLite or Firebase to enable fast and efficient access. By combining AI technologies with a user-centric design, this platform aims to offer a practical and intelligent solution for career development and planning.

Keywords—Career Path Advisory, Competency Gap Detection, Customized Guidance System, AI-Powered Solutions, Machine Learning Techniques, Resume Analysis, NLP Applications, Role Matching System, Online Career Platform, Professional Growth Tools, Smart Career Assistant, Rule-Based Recommendation Engine, Learning Path Suggestions, Career Forecasting, Decision-Making Support System.

Introduction :-

Selecting the right career can be a daunting and confusing process, especially for individuals who lack personalized direction aligned with their unique skills, interests, and goals. To solve this issue, VISTA has been developed as a smart career advisory system that harnesses the power of artificial intelligence to provide tailored career recommendations.

VISTA combines machine learning techniques with rule-based decision-making to evaluate user profiles and suggest career paths that best match their background. This hybrid approach ensures flexibility in adapting to diverse user scenarios while maintaining consistent and reliable outcomes. The platform is suitable for students, job aspirants, and professionals seeking a career transition or advancement.

A key feature of VISTA is its Skill Gap Analysis module. This functionality compares a user's existing skill set with the requirements of their chosen career path. It then identifies missing competencies and suggests specific courses, certifications, or training opportunities to bridge those gaps. This targeted approach to skill development enhances users' readiness and competitiveness in the job market.

Additionally, VISTA offers in-depth insights into a wide range of professions. Users can explore detailed information such as key responsibilities, required skills, current industry trends, and career growth prospects. Presenting this data in a structured and user-friendly format allows individuals to make more informed and strategic decisions.

The platform boasts a clean and intuitive interface, making it easy to navigate through career suggestions and upskilling resources. This user-focused design improves the overall experience and encourages proactive involvement in career planning.

In conclusion, VISTA serves as an intelligent and reliable partner in career development. By offering customized recommendations and identifying key skill gaps, it empowers users to take control of their professional journey with clarity and confidence.

Literature Review:-

The integration of artificial intelligence and natural language processing has led to significant improvements in job recommendation platforms, offering users more accurate and customized suggestions. A notable advancement in this field is JobFormer (2024), introduced by Guan et al. This system adopts a two-stage model that includes both job retrieval and ranking. It uses a semantically enriched transformer architecture with local and global attention

layers to interpret job descriptions in depth. By embedding skill relationships and enforcing consistency between user profiles and job listings, the model delivers high alignment between candidates and roles. Tests showed that JobFormer significantly outperforms existing solutions in metrics like Recall@20 and AUC. Despite these improvements, challenges such as limited user history and cold-start issues persist.

In a different approach, Avlonitis et al. (2023) modeled career progression as a sequential decision-making problem using a Markov Decision Process (MDP). They applied reinforcement learning techniques like Q-Learning and Sarsa, utilizing employment datasets from the Netherlands to simulate job transitions. Their model reportedly improved long-term income projections by around 5% compared to conventional career paths. However, the scope was limited due to simplified labor market representations and a narrow range of job types.

Zheng et al. (2023) developed GIRL, a generative framework that leverages large language models to refine job recommendations. The model's training involved a three-step process: supervised fine-tuning, reward modeling based on recruiter feedback, and reinforcement learning-based policy optimization. While GIRL improved both accuracy and interpretability, it raised concerns about scalability and performance across diverse employment sectors.

Another notable development is SkillRec (2025), which integrates BERT and FastText embeddings within a neural architecture to suggest relevant skills from job titles. BERT-based configurations showed superior accuracy. However, since the dataset primarily focused on technical positions, the model's applicability across non-technical industries remains limited.

Additional tools such as SkillSync and Skill Scanner rely on collaborative filtering and resume analysis, respectively, to connect users with suitable job openings. While these approaches have shown practical utility, many lack comprehensive performance evaluation. Moreover, methods that depend heavily on social media data or simplistic keyword matching raise concerns about user privacy and result accuracy.

In summary, recent innovations have significantly improved the contextual relevance and precision of job recommendation systems. Nonetheless, persistent issues such as data imbalance, real-time responsiveness, and transparency need to be addressed for these technologies to reach their full potential.

Methodology:

VISTA is designed using a modular and systematic development approach aimed at assisting users with career guidance through intelligent skill evaluation. The project architecture includes several interconnected components that work in a step-by-step manner to deliver personalized insights.

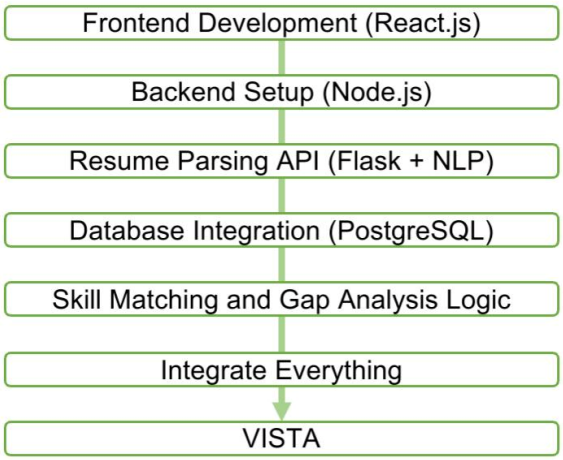
Development Stages:

1. **Frontend Interface (React.js):** An intuitive user interface is developed using React.js to allow users to input personal data, upload their resumes, and view customized career recommendations.
2. **Backend Configuration (Node.js):** Node.js serves as the backend engine, managing API calls, user sessions, and facilitating communication among various services.
3. **Resume Analysis Service (Flask + NLP):** A lightweight Flask service employs Natural Language Processing techniques to extract key data such as skills, qualifications, and work experience from the uploaded resumes.
4. **Database Connectivity (PostgreSQL):** PostgreSQL is used to securely store and organize user information, parsed resume content, and predefined job role templates.
5. **Skill Mapping and Gap Detection Module**: This module evaluates the user's existing skill set against ideal job role profiles. It utilizes decision tree algorithms or content-based filtering to identify missing skills.
6. **System Integration**: All components are interconnected to ensure smooth data exchange and a cohesive system operation.
7. **Final Output** – VISTA: The final product delivers personalized recommendations, showcasing potential career paths, skill deficiencies, and learning resources to help users advance.

Operational Workflow:

1. **User Input Collection**: Users provide their details through a form and upload resumes for analysis.
2. **Data Processing:** The input data undergoes standardization, keyword extraction, and is converted into a machine-readable format.
3. **Career Matching**: A rule-based engine or machine learning model aligns user profiles with the most appropriate career roles.
4. **Skill Gap Analysis:** The system highlights the differences between the user's current capabilities and those required for their target roles.
5. **Personalized Suggestions:** Based on the analysis, users are given targeted feedback including role suggestions, necessary skills, and recommended learning resources.

Fig: Flow Chart



Implementation:

1. Stoner Input Interface

The system begins by collecting detailed information from druggies through a digital form, including

- Academic background
- Primary chops and any attained instruments
- Fields of interest
- (Optional) Career bournes

Also, druggies can upload their resumes in PDF format. The platform uses introductory Natural Language Processing(NLP) styles to prize and interpret applicable details automatically from the document.

2. Recommendation Machine

The recommendation process is powered by two main factors

- **Machine Learning Model** Trained on datasets that relate skillsets with colorful career paths, enabling data- driven suggestions.
- **Rule**- Grounded sense Utilizes predefined mappings curated by experts to give quick and fluently resolvable recommendations.

3. Skill Gap Analysis

Once a stoner profile is compared against ideal job places, the system performs a gap analysis to

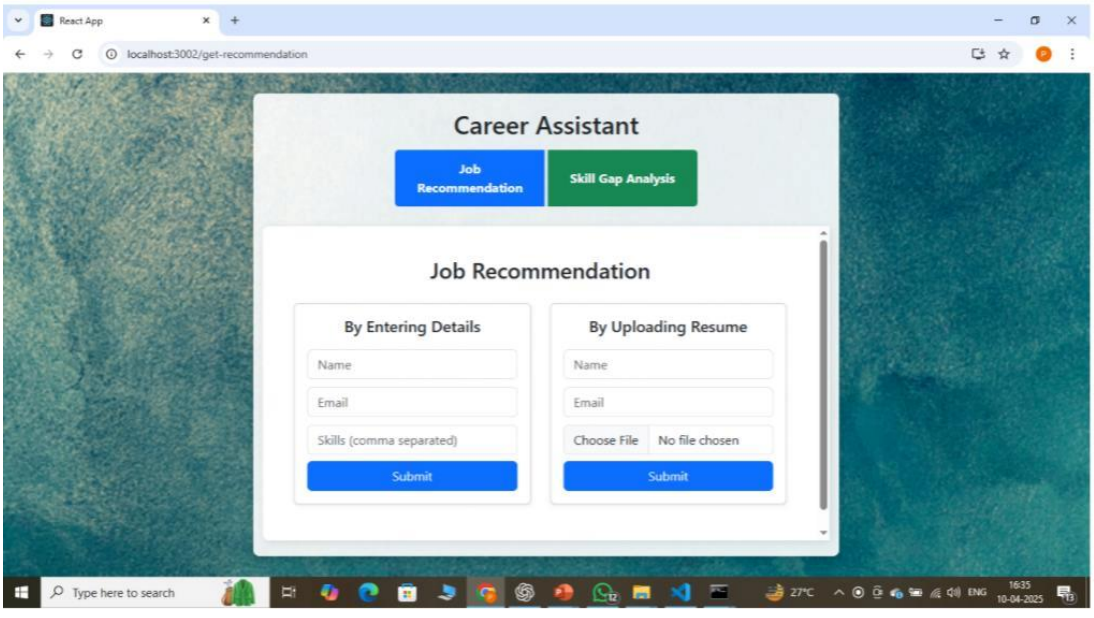
- Identify chops the stoner lacks for specific careers
- Recommend suitable online courses or instruments from platforms like Coursera and Udemy to bridge those gaps

4. Technology Stack

The VISTA system is erected using the following technologies

- **Frontend** HTML, CSS, JavaScript, or voluntarily Streamlit for rapid-fire interface development
- **Backend Python**- grounded fabrics similar as Beaker or Django
- **Database** SQLite or Firebase for data storehouse
- **Libraries and Tools Scikit-** learn for machine literacy, Pandas for data manipulation, and spaCy for NLP- driven capsule parsing

Fig: Job Recommendation



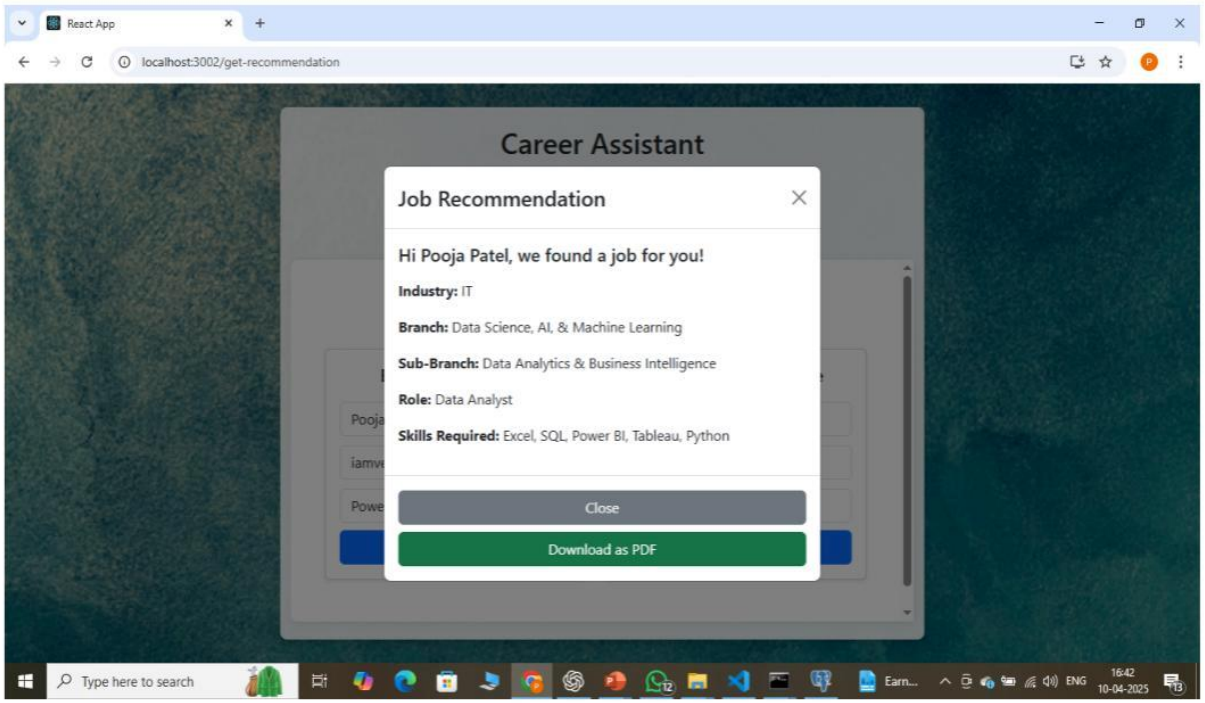


Fig : Recommendation submission

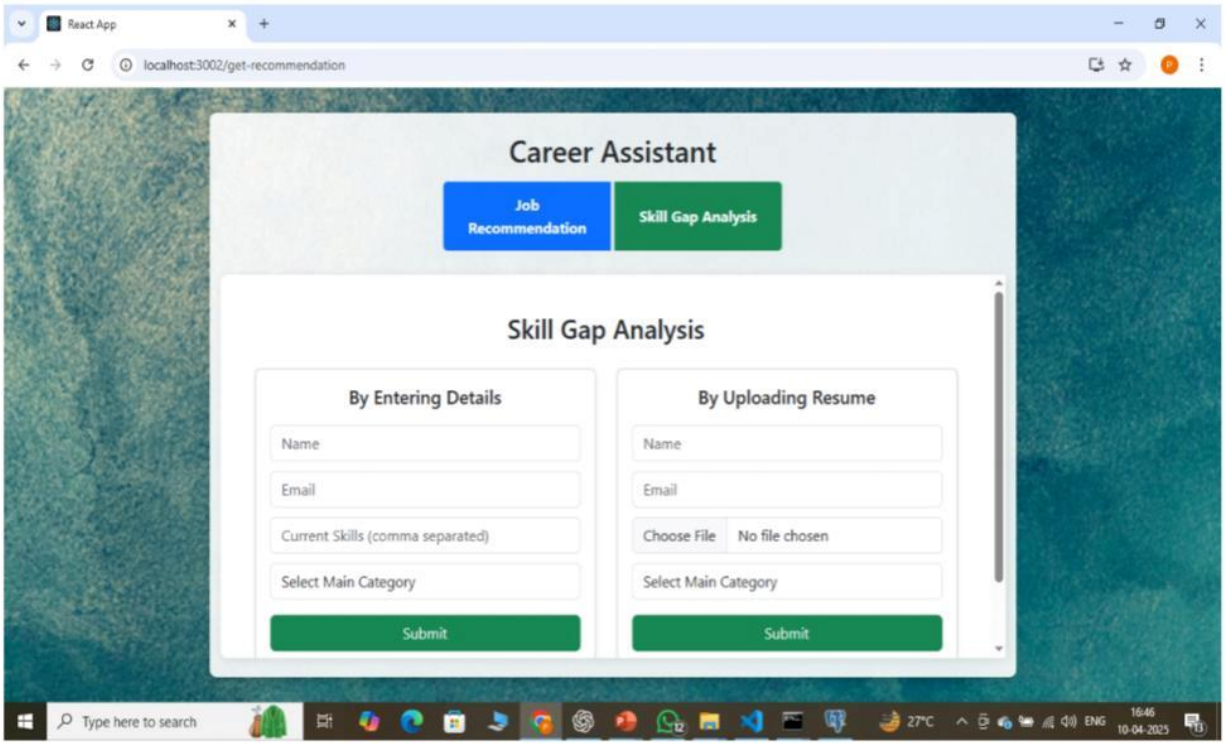
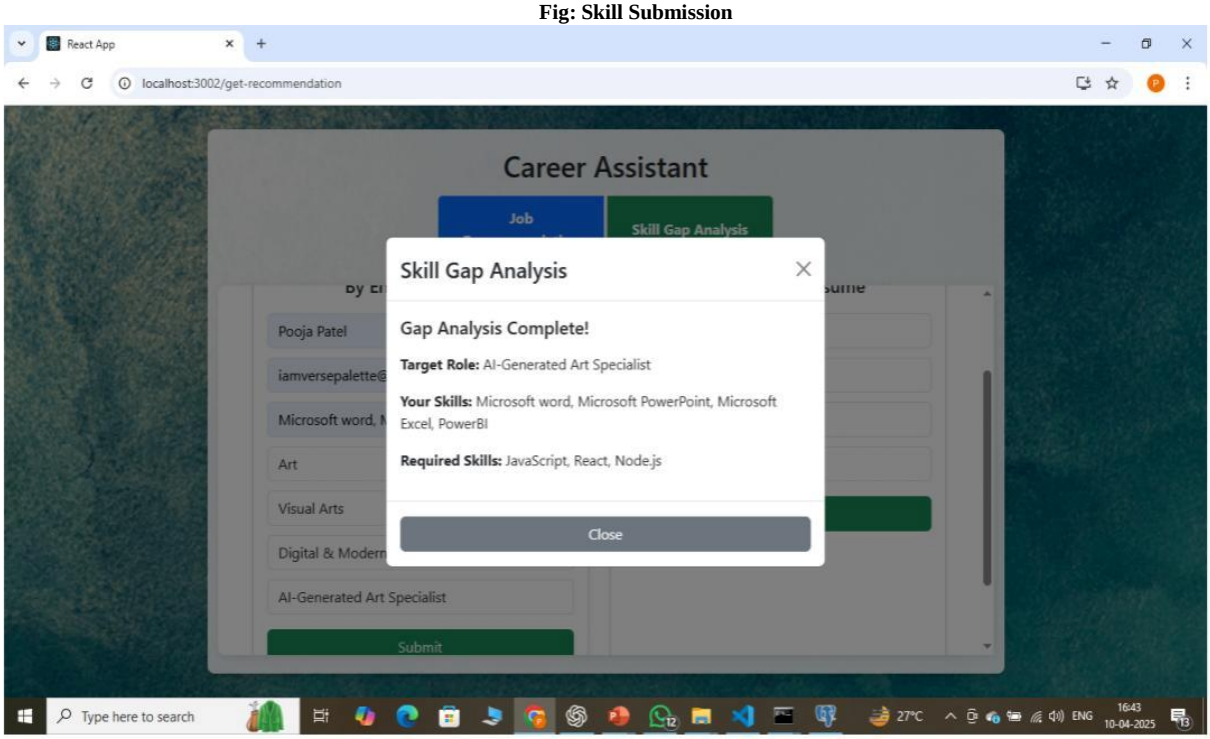


Fig: Skill Gap Analysis

Fig: Skill Submission



Result :-

1. **Accurate and Personalized Career Recommendations :** VISTA will deliver career suggestions tailored to each user's unique skills, interests, and academic background, enhancing the relevance and precision of career planning.
2. **Effective Skill Gap Identification :** The system will highlight the skills required for a user's desired career path and suggest targeted courses and resources to bridge these gaps.
3. **Enhanced Career Decision-Making :** Through structured roadmaps and data-driven insights, users will make more informed decisions aligned with their long-term professional goals.
4. **Time-Saving Career Exploration :** AÍ-powered instant recommendations will eliminate the need for extensive manual research, streamlining the career planning process.
5. **Resume-Based Career Suggestions :** By analyzing uploaded resumes, the system will offer more personalized and experience-driven career recommendations, making it suitable for both students and working professionals.
6. **Improved Job Readiness :** VISTA will recommend relevant certifications and training, enabling users to enhance their employability and stay competitive in the job market.
7. **Increased User Engagement :** Interactive features like career tracking, mentorship modules, and gamified learning will foster deeper engagement and continuous user participation.
8. **Scalability and Adaptability :** The system will evolve with changing job market dynamics, ensuring recommendations remain current and applicable across industries and geographies.
9. **Higher Success Rate in Job Placements :** Users who actively follow the platform's guidance and upskill accordingly will likely experience improved job placement outcomes in their chosen fields.
10. **A Step Toward Automated Career Guidance :** VISTA represents a move toward intelligent, AI-driven career counseling, offering a scalable alternative to traditional guidance methods.

Future Enhancements:

- **Real-Time Labor Market Insights:** Implementing API integrations with major job portals to continuously update career recommendations based on current hiring trends and industry demands.
- **Platform Connectivity:** Linking user profiles with platforms such as GitHub and LinkedIn to gather dynamic professional data and enrich career suggestions.
- **Mobile Accessibility**: Launching a dedicated mobile application to allow users to access career planning tools conveniently from anywhere.
- **Assessment of Soft Skills and Personality Traits**: Introducing modules that evaluate personal attributes and interpersonal skills to further personalize career matches.

- **Gamified Learning and Progress Tracking**: Adding interactive elements such as achievements, challenges, and milestones to make career development more engaging and motivating.
- **AI-Driven Resume and Interview Support**: Offering tools that automatically refine resumes and provide tailored interview preparation based on target roles..

Conclusion :-

VISTA offers a valuable and intelligent solution for individuals seeking personalized career guidance tailored to their skills, interests, and academic background. By integrating machine learning and rule-based approaches, VISTA delivers data-driven career recommendations, identifies skill gaps, and suggests targeted upskilling resources to bridge those gaps.

Its ability to analyze resumes and provide real-time insights enhances the career planning process, making it faster, more efficient, and highly relevant. Future enhancements such as real-time job market analytics, integrated mentorship programs, and AI-powered resume building can further expand VISTA's functionality and impact.

With ongoing improvements and smart integrations, VISTA has the potential to evolve into a comprehensive and adaptive career guidance platform. It empowers both students and professionals to make confident, well-informed career decisions and stay competitive in the ever-changing job market.

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