AI Powered Career Reboot System for Women - Personalized Reskilling Pathways

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***Abstract*—Career interruptions often leave women at a disadvantage when re-entering the workforce, as they struggle with outdated skills, reduced confidence, and rapidly changing industry demands. Conventional training programs rarely provide customized pathways, resulting in a mismatch between acquired skills and actual job opportunities. To address this challenge, this project introduces an AI-powered career reboot system designed exclusively for women seeking to restart their professional journey. The system evaluates an individual's existing skills and career history, identifies specific gaps in relation to current market requirements, and recommends personalized reskilling pathways along with relevant job opportunities. By leveraging K-Nearest Neighbors (KNN) alongside TF-IDF and cosine similarity, the platform generates these tailored pathways based on similarity to the user's profile. By delivering personalized guidance rather than generic training, the platform ensures that women gain targeted competencies that directly improve employability. In addition, the system supports inclusivity by empowering women with clear, data-driven career roadmaps, boosting their confidence, and reducing barriers to re-entry. This approach demonstrates how artificial intelligence can be leveraged not only for technical efficiency but also for creating socially impactful solutions that promote gender equality and economic empowerment.**

***Index Terms*—Artificial Intelligence (AI), Machine Learning (ML), K-Nearest Neighbors (KNN), Natural Language Processing (NLP), TF-IDF Vectorization, Cosine Similarity, Skill Gap Analysis, Career Recommendation System, Data-Driven Decision Making, Personalized Reskilling, Workforce Reintegration, Women Empowerment, Employment Prediction, Human-Centered Computing.**

I. INTRODUCTION

In today's rapidly evolving job market, continuous learning and adaptation have become essential for sustaining employability. For many women, however, career interruptions caused by personal, social, or familial responsibilities create significant challenges when attempting to re-enter the workforce. Extended breaks often result in outdated skills, limited exposure to new technologies, and a lack of confidence in competing with active professionals. Consequently, many women experience barriers in securing meaningful employment, despite possessing valuable prior experience.

Traditional reskilling initiatives, while helpful, are often designed as one-size-fits-all programs. Such approaches fail to recognize the diversity of career backgrounds, skill levels, and aspirations that women bring to the workplace. A more personalized and dynamic solution is required, one that not only identifies individual strengths and weaknesses but also aligns reskilling opportunities with real-time labor market demands.

Artificial Intelligence (AI) provides a powerful means to bridge this gap. By analyzing existing skills, comparing them with industry requirements, and recommending tailored training and career pathways, AI can support women in overcoming the challenges of workforce reintegration. This project proposes an AI-powered career reboot system that generates personalized reskilling pathways, connects women to relevant opportunities, and empowers them to return to the workforce with confidence.

The proposed system aims to go beyond conventional training by delivering customized guidance, addressing both the technical and motivational aspects of career re-entry. In doing so, it contributes to broader goals of gender equality, inclusivity, and economic empowerment, while showcasing the role of AI in creating socially responsible technology solutions.

II. LITERATURE SURVEY

The review of existing studies highlights several key observations that guide the design of the proposed AI-powered career reboot system for women

Title	Authors / Year	Methods Used	Key Findings	Publisher / Outlet
Comparative Analysis of TF-IDF and Word2vec Algorithm for Content-based Job Recommendation System	Krisha Shrestha (2020)	TF-IDF + Cosine Similarity baseline; Word2Vec + Word Mover's Distance; compared both methods for job recommendation from job posting text	Word2Vec based methods perform better when semantic similarity matters; TF-IDF + cosine still a strong baseline; there is trade-off between complexity vs performance	Department of Computer Science & IT, TU, Nepal (Thesis)
Resume Analyzer and Job Recommendation System	K S Varith Reddy et al. (2025)	Extract resume features; TF-IDF / Count Vectorization; Cosine Similarity; KNN ranking	System accurately matches resumes and job descriptions; recommends courses/certifications to improve match strength	IRE Journals
Job Recommendation from Semantic Similarity of LinkedIn Users' Skills	Giacomo Domeniconi, Gianluca Moro, Andrea Pagliarani, Karin Pasini, Roberto Pasolini (2016)	Use Latent Semantic Analysis (LSA) over skills; hierarchical clustering; match user skills to job clusters	Found that using semantic associations (via LSA) improves relevancy of job suggestions compared to simple keyword matching	Proceedings of the 5th International Conference on Pattern Recognition Applications and Methods
VacancySBERT: the approach for representation of titles and skills for semantic similarity search in the recruitment domain	Maiia Bocharova, Eugene Malakhov, Vitaliy Mezhuyev (2023)	Siamese neural networks / SBERT embeddings; semantic similarity search combining titles and skills	Gives much better matching accuracy; more flexible than pure keyword or TF-IDF methods; improves recall in top-K suggestions	ArXiv preprint

III. PROPOSED WORK

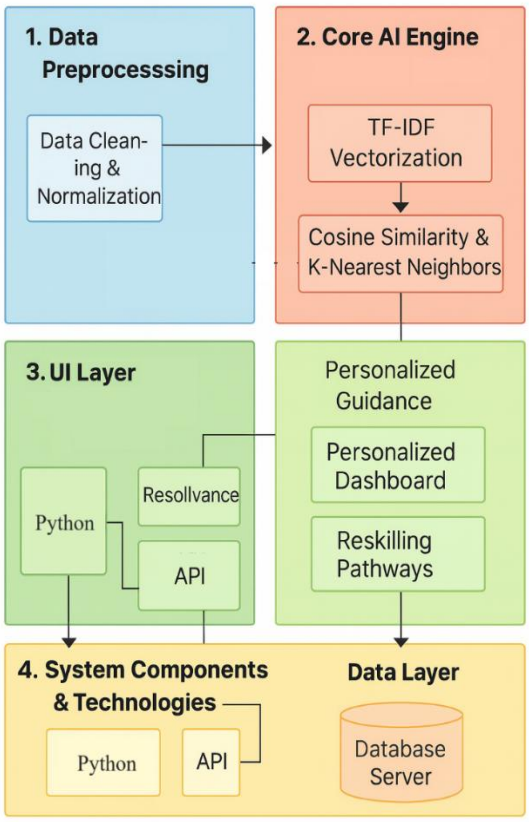
The proposed AI-powered Career Reboot System for Women is designed to bridge the gap between women returning to work and the evolving requirements of the job market. The scope of this project covers the following dimensions:

- Target Users
  - Women who have experienced career breaks and seek to re-enter the workforce.
  - Administrators responsible for monitoring system outputs.
- Core Functionalities
  - Registration and profile management for women professionals through admin-verified access.
  - Skill profile analysis based on structured inputs.
  - Matching of individual skill sets with current job requirements using AI algorithms.
  - Personalized reskilling pathway recommendations by linking identified skill gaps with suitable courses.

- Display of career opportunities aligned with reskilling outcomes.
- System Boundaries
- The system does not directly provide employment but recommends career pathways and opportunities based on skill alignment.
- Recommendations are limited to the quality and coverage of datasets provided by administrators.
- Expected Impact
- Facilitate smoother career re-entry for women by reducing uncertainty in skill selection.
- Empower women with confidence through clear, personalized guidance.

Provide organizations with better-prepared candidates whose skills align with mrket demand.

IV. SYSTEMS ARCHITECTURE



V. SYSTEM IMPLEMENTATION

The System Implementation phase involves turning the design and planned modules into a fully functional system that can be tested and deployed. For the proposed project, the implementation is divided into two main components: the AI-based result module and the python-based web application for women interaction.

AI-Based Module

- Dataset Preparation
- Model Development
- Evaluation

Python-Based Web Application

- UI/UX Design
- Integration of AI Module
- Security and Error Handling

Implementation Outcome

- Women can log in and immediately view **result**.
- Admin can upload new data, retrain the model, and monitor performance.

The system provides an integrated AI + **web** interface solution for improving decision-making.

VI. CONCLUSION

The AI-powered Career Reboot System for Women addresses a critical gap in workforce reintegration by providing personalized reskilling pathways and career guidance for women returning after a career break. Through the integration of AI-based skill analysis, gap identification, and job alignment, the system offers targeted analysis that are tailored to each individual's existing competencies and career goals.

This project demonstrates that leveraging structured datasets, combined with algorithms such as TF-IDF and cosine similarity, can produce meaningful, actionable result in a transparent and interpretable manner. By focusing on personalization and inclusivity, the system not only enhances employability but also empowers women with confidence and clear guidance in their career journey.

In conclusion, the proposed system offers a practical, AI-driven solution that bridges the gap between skill deficits and market demands, promoting gender inclusivity and enabling women to re-enter the workforce successfully. It lays a foundation for further research and development in intelligent career guidance systems tailored to underrepresented groups in the professional ecosystem.

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