**LITERETURE RIVIEW**

Faruque et al. (2024)[1] developed an AI-driven career prediction system using NLP and ML techniques such as SVM, CNN, and LSTM, with SVM achieving 88.63% accuracy. Their focus on natural language processing (NLP) for tailored career counseling is consistent with my strategy of using feature engineering and sophisticated machine learning models to increase prediction accuracy. This work shows how textual data can enhance career suggestions and provides some useful observations for future research.

In Pandey and Maurya (2021)[2], they also tested different machine learning techniques to figure out best career path of engineering students; Decision Tree, Random Forest and XGBoost. They found that soft-voting classifiers yielded the highest accuracy of 53.03%. The best accuracy, 53.03%, was obtained using soft-voting classifiers, they discovered.This study demonstrates how machine learning could assist students in making well-informed career decisions, which is consistent with my own research. Parvez et al. (2017) [3] also studied the prediction of potential IT professionals in Bangladesh using Naive Bayes, J48, Bagging and Random Forest classfiers and found that Random Forest gave highest accuracy (67.4%). In addition, working with classifiers and performing statistical evaluation for better predictions was our main focus. That being said it resonates with my research where I compare various machine learning models to improve the accuracy of the career prediction for students. Both studies confirm that machine learning in career prediction is effective and argue that selecting proper classifier could give better result.

In Reddy 2021[4], introduced a machine learning based system that aids computer science students in selecting the right career based. We used algorithms like XGBoost, Decision Trees to evaluate the abilities and preferences of the students and provide a suitable job role respectively. This tool will supply the students with a clear development plan based on which their capabilities can be aligned with the career goal, resulting in better job satisfaction and outputs. In a similar vein, Gavhane et al. (2021)[5] presented a career prediction system that assesses 15 possible careers using methods including SVM, XGBoost, and hybrid algorithms. Their approach provides highly accurate recommendations, allowing students to make well-informed, personalized career decisions. In line with my research on applying similar algorithms to forecast career trajectories for CSE undergraduates, both findings highlight the relevance of machine learning in assisting students in choosing occupations that fit their interests and skill sets. These works highlight how AI can improve career guidance, making it more tailored and effective for students.

Casuat et al. (2020)[6] devised a machine learning based approach to infer students employability using grades, on the job training as well as the practice interviews. After testing six different algorithms using SMOTE to handle imbalanced datasets, Support Vector Machine (SVM) produced the best accuracy, 91.22%. This allows skill shortages to be defined, prevents the model being overfitted or underfitted, and demonstrates how to adapt this approach for further employability.In this context, Sinha and Singh (2023)[7] also used machine learning techniques for providing career prediction using SVM, Decision Trees, Random Forest. Based on students' interests, abilities, academic standing, they suggested career pathways emphasizing the importance of data preparation and the ability to integrate supervised and unsupervised learning techniques. These studies are similar to my own research in that they show how machine learning can be used to predict career outcomes and characterize the specific sound of guidance predicated on skills and profiles.

**Summary of all paper**

1

Title: Unlocking Futures: A Natural Language Driven Career Prediction System for Computer Science and Software Engineering Students.

Cite: Hossain Faruque, S., Akter Khushbu, S. and Akter, S., 2024. Unlocking Futures: A Natural Language Driven Career Prediction System for Computer Science and Software Engineering Students. *arXiv e-prints*, pp.arXiv-2405.

Summary: This paper introduces an AI-assisted career prediction system for Computer Science and Software Engineering students, leveraging Natural Language Processing (NLP) and Machine Learning (ML) algorithms to provide tailored career recommendations. The study integrates data preprocessing, feature engineering, and model evaluation using methods like SVM, CNN, and LSTM, with SVM achieving the highest accuracy of 88.63%. It highlights the utility of NLP in improving career guidance precision and suggests further research into expanding datasets and incorporating deep learning techniques.

2.  
Title: Prediction Of Undergraduate Students’ Career Using Various Machine Learning And Ensemble Learning Algorithms.

Cite: Pandey, A. and Maurya, L.S., 2021. Prediction Of Undergraduate Students’ Career Using Various Machine Learning And Ensemble Learning Algorithms. *Webology (ISSN: 1735-188X)*, *18*(6).

Summary: This paper explores machine learning algorithms to predict suitable career paths for engineering students based on academic performance and personal skills. Six classification methods, including Decision Tree, Random Forest, and XGBoost, are evaluated, with soft-voting classifiers achieving the highest accuracy of 53.03%. The study highlights the potential of machine learning to assist students in making informed career decisions.

3  
Title: Prediction of Potential Future IT Personnel in Bangladesh using Machine Learning Classifier.

Cite: Parvez, M.H., Khatun, M.M., Reza, S.M., Rahman, M.M. and Patwary, M.F.K., 2017. Prediction of potential future it personnel in bangladesh using machine learning classifier. *Global Disclosure of Economics and Business*, *6*(1), pp.7-18.

Summary: This paper investigates the prediction of future IT personnel in Bangladesh using machine learning classifiers such as Naive Bayes, J48, Bagging, and Random Forest. Data from IT and non-IT graduates were processed, with Random Forest achieving the highest accuracy at 67.4%. The study emphasizes the value of classifier comparisons and statistical evaluations in predicting potential IT professionals.

4.  
Title: Career Prediction System

Cite: Reddy, M.M., 2021. Career Prediction System. *International Journal of Scientific Research in Science and Technology*, *8*(4), pp.54-58.

Summary: The study presents a machine learning system designed to guide computer science students in career selection by assessing their skills and preferences. Using algorithms such as XGBoost and Decision Trees, it predicts suitable job roles and provides a clear roadmap for skill development and career progression. By addressing the confusion in career choices, the system ensures better alignment of students' abilities with their professional aspirations, improving career satisfaction and outcomes.

5.  
Title: Career Path Prediction Using Machine Learning Classification Techniques.

Cite: Gavhane, P., Shinde, D., Lomte, A., Nattuva, N. and Mandhane, S., 2021. Career Path Prediction Using Machine Learning Classification Techniques. *Volume 8, Issue 3 of International Journal of Scientific Research in Computer Science, Engineering and Information Technology*.

Summary: The study proposes a machine learning-based career prediction system to assist students in selecting suitable career paths aligned with their skills and interests. It evaluates 15 career options using advanced classification techniques like SVM, XGBoost, and hybrid algorithms, offering highly accurate recommendations. The interactive framework enhances user engagement, ensuring informed and personalized career decisions for a better future.

6.   
Title: Predicting Students’ Employability using Support Vector Machine: A SMOTE-Optimized Machine Learning System.

Cite: Casuat, C.D., Festijo, E.D. and Alon, A.S., 2020. Predicting students’ employability using support vector machine: a smote-optimized machine learning system. *International Journal*, *8*(5), pp.2101-2106.

Summary: This study developed a student employability prediction system using machine learning, focusing on mock job interviews, on-the-job training, and GPA data. By addressing imbalanced datasets with SMOTE, six algorithms were tested, with Support Vector Machine (SVM) achieving the highest accuracy of 91.22%. The system highlights skill gaps and provides actionable insights to improve graduate employability while ensuring the predictive model is neither underfitted nor overfitted.

7.  
Title: Student Career Prediction Using Algorithms Of Machine Learning

Cite: Sinha, A. and Singh, A., 2023. Student Career Prediction Using Algorithms Of Machine Learning. *Ashish, Student Career Prediction Using Algorithms Of Machine Learning (May 6, 2023)*.

Summary: This study explores career prediction for students using machine learning techniques, such as Support Vector Machines (SVM), Decision Trees, and Random Forest. It leverages data on students' skills, academic performance, and interests to suggest suitable career paths. The research highlights the importance of data preprocessing and combines supervised and unsupervised learning methods to enhance prediction accuracy and provide personalized career guidance.