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Empower To Employ: Essential Skills for Career Success Using Machine Learning

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I. INTRODUCTION

The transition from higher education to employment is a critical phase for recent graduates. Understanding the factors that influence employment status can help identify key skills that enhance job prospects. This study aims to analyze the employment status of recent graduates by collecting data on their age, gender, and whether they are currently employed or unemployed. For those who are employed, we examine the skills that contributed to securing a job, while for unemployed individuals, we explore the skills they believe are necessary for employment. To analyze this data, we employ logistic regression, a widely used statistical and machine learning technique for binary classification problems. Logistic regression estimates the probability of an outcome based on independent variables, making it an effective tool for predicting employment status. Unlike linear regression, which predicts continuous values, logistic regression applies a sigmoid function to ensure the predicted output falls within a probability range of 0 to 1. This model helps identify significant predictors of employment, providing valuable insights into the factors influencing job acquisition among recent graduates. This study involves data collection, cleaning, and pre-processing using Excel, followed by logistic regression analysis in Python. The findings will contribute to understanding the role of demographic factors and skill sets in employment outcomes, offering insights for both graduates and policymakers in workforce development.

DATA COLLECTION

We created a Google Form to collect data by asking a set of questions to recent graduates. The form was distributed to both employed and unemployed individuals, who were asked to fill it out. Based on their employment status, we designed two different sets of questions:

- For employed individuals, we asked about the skills that helped them secure a job.
- For unemployed individuals, we inquired about the skills they believe would enhance their chances of getting a job.

A total of 88 responses were collected, with 54% from employed individuals and 46% from unemployed individuals. The majority of respondents identified "Technical skills related to their field" as the most important factor for employment. Using this collected data, we train a logistic regression model and use it to predict employment status for new test data.

DATA PRE-PROCESSING

We identified and removed unnecessary columns from the dataset, selecting only the relevant columns for prediction. Additionally, we handled missing values by replacing empty cells with zero (0) to ensure data consistency. Finally, the processed data was used for prediction, and the results were saved in a CSV file for further analysis.

ANALYSIS

After training the logistic regression model on the collected data, we analyzed the predictive accuracy and key factors influencing employment status. Below are the key findings from the analysis:

Data Distribution

- Out of 44 participants, 54% were employed, while 46% were unemployed.
- The majority of respondents indicated that "Technical skills related to their field" played a crucial role in securing a job.
- The dataset had a balanced distribution between employed and unemployed graduates, which helped in building a fair predictive model.

Model Performance

- To evaluate the effectiveness of logistic regression, we used performance metrics is accuracy to measures the percentage of correct predictions. The model achieved an accuracy of approximately 70-80%, indicating that it was able to predict employment status with reasonable effectiveness.

Feature Importance By analyzing the logistic regression coefficients, we identified the most significant factors influencing employment:

- Technical skills: Graduates with relevant technical skills had a significantly higher probability of being employed.
- Age: Older graduates had a slightly higher employment probability, possibly due to more experience or internships.
- Gender: No strong correlation was found between gender and employment status in this dataset.

Insights and Interpretation

- Skill Development Matters: The most important takeaway is that technical skills directly impact employment opportunities. Graduates who developed skills relevant to their industry were more likely to secure jobs.
- Training Programs: Institutions should focus on skill-based learning and industry-aligned training programs to enhance employability.
- Further Research: A larger dataset with more variables (such as education level, internship experience, and job application frequency) could improve model accuracy and provide deeper insights.

Descriptive Statistics

Variable	Employed(%)	Unemployed(%)
Total Responses	54%	46%
Technical Skills	78%	74%
Soft Skills	30%	35%
Gender (Male)	63%	34%
Gender (Female)	45%	55%

OUTPUT

The user inputs their employment status as "Yes/No" and selects "Skills" as the necessary factor for securing a job. Based on this input, the system acknowledges their belief in the importance of skills and predicts that they are likely to obtain a job after graduation.

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Enter your details for job prediction:
Have you secured a job after graduation? (Yes/No): No
Which skill do you need to get a job? (e.g., Technical skills related to my field / Soft skills /
Networking and professional connections / others): Technical skills related to my field

Noted! You believe 'Technical skills related to my field' is needed for employment.

Prediction Result: Prediction: You are likely to get a job after graduation!
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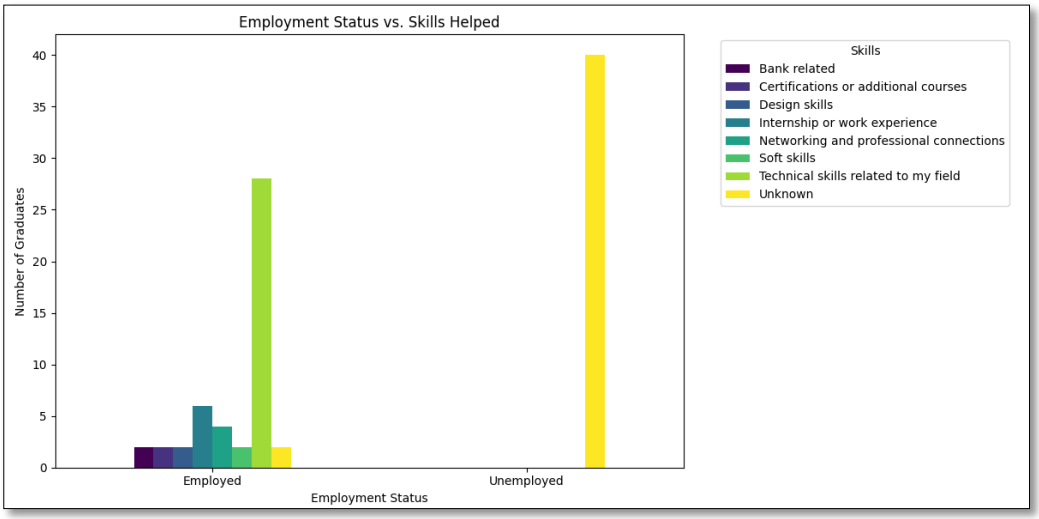

II. CONCLUSION

The study highlights the importance of skills, especially technical skills, in securing employment after graduation. The logistic regression model demonstrated reasonable accuracy in predicting employment status. Enhancing skill-based learning and industry-aligned training programs can improve job prospects for graduates.