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# Future Technology Trends Prediction for the Job Market

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**ABSTRACT**
Machine learning models are increasingly being used to predict various phenomena in different industries. The prediction of technology trends in the job market is becoming an important task for companies and job seekers alike. In this paper, we propose a machine learning model for predicting the demand for different technologies in technical jobs. The model is trained on data from job postings and analyses the skills and technologies required by employers. We then use the model to predict the demand for different technologies in the future job market. Our results show that the model can accurately predict the demand for different technologies and can be used by job seekers to plan their career paths and by companies to plan their hiring strategies. We prepared Campus Hires ATS which implements our machine learning model to predict technology trends in future.

**Keywords**: ATS, Campus Hiring, Future Prediction, Machine Learning.

## I. INTRODUCTION

The machine learning model used by the Campus Hires ATS is a supervised learning model, specifically a classification model. The model takes as input various features of a job applicant, such as their education, work experience, and skills, and predicts the likelihood of the applicant being hired.

The model is trained on historical job application data using machine learning algorithms such as logistic regression, decision trees, or neural networks. The specific algorithm used depends on the data and the problem being addressed.

The model is trained using a labelled dataset, where each instance represents a job application and is labelled with the outcome (e.g., accepted, rejected, or declined). The model learns to recognize patterns in the data that are associated with each outcome and uses these patterns to predict the outcome of new job applications.[6]

The performance of the model is evaluated using a holdout dataset, which is a portion of the data that is not used for training. The evaluation metrics used depend on the specific machine learning algorithm used, but commonly used metrics include precision, recall, and F1 score.

The mathematical approach used by the Campus Hires ATS model involves the use of supervised learning algorithms to classify job applicants into two or more categories based on their qualifications and experience. In this approach, the model learns from historical job application data to predict the probability of a candidate being hired for a particular job.

## II. METHODOLOGY

To develop our machine learning model, we collected data from various job posting websites. We focused on technical job postings and collected information on the skills and technologies required by employers. We then used this data to train our model to predict the demand for different technologies in the future job market.

We used a supervised learning approach to train our model. We divided our data into training and testing sets and used the training set to train our model. We used a decision tree algorithm to develop our model. We chose this algorithm because it is easy to interpret and can handle both categorical and continuous data.

The CampusHires ATS (Applicant Tracking System) with future trends prediction for campus hiring methodology involves several steps to ensure that the system is effective in identifying and attracting top talent from college campuses.[2]

**Collecting and analysing data:** The first step is to collect data on past hiring trends, including the number of applicants, the success rate of hires, and the types of candidates who have been successful in the past. This data is then analysed to identify patterns and trends that can be used to inform future hiring decisions.

**Defining job requirements:** Based on the analysis of past hiring trends, job requirements are defined for each open position. This includes identifying the skills and qualifications needed for the role, as well as any specific criteria that are important for success in the position.

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**Creating job postings:** Job postings are created that highlight the key requirements for each position. These postings are designed to be compelling and attractive to top talent, using language and messaging that resonates with college students and recent graduates.

**Screening and filtering candidates:** As applications come in, the system uses AI algorithms and machine learning to screen and filter candidates based on their qualifications, experience, and other relevant factors. This helps to identify the most promising candidates and saves time for recruiters who don't have to manually screen each application.[5]

| Person Characteristics | Job Fit |
|---|---|
| Age<br>Gender<br>Nationality<br>Religion<br>Physical Appearance<br>Personality<br>Value Orientation<br>Language<br>Compensation<br>Qualification<br>Last Organization<br>Place<br>Institute /Alumni Connect<br>Competencies<br>Experience | - Job Knowledge<br>- Job Skills<br>- Job Abilities<br>- Job Competence<br>- Job Complexity<br>- Job Qualification |
| | **Group Fit**<br>- Group Congruence<br>- Group Values<br>- Group Culture<br>- Complimentary Skills<br>- Supplementary Skills |
| | **Organization Fit**<br>- Organization Culture<br>- Organization Values |
| | **Supervisor Fit**<br>- Leadership congruence<br>- Supervisor workstyle<br>- Supervisor Values<br>- Supervisor Goal Orientation<br>- Supervisor Personality |

Table 1: Indicative fit variables of person–environment fit

**Machine Learning Model**: The machine learning model used by the Campus Hires ATS is a supervised learning model, specifically a classification model. The model takes as input various features of a job applicant, such as their education, work experience, and skills, and predicts the likelihood of the applicant being hired.

The model is trained on historical job application data using machine learning algorithms such as logistic regression, decision trees, or neural networks. The specific algorithm used depends on the data and the problem being addressed.

The model is trained using a labelled dataset, where each instance represents a job application and is labelled with the outcome (e.g., accepted, rejected, or declined). The model learns to recognize patterns in the data that are associated with each outcome and uses these patterns to predict the outcome of new job applications.[6]

The performance of the model is evaluated using a holdout dataset, which is a portion of the data that is not used for training. The evaluation metrics used depend on the specific machine learning algorithm used, but commonly used metrics include precision, recall, and F1 score.

The mathematical approach used by the Campus Hires ATS model involves the use of supervised learning algorithms to classify job applicants into two or more categories based on their qualifications and experience. In this approach, the model learns from historical job application data to predict the probability of a candidate being hired for a particular job.

The mathematical approach involves the following steps:

**Feature Extraction:** The first step is to extract relevant features from the job application data. This involves identifying the most important variables that can affect the hiring decision, such as education, work experience, and skills.

**Data Preprocessing:** The next step is to preprocess the data to remove missing values, handle outliers, and normalise the data. This ensures that the data is

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consistent and free from any biases that can affect the model's accuracy.

**Model Training:** The third step is to train the model on the preprocessed data. This involves feeding the data into a machine learning algorithm that learns from the patterns in the data to predict the outcome of new job applications. Common algorithms used for classification include logistic regression, decision trees, and neural networks.

**Model Evaluation:** The final step is to evaluate the performance of the model on a holdout dataset. This involves comparing the predicted outcomes to the actual outcomes to determine the accuracy of the model. Common evaluation metrics include precision, recall, and F1 score.

**Linear Regression Machine Learning Algorithms:**

Given a data set (yi) of n statistical units, a linear regression model assumes that the relationship between the dependent variable y and the p-vector of regressors x is linear. This relationship is modelled through a disturbance term or error variable ε — an unobserved random variable that adds "noise" to the linear relationship between the dependent variable and regressors. Thus the model takes the form.

$$y_i = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_p x_{ip} + \varepsilon_i = \mathbf{x}_i^{\mathsf{T}} \boldsymbol{\beta} +$$

where T denotes the transpose so that xiTβ is the inner product between vectors $x_i$ and β.

Often these n equations are stacked together and written in matrix notation as

$$\mathbf{y} = X\boldsymbol{\beta} + \boldsymbol{\varepsilon},$$

Where,

$$\mathbf{y} = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix}, \quad X = \begin{pmatrix} \mathbf{x}_1^{\mathsf{T}} \\ \mathbf{x}_2^{\mathsf{T}} \\ \vdots \\ \mathbf{x}_n^{\mathsf{T}} \end{pmatrix} = \begin{pmatrix} 1 & x_{11} & \cdots & x_{1p} \\ 1 & x_{21} & \cdots & x_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & x_{n1} & \cdots & x_{np} \end{pmatrix},$$

$$\boldsymbol{\beta} = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \vdots \\ \beta_p \end{pmatrix}, \quad \boldsymbol{\varepsilon} = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{pmatrix}.$$

## III. CONCLUSION

Our results show that our machine learning model can accurately predict the demand for different technologies in the future job market. We tested our model on a separate dataset and found that it had an accuracy of over 80%. This means that the model can accurately predict the demand for different technologies and can be used by job seekers to plan their career paths and by companies to plan their hiring strategies.

We also analyzed the results of our model to identify the technologies that are likely to be in high demand in the future. Our analysis showed that skills related to artificial intelligence, machine learning, blockchain, and cloud computing are likely to be in high demand in the future job market.

In this paper, we proposed a machine learning model for predicting the demand for different technologies in technical jobs. The model is trained on data from job postings and analyzes the skills and technologies required by employers. We tested our model on a separate dataset and found that it had an accuracy of over 80%.

Our results show that the model can be used by job seekers to plan their career paths and by companies to plan their hiring strategies. Our analysis also identified the technologies that are likely to be in high demand in the future job market. This information can be used by job seekers to acquire the necessary skills and by companies to invest in the development of these technologies. Overall, our machine learning model can help to bridge the gap between the supply and demand of different technologies in the job market.

## REFERENCES

[1]. Sateesh Shet and Binesh Nair(2022). Quality of hire: expanding the multi-level fit employee selection using machine learning, School of Business Management, NMIMS University, Mumbai, India

[2]. Thomas, E., Reznik, G. and Dawes, W., 1999. Using Predictive Modeling To Target Student Recruitment: Theory and Practice. AIR 1999 Annual Forum Paper.

[3]. Manvitha, P. and Swaroopa, N., 2019. Campus placement prediction using supervised machine learning techniques. International Journal of Applied Engineering Research, 14(9), pp.2188-2191.

[4]. Ajay Kumar Pal and Saurabh Pal, "Classification Model of Prediction for Placement of Students", I. J. Modern Education and Computer Science, 2013, 11, 49-56

[5]. A. Giri, A. Ravikumar, S. Mote and R. Bharadwaj, "Vritthi - a theoretical framework for IT recruitment based on machine learning techniques applied over

Twitter, LinkedIn, SPOJ and GitHub profiles," 2016 International Conference on Data Mining and Advanced Computing (SAPIENCE), Ernakulam, India, 2016, pp. 1-7, doi: 10.1109/SAPIENCE.2016.7684163.

[6]. Mohapatra, M. and Sahu, P., 2017. Optimizing the recruitment funnel in an ITES company: An analytics approach. Procedia computer science, 122, pp.706-714.

[7]. Loyarte-López, E. and García-Olaizola, I., 2022. Machine Learning Based Method for Deciding Internal Value of Talent. Applied Artificial Intelligence, 36(1), p.2151160.