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JOB SEARCH IMPROVING TECHNIQUE USING RECOMMENDATION SYSTEM AND OPEN AI.FOR FREELANCERS

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ABSTRACT-

This web application will help bridge the gap between service providers and customers. Participants in the recruitment process are welcome. Although companies may promote their available positions. Various methods, such as job advertisements, recommendations, and auctions, are available to users for finding assignments. The web service will employ recommendation algorithms to assist firms in selecting the most suitable applicants, expediting the user recruitment process. Users can interact with one another via blogs. The Recommendation System will show that it is a useful tool for streamlining the procedure and pointing users in the direction of their selected career objectives. Based on the KNN algorithm, this recommendation model would be used. Accuracy will be determined using RMSE and the confusion matrix. Students will discover that the Chat-GPT feature of Open AI is a great mentor and learn how to properly design their careers via the usage of this tool.

KEYWORDS: *Machine Learning, Recommendation System, RMSE, Confusion Matrix, Open AI., Chat-GPT.*

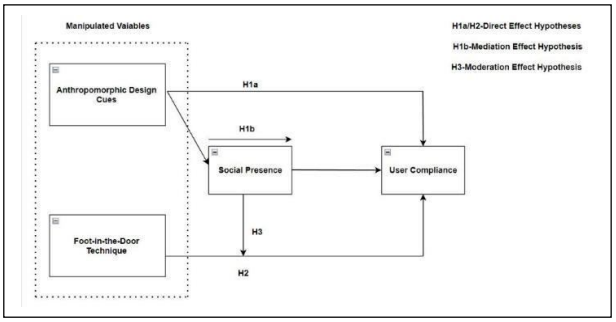
I. INTRODUCTION

The word "freelancing" immediately crosses our minds when we first see the project's name, Freelancing Website. Contracting out tasks is part of becoming your own boss. Instead of being employed by a company, freelancers typically operate as independent contractors. An auction is a procedure for purchasing and selling goods and services that entails putting them up for bids, allowing people enter bids, and selling to the person who makes the highest offer. Companies known as sellers put assets up for sale. Those who wish to buy products or services are known as buyers.

Chat-GPT: In order to produce text that resembles human speech in response to commands, Open AI created the Chat-GPT language model and is based on the transformer architecture.

KNN (K-Nearest Neighbor): The fundamental tenet of KNN is to utilize the labels or values of the k-nearest neighbors in the training data to predict the label or value of a new data point.

NLU: NLU entails a number of activities, including sentiment analysis, discourse analysis, named entity recognition, syntactic and semantic analysis, and others. These activities seek to glean significant information from human language.



. **Fig 1.1 Chatbot Architecture**

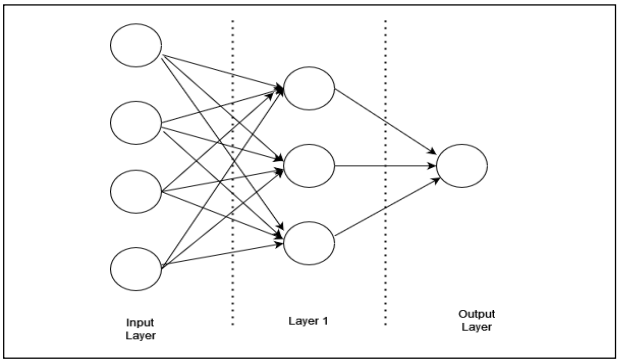


Fig 1.2 Neural Networks Architecture.

Recommendation System: This programme has an integrated recommendation system that can assist people and organizations in decision-making. Customers will be helped by this tactic in choosing their domain based on recent market ends. As a result, they will have an easier time finding employment or a company.

II. LITERATURE REVIEW

Adapted from the paper "I Thabassum, N. F. (2013). A Survey of the Websites for Remote Freelance Jobs. 4(1), 42-50" International Journal of Business Research and Management" We realized that online job boards for remote employment are significantly increasing the software industry's profits

Results of the paper "He, W., & Yan, G. (2015). Mining blogs and forums to understand the use of social media in customer co-creation. The Computer Journal, 58(9), 1909-1920." explains how an increasing number of businesses are utilizing customer co-creation to include customers and fulfil their need to have an impact on the products or services they receive.

This paper "Klemperer, P. (2008). Competition policy in auctions and Bidding markets" tells us that it's customary to use the existence of a "bidding market'' In markets characterized by auctions or bidding processes, we discuss three false claims to that effect: the "consultants' fallacy" that "market power is impossible," the "academics' fallacy" that (often) "market power does not matter," and the "regulators' fallacy" that "intervention against pernicious market power is unnecessary."

Through this" Heng, S. (2004). E-payments: modern complement to traditional payment systems. Economics Working Paper, (44)." We comprehended how; the appeal of electronic payment systems is growing among major financial institutions.

III. PROBLEM

The current global market has difficulty operating due to conflict and natural disasters. The impact of this barrier on many organizations is significant. As a result, there was a recession that led to job losses, the closure of numerous firms

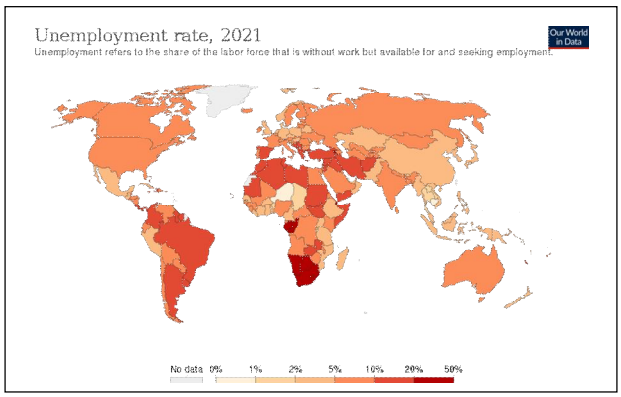


Fig 3.1 Unemployment Rate in world (2021). Source [Wikipedia]

Its actual objective is to increase the employment rate. To oversee the fair hiring process, the agent will need to have a variety of skills. The user and the organization must first authenticate. We'll give businesses a fair chance to fill open positions by erecting additional barriers. It will support full-time, part-time, and independent contractor workers, among other types of employees.

The Portal The use of job websites has significantly increased employment. This clarifies the significance of these applications.

IV. METHODOLOGY

In order to increase the effective employment rate, the agent's main goal is to. In order to connect users and organizations, we provide a conduit. Users have access to a forum through which they may ask questions and receive the help they need. Different strategies will be used to enhance recruiting. The agent's performance will increase as a result of more efficient machine learning. To determine the ideal result, several algorithms will be utilized, as necessary. Authentication and permissions from users and organizations will be this agent's primary areas of attention. Open AI and the "Recommendation System" will show to be valuable instruments for boosting the agent's performance. The following figure shows the usage of Recommendation system and Open AI shown by Blue and Green color respectively.

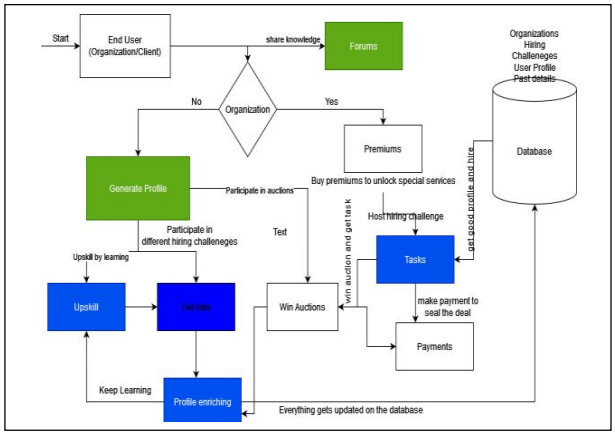


Fig 4.1 System Architecture (Blue:Recommendation System Green:AI chatbot).

4.1 Bayesian-Embedded KNN: Our agent will be built using an approach that combines the Bayesian and KNN algorithms.
The above algorithm can be explained as:
Let's say we have a data set with Nk points in class Ck and N total points.

$$\sum kNk=|N\sum|=\mathbf{N}.$$

By creating a sphere centred on a new point, x, that contains precisely K points of any class, we can classify it. Consider a sphere of this type with volume V and Kk points of class Ck.Then,

$$p(x|Ck)=Kk \mid (\mathbf{Nk}*V)|$$

provides an estimate of the density related to each class is given. The unconditional density is similarly given by,

$$p(x)=K \mid (N*V),$$

while the class priors are given by,

$$p(Ck)=Nk|N|$$

In order to calculate the posterior probability of class membership, we can now combine the three equations using Bayes' theorem.

$$p(Ck|x)=p(x|Ck)*p(Ck)|p(x)=Kk|K$$

The test point x must be assigned to the class with the biggest posterior probability, which corresponds to the largest value of Kk|K, if we want to reduce the likelihood of misclassification.

Implementation : Our agent will work according to the users profile. The Organizations and their jobs will be stored in the database. The Recommendation System will then map the users profile and expertise to the Organizations need. Similarly, the Organizations will get recommendation based on their needs and users experience.

User Flow: After creating a profile, a user can take part in various hiring challenges and get employment with various organisations. Users can upgrade the abilities that are suggested for them by the recommendation system in order to enhance their profiles. Users can participate in the various forums as suggested by the recommendation systems.

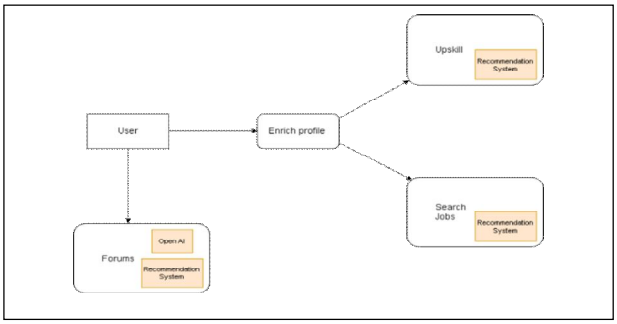


Fig 4.2 Use of Recommendation System and Open AI in the agent(User's side).

Organization Flow: After an organisation purchases premiums, they are able to host various hiring challenges as advised by the recommendation systems and take part in a range of discussion forums and lectures that are appropriate and advised by the recommendation systems.

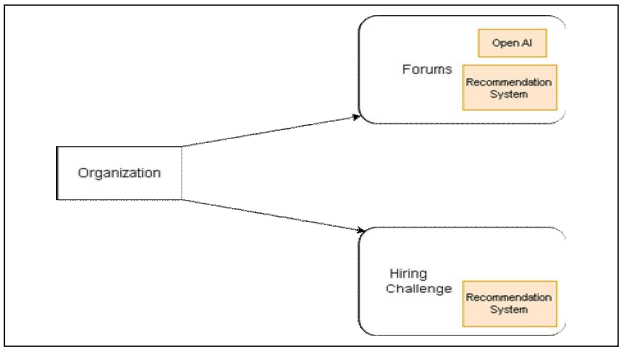


Fig 4.3 Use of Recommendation System and Open AI in the agent(Organization's side).

V. EVALUATION

5.1 Root Mean Squared Error (RMSE): By scaling up errors that can't be matched to actual rating values because of different rating scales, MSE helps to remove the sign of the negative. We achieve this by comparing our mean result to the scale we used to score the products.

$$\mathrm{RMSD} = \sqrt{\frac{\sum_{t=1}^{T}(\hat{y}_t - y_t)^2}{T}}.$$

Confusion Matrix: The confusion matrix is a matrix that is used to evaluate the performance of categorization models given a certain set of test data. It cannot be determined unless the true values of the test data are known. Confusion matrix has the following features, among others:

The matrix is a 2*2 table for the first two classes the classifiers predict, a 3*3 table for the next three classes, and so on.

Table 6.3 Comparison of RMSE values of different algorithms

Algorithms	**RMSE**
Linear Regression	0.98
Content Based Filtering	0.94
Latent Factor Analysis	0.97
Collaborative Filtering	0.96
Slope One	0.95
Matrix Factorization	0.98
KNN Bayesian	0.93

- The total number of forecasts, actual values, and forecasted values are the two dimensions of the matrix.

n = 100	Actual: No	Actual: Yes	
Predicted: No	TN: 65	FP: 3	68
Predicted: Yes	FN: 8	TP: 24	32
	73	27	

Fig 5.1 Confusion Matrix

VI. RESULTS AND DISCUSSIONS

The table below displays the descriptive analysis of the agent and its result.

	Use of internet for job search	Use of portal for job search	Social network ranking (out of 16)
Experienced job searcher	78%	29%	7.73
Recent Grads.	64%	18%	8.29

VI. CONCLUSION

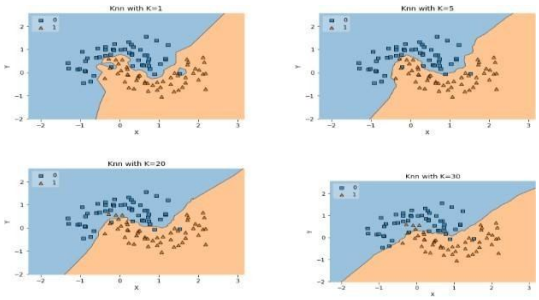


Fig 7.1 Predicted and Actual values for recommendations system based on different N values.

To find the approach that the recommendation system reacts to the best, we employed the trial-and-error method. Overfitting was a problem at higher cluster or N values, and vice versa. It is necessary to pick the right N value.Our evaluation of this application's features led us to the conclusion that it can give job seekers the tools and advice they need to be successful. The auction characteristics of this programme make it unique. It has been proven that newcomers have an equal opportunity to showcase their abilities. The aforementioned products do not provide auction-like features. As a result, a lot more people are now taking part in hiring challenges. There are now more users as a result of the forums' addition.

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