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AI-Driven Fake Job & Scam Detection System

C Sandhya[1] , Bharathi GR[2]
Student,Department of Computer Applications, St Francis College, Bengaluru[1]
Assistant Professor, Department of BCA, St Francis College , Bengaluru[2]
Email: sandhya973199@gmail.com, bharathi.gr7@gmail.com

Abstract - Online recruitment has made job hunting much faster, but it has also opened the door to fraudulent postings, recruiter impersonation, and identity theft. This paper presents Job Shield AI, a hybrid system combining machine learning with rule-based checks to screen job ads and flag fraudulent listings in real time. Constructed in Python on the EMSCAD dataset it analyzes free text fields such as job descriptions and company profiles and structured details such as title, salary and requirements. NLTK to clean the text and features are created via TF-IDF. Pandas, Numpy and Scikit learn to process and train. A Random Forest classifier tells genuine postings apart from fraudulent ones and runs inside a Streamlit web app anyone can use.

Rather than a bare verdict, each result carries a risk score, a confidence percentage, and a plain language breakdown of the red flags found. A recruiter email and domain checker catches typosquatted or disposable domains scammers rely on, and a salary checker flags offers too good to be true. When a posting is flagged fraudulent, a built-in map points users to the nearest cyber crime office. Genuine postings unlock a seven-day interview roadmap with STAR-based mock interview practice. Together, these features turn JobShield AI into more than a filter, making it a genuine safety companion for job seekers.

Keywords: Machine Learning, Fake Job Detection, NLP, Random Forest, Cyber Fraud, Streamlit.

INTRODUCTION

Current digital transformation has changed the process of hiring and candidates who seek for employment.Several platforms like Linkedin,Indeed,Glassdoor,Naukri and other jobboards handles millions of hiring a day.This open nature of digital hiring has opened door for many fake job scams.The main objective of this scam is to gather personal information about the candidate for identity theft or money theft .The rise of this digital scams has left the employee to lose trust in digital hiring methods.In order to get rid of this the paper has created a “JobShieldAi” a hybrid system to detect job advertisements in real world scenario.In this Random Forest Classifier which is trained with Natural Language Processing(NLP) has used

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the features of rule engines (email/domain/salary) to detect fake job postings. Natural Language Processing (NLP) focuses on extracting meaningful words from the job description while Machine Learning(ML) algorithms learns hidden features.This paper depicts risk scores,red flags further steps to be taken if a fake job posting has been found . Apart from only focusing on the job description the system also detects based on the recruiter domain id and salary benchmark to detect unrealistic offers.Job seekers can provide their resume to check whether the resume matches the job posting. Further job seekers can address the fraud/fake job to the nearest cyberhub with a interactive geolocation map .In case of a genuine job postings the system assists the job seekers for the methods to crack the interview .The system has StarBased mock interview roadmap for the candidates.Finally the system can be accessed through Streamlit web application for a interactive real time experience.Instead of just predicting ,the system explains why the job posting was flagged specifying the risk factors for both genuine/fake job postings.

LITERATURE REVIEW

In this section I have presented prior studies related to my work.

no	TITLE	AUTHOR NAME	PUBLISHED YEAR	METHODOLOGY	DATASET USED	FINDINGS
1.	Automated Content Analysis of Online Job Scams	M.E.Amin & S.A.Khan	2012	The author has used Rule-Based for filtering and Naive Bayes for classification	Manual Web Crawled Job Listings;Spam keywords and Email Domain	Created a benchmark that keywords and mail address can flag scam postings
2.	Online Recruitment Fraud Detection	S.Vdros ,C.Kolias,et al	2016	The author has used Naive Bayes ,Random Forest Classifier and SVM	The author has used E and EMSCAD Dataset with 178,80 job postings with TF-IDF text feature and metadata	Created Online Recruitment Fraud Dataset
3.	Detecting	R.A.AI	2018	Used Decision TREE	Used EMSCAD	Found the

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	Fraudelent Job Postings Using Data Mining	-Nafaies et al		for rule generation and K-Nearest neighbors for similarity matching	Dataset for structuring attributes	missing fields like company profile,salary offers and
4.	An Automated Framework For Online Recruitment Fraud Identification	A.T.Mhabub,M.S.Rahman,et al	2020	XBoost & LightGBM for maximizing speed and SMOTE for fixing class imbalance	Used EMCAD Dataset ,TF-IDF	Depicted the class imbalance
5.	Detecting Fraud Job Recruitment Using Features Reflecting Real-world Knowledge	P.Kularbphettong et al	2023	Random forest for tree ensembles,Gradient Boosting for calculating importance scores	Used EMSCAD Dataset and extracted features like missing info	Reached good accuracy through high salary offers
6.	Detecting Fake Job Postings Using Bidirectional LSTM	A.S.Pillai	2023	Used Bi-Directional LSTM and Neural Network(NN)	Used EMSCAD Dataset and token vectors	Using BI-LSTM he could detect long text descriptions in job listings
7.	Evaluation of CNN-BiGRU & CNN-BiLSTM for Fake Job	Pawan Kumar and Ritu Sharma	2024	The author has used hybrid techniques and deep learning network	Used job title ,metadata,company profile and text fields for analyzing	This combined hybrid system has been used for extracting recurrent layers for semantic context
8.	Machine Learning Approach in Predicting Fraudulent job Advertisements	A.H.M. Hanif,N.Maarop,et al	2024	Used Random Forest Classifier and Regression Stacking	Classified metadata with company logo	Focused rather than textual data
9.	Real Time Detection of Fraudulent Employment Postings via NLP	A.K.S.Jaduan, R.Kumar,et al	2025	ML pipeline with Live Web Scraping and REST APIs	Recruiter metadata,email,live postings	Changed from offline to online(live) job portals

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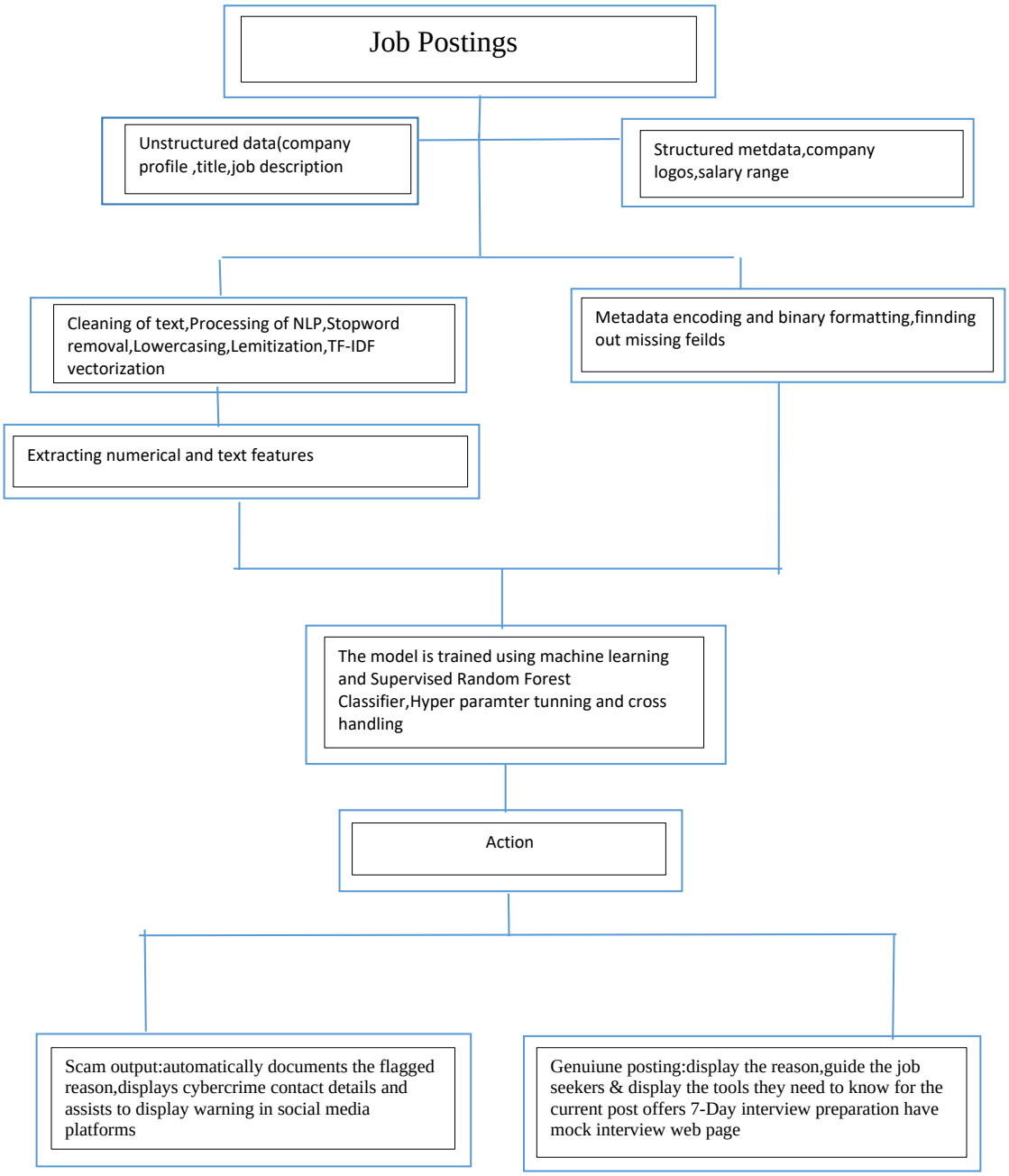
	& API Integration					
10.	DistilBERT with LLM_Powered Explainability for Job Ads	R.Gupta et al	2026	Used DistilBERT Transformer which is combined with LLM	Metadata and unclassified job text	Explaining reasons for the red flags

Methodology

Ai Driven Fake Job & Scam Detection System Architecture

The methodology uses hybrid system that can process both unstructured data(job title,job description,company profile) and structured metadata(company logo,salary range)

Work flow diagram of the system



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1. Processing data and extracting feature: Initially the unstructured data(job tittle,company profile,job description) are converted to lower case and performed stop word removal using Natural Language Toolkit(NLTK) and also lemitized.structured metadata is taken.TF-IDF Vectorization is used for extracting text from raw data.This converts text data into numerical values and each word is assigned a unique value.

TF-IDF(t,d,D) = TF(t,d)*log(|D| / |{d ΣD:t Σd}|)

This resulted data is combined with structured metadata such as salary ranges,geolocation and company logos for creating input matrix

2. Training the model : The system uses supervised random forest classifier which can handle 100 decision trees.While training the classifier combines with feature using GINI impurity to differentiate decision tree.Based on learned patterns the model works. When the candidate paste the job postings individual tree probability votes are evaluated and predicted .

- If the score < 30:Genuinue postings
- Score 30-60 : moderate .It displays moderate flags due to missing credentials provided in the job posting

Score > 70 : High risk Fake job

3. Unlike the traditional existing systems which only predicts and stops.This system provides further stops to be taken if it is:

- Genuine postings: Displays the reason for prediction ,tools needed to be learned to crack the job opportunity,provides 7-Day interview preparation and also how mock interview web pages

- Fraud job: Reason for high risk flag.Displays the cybercrime details to report the fraud job additionally displays a geolocation map for locating cybercrime and report to the nearest hub and helps to report fake job information on the social media platforms like(Linkedin,Twitter)

Result and Discussion

The model was evaluated using 80:20 Train-Test split on the EMSCAD Dataset.Model performance is performed using the standard classification metrics derived from the True Positive(TP),True Negative(TN),False Positive(FP),False Negative(FN).

ACCURACY : TP + TN / TP + TN + FP + FN

PRECISION : TP / TP + FP

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RECALL : TP / TP + FN

F1-SCORE : 2 * PRECISION * RECALL / PRECISION + RECALL

MODEL PERFORMANCE ANALYSIS

Random forest classifier has achieved strong predictive evaluation on both textual data and metadata. The table here shows the outcome

METRICS	SCORES
ACCURACY	94.8%
PRECISION	93.2%
RECALL	91.5%
F-SCORE	92.3%

CONFUSION MATRIX OUTCOME

To access class level distribution and error rates. Confusion matrix is used for test prediction.

PREDICTED	PREDICTED GENUINE	PREDICTED SCAM
GENUINUE POSTINGS	TN = 3120	FP = 140
SCAM POSTINGS	FN = 52	TP = 264

DISCUSSION

Analysis of the outcome tells that the model shows high precision which indicates less false scam rates on genuine listings. The recall rates depicts that there is consistent detection of the fraudulent job postings through varying metadata and missing metadata attributes.

CONCLUSION

This study “JOBSHEILDAI” has been designed for protecting job seekers to escape from fraud job advertisements and assist them with the legitimate job postings. Using TF-IDF for extracting unstructured data and supervised random forest classifier to analyze both structured metadata and unstructured textual data. This model has achieved an accuracy of 94.8% which is efficient enough to identify fake job postings.

Beyond only predicting yes or no the system has been developed for taking immediate incident response. By drafting Cybercrime FIR, locating on a map for cyberhug ,warning alerts for fraudulent job postings on social medial platforms, In case of a genuine postings the system assists the job seekers to prepare through 7-DAY interview preparation and mock interview guidance and job seekers can paste their resume and

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check whether their resume fits the job role. Therefore this system provides overall security assurance and career assistance tools.

FUTURE WORKS

The future works to be included in this system include:

- By using dynamic APIs and connectors through web scrapers to fetch job posting data from professional applications such as(Linkedin.Indeed)
- By replacing standard n-gram vectorization with BERT which can be used for evaluating complex semantic data and changing patterns
- By adding Optical Character Engine(OCR) which can analyze text from multiple languages

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