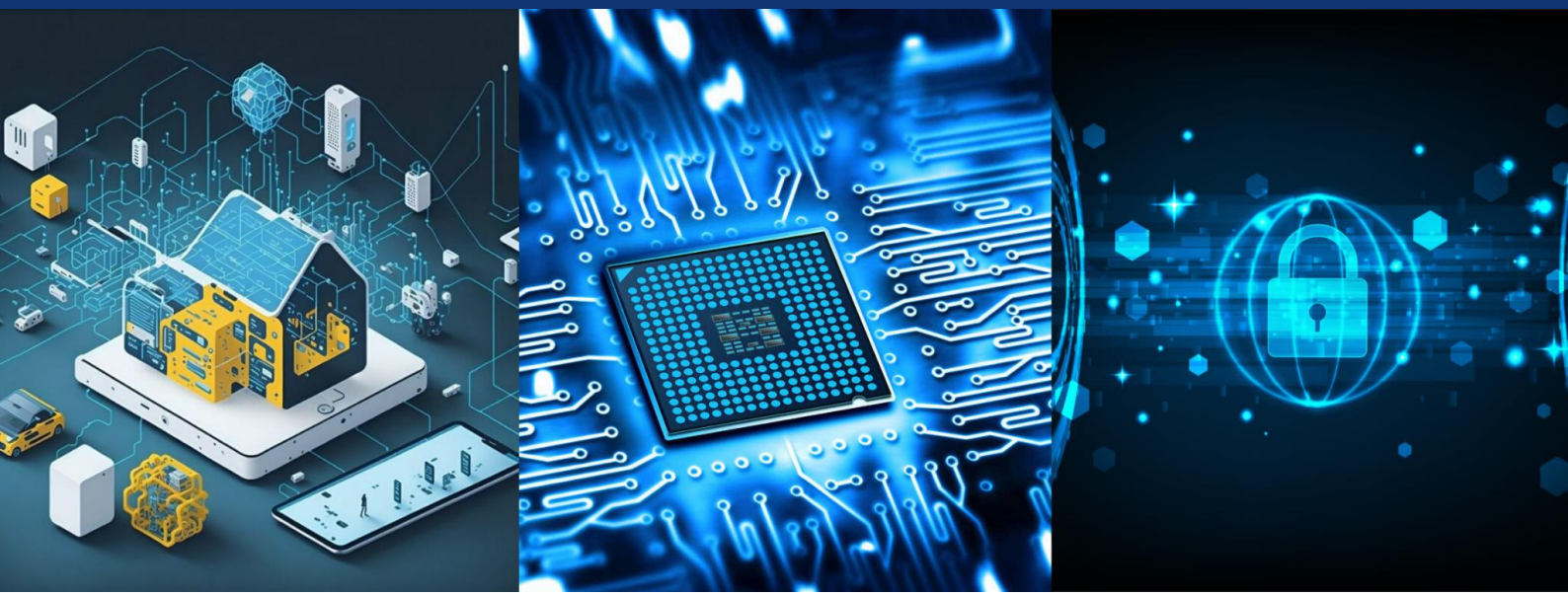
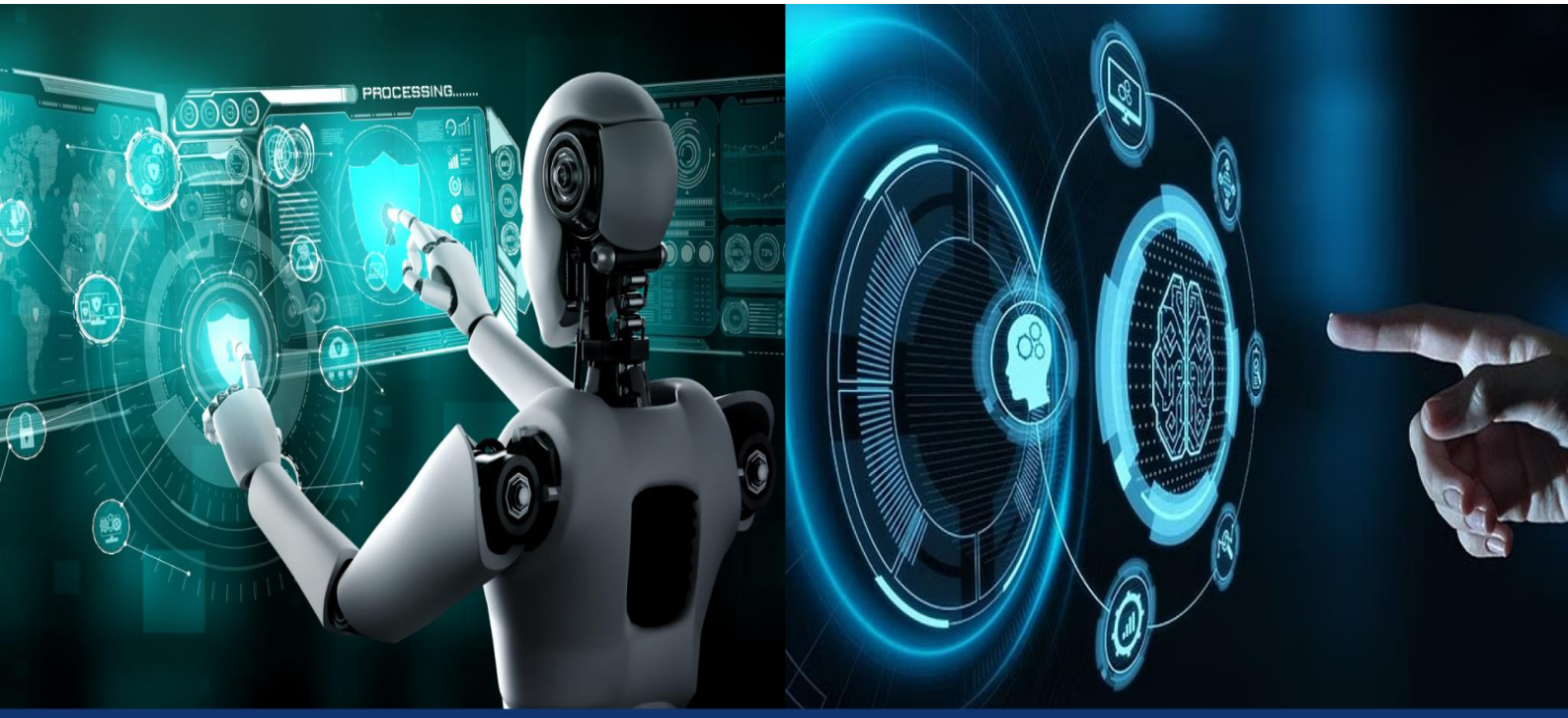
ISSN(O): 2320-9801
ISSN(P): 2320-9798



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.771 **Volume 13, Issue 4, April 2025**

© 2025 IJIRCCE | Volume 13, Issue 4, April 2025| DOI: 10.15680/IJIRCCE.2025.1304127

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

CV Analysis for Job Recruitments

Netra Chandrakant Neman, Samiksha Rakesh Patil, Disha Ganesh Gawade,

Prof. Chaitanyanaresh Rathod, Prof. Junaid Mandviwala

Department of Artificial Intelligence and Data Science, Rizvi College of Engineering, Bandra, Mumbai, India

ABSTRACT: This system intelligently extracts and analyzes important information like skills, work experience, education, and pertinent accomplishments to automate the initial screening of resumes using Machine Learning (ML) techniques. It evaluates each applicant's suitability by comparing these specifics to predetermined job requirements. The system reduces manual labor, expedites the hiring process, and improves the effectiveness and precision of candidate shortlisting in the early phases of hiring by prioritizing resumes according to their suitability for the position.

KEYWORDS: Machine Learning (ML), Resume Screening, Candidate Ranking, Recruitment Automation, Skill Extraction, Job Matching.

I. INTRODUCTION

The CV Analysis for Job Recruitment project aims to automate the CV screening process, so that candidates can be reviewed much faster, more accurately, and without subjectivity and bias. Using machine learning, the system will analyze the CVs in a raw format, and then apply machine learning to extract coding information for preselected inputs: work experience, education, skills. Finally, the system compares the CV analysis with the job requirements. Supervised machine learning models will be used to match candidates for the job position, based on their rankings. AI and machine learning will reduce the time spent for the recruiters to review CVs and remove human biases, resulting in a consistent and fair recruitment process.

In this initiative, machine learning models are trained on past recruitment data, allowing the system to continually learn and refine its candidate evaluations. The goal of the solution is to assist recruitment professionals with a data-driven application that will enhance the quality of hiring decisions and free up valuable time for more strategic recruitment initiatives. Engagement in this system can happen at any point in the hiring process, and can be easily implemented in all types of organizational settings providing scalability and efficiency in the management of hundreds of applications and improving overall recruitment processes.

II. KEY CONCEPTS

1. Resume Parsing:
Resume parsing is the process of taking unstructured resume text and turning it into structured information like education, experience, and skills. It makes it possible to process data quickly and accurately in order to support automated workflows for hiring and candidate evaluation.
2. Feature Extraction:
Finding and choosing relevant information from resumes, such as keywords, experience levels, job titles, and skills, is known as feature extraction. Candidate profiles are represented using these features in a way that is appropriate for job matching algorithms and machine learning models.
3. Job – Resume Matching:
Job-resume matching compares the features taken from resumes with the specifications stated in job descriptions. It makes it possible for candidate qualifications and job requirements to be accurately aligned, facilitating effective and focused hiring.
4.Candidate Ranking:
In candidate ranking, candidates are ranked according to how well their qualifications match the job requirements. Recruiters' selection process is effective as it assists in prioritizing the best applicants.

© 2025 IJIRCCE | Volume 13, Issue 4, April 2025| DOI: 10.15680/IJIRCCE.2025.1304127

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

III. METHODOLOGY

1. Experimental Setup:

1.1 Data Cleaning: Duplicates, irrelevant columns, and missing values were eliminated. Standardized text formats and fixed irregularities in job descriptions and resumes.

1.2 Data Visualization: Utilized bar charts, box plots, and pie charts to understand feature patterns and data distribution. Displayed resume data, such as years of experience, job match scores, and skill frequency.

1.3 Encoding and Heatmap: Applied label encoding to categorical features (e.g., skills, job titles). Using correlation matrices, a heatmap was created to show the relationships between the features.

1.4 Outliers Detection: Outliers in numerical features such as experience, education, years of experience, job title, skills, and key skills.

1.5 Train-Test Split: To guarantee an objective assessment of the model, divide the dataset into training and testing sets (e.g., 80/20 ratio).

1.6 Model Building: Trained machine learning model for logistic regression to forecast candidate-job matches. Model performance was assessed using F1-score, recall, accuracy, precision, and ranking metrics as appropriate.

2. Procedures Adopted:

The following steps outline the procedure followed in the project:

2.1 Finding Dataset: Gather or obtain a dataset of job descriptions and resumes. Make use of publicly accessible datasets or anonymized real-world data, such as job role details, resume text, and candidate details.

2.2 Analysing Resumes: Preprocess the resumes by extracting and cleaning the text (removing stop words, noise, and lowercase letters, for example). Employ machine learning techniques to extract important attributes like job titles, education, work experience, and skills. Use feature vectors to depict the job descriptions and resumes.

2.3 Ranking Candidates: Utilizing similarity metrics, compare each resume vector to the matching job description vector. It is optional to predict suitability scores using a trained machine learning model. Sort candidates from most to least relevant according to their predicted match scores or similarity scores.

Diagram:

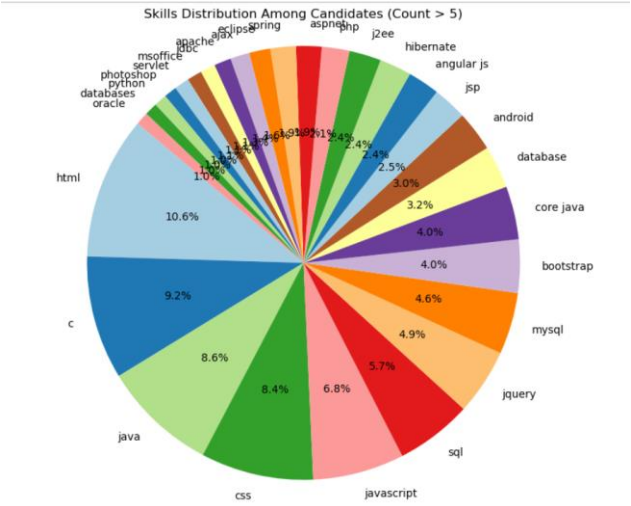


Fig 3.1 Skill Distribution

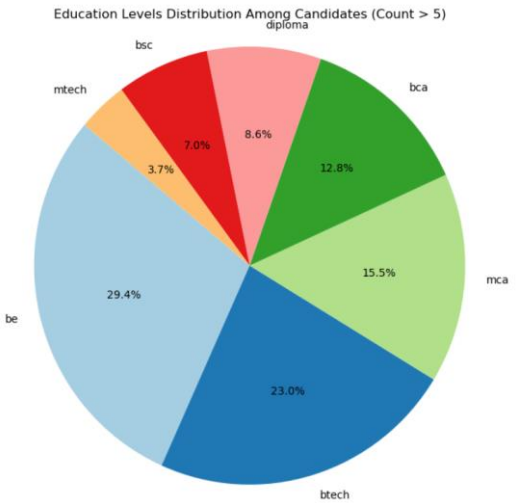


Fig 3.2 Education Distribution

© 2025 IJIRCCE | Volume 13, Issue 4, April 2025| DOI: 10.15680/IJIRCCE.2025.1304127

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

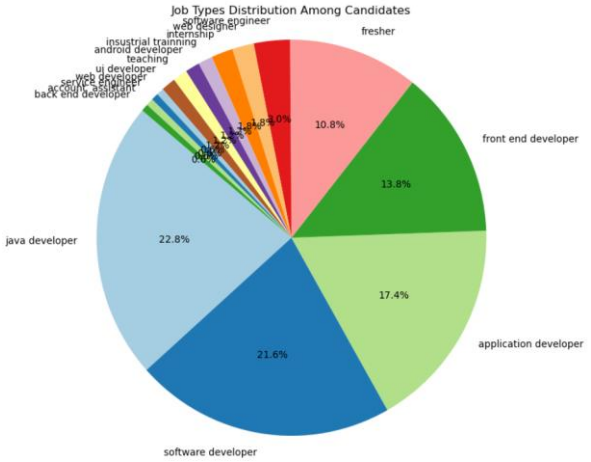


Fig 3.3 Job Type Distribution

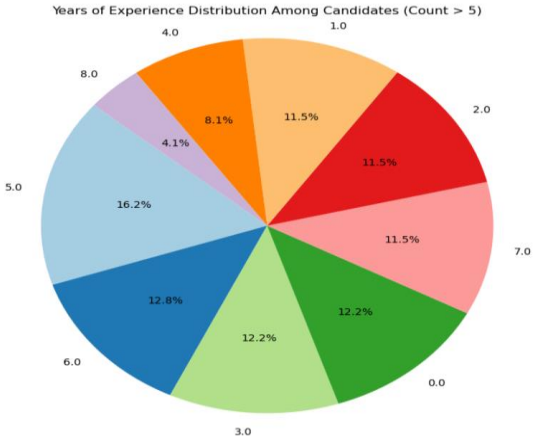


Fig 3.4 Years of Experience Distribution

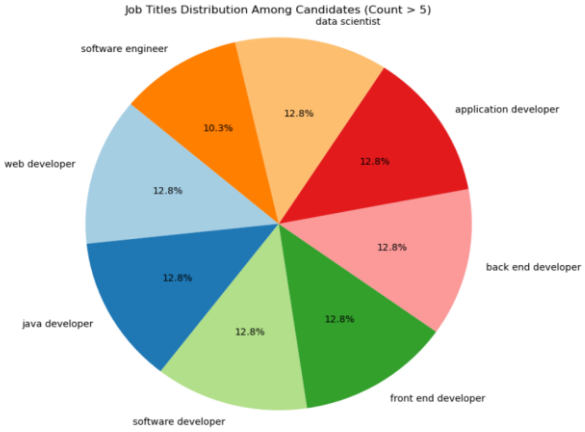


Fig 3.5 Job Title Distribution

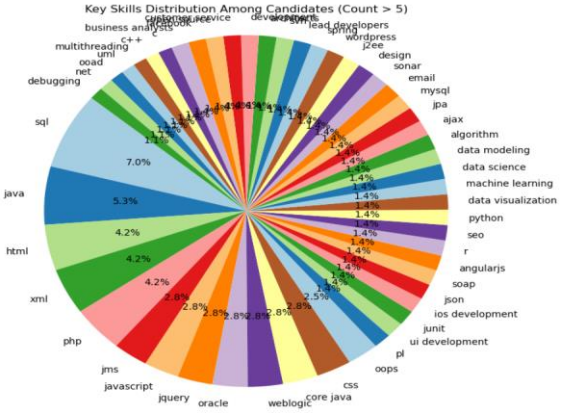


Fig 3.6 Key Skills Distribution

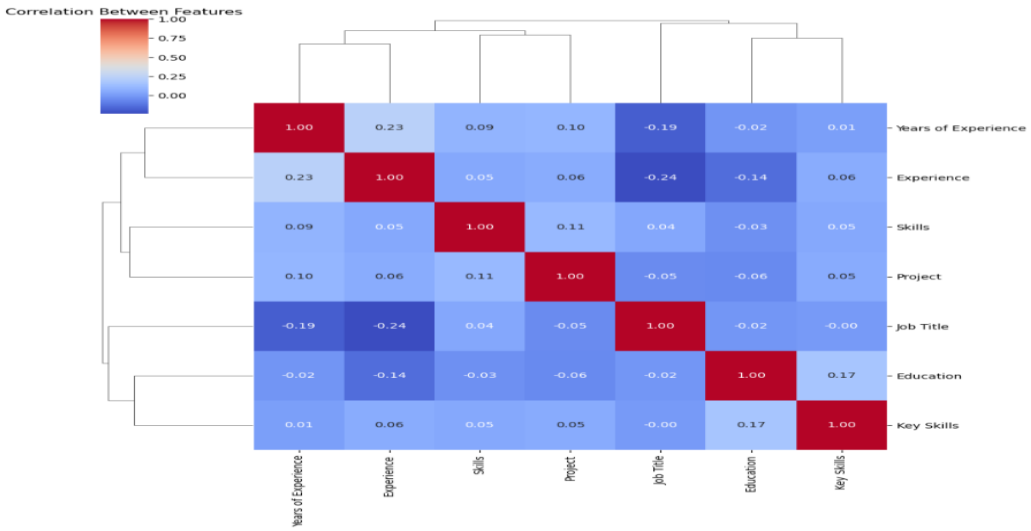


Fig 3.7 HeatMap

© 2025 IJIRCCE | Volume 13, Issue 4, April 2025| DOI: 10.15680/IJIRCCE.2025.1304127

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

IV. RESULTS

By automating CV analysis, the machine learning-powered system accelerated hiring while precisely matching applicants to open positions. It minimized bias, cut down on manual screening, and scaled easily for big applicant pools. Despite being very successful, there were still issues with model explainability and non-standard resume formats. Employers saw improved candidate experiences, reduced expenses, and quicker hires. Future developments will concentrate on managing various CV formats and increasing the transparency of AI decisions.

Diagram:

```
Ranked Candidates:
Resume 1: Score - 2, Job Title - 5, Key Skills - 3
Resume 2: Score - 2, Job Title - 5, Key Skills - 3
Resume 3: Score - 2, Job Title - 1, Key Skills - 5
```

Fig 4.1 Result of Ranking

V. CONCLUSION

Incorporating machine learning (ML) into CV analysis for job recruitment has the potential to completely reshape how we approach hiring, making it more efficient, objective, and data-driven. By automating the extraction of key information from CVs and aligning it with job descriptions, ML models can significantly cut down the time and workload involved in manual screening. This not only saves time but also helps recruiters focus on the more strategic aspects of hiring, such as evaluating cultural fit and conducting interviews.

ML models, particularly those using supervised learning, assess and rank candidates based on their qualifications, skills, and experience, ensuring that decisions are made faster and with greater accuracy. This process leads to more consistent and objective hiring decisions, which reduces the biases that can often appear in human-driven recruitment. For example, unconscious biases related to gender, age, or background are minimized, as the system focuses purely on qualifications and relevant experience.

One of the most valuable aspects of machine learning in recruitment is its ability to improve over time. By learning from past hiring data, the system becomes increasingly accurate at predicting which candidates are most likely to succeed in a role. This continuous learning process ensures that the system adapts to evolving hiring needs and trends, making it even more effective in the long run.

Overall, using ML for recruitment not only enhances operational efficiency but also results in fairer and more consistent hiring decisions. As organizations grow and the volume of applicants increases, ML-powered recruitment systems provide a scalable solution that maintains both fairness and effectiveness in the hiring process. This makes ML a powerful tool that can help companies find the best candidates while ensuring the process remains unbiased and efficient

REFERENCES

[1] Malherbe, E, et al. (2019) “Automated Resume Screening: A Systematic Review” IEEE Access.
[2] Datta, A., et al. (2018) “Automated Experiments on Adversarial Resume Screening” ACM FAT Conference.
[3] De-Arteaga, M., et al. (2019) “Bias in Resume Screening Tools.” Nature Humn Behavior.

© 2025 IJIRCCE | Volume 13, Issue 4, April 2025| DOI: 10.15680/IJIRCCE.2025.1304127

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Authors Profile

Ms. Disha Ganesh Gawade is a Second Year Student at Mumbai University, completing her Bachelor of Engineering in Artificial Intelligence and Data Science from Rizvi College of Engineering. Her research interests include application of programming and Artificial Intelligence. She has completed courses in various programming languages, which has fueled her passion for applying her knowledge for meaningful projects in the field. With a keen interest in AI and a commitment to using technology for social good, she is currently leading a project on CV analysis which aims at improving efficiency in attendance tracking.

Ms. Netra Chandrakant Neman is a Second Year Engineering Student pursuing a Bachelor's Degree in Artificial Intelligence and Data Science at Rizvi College of Engineering, Mumbai University. Her area of research includes programming and applications of AI, with a focus on Machine Learning and Computer Vision. Passionate about the moral implications of AI, she seeks to create technology that addresses real-life settings. Currently, she is part of a group developing a facial recognition attendance system to enhance attendance tracking in educational settings. In this project, she played a key role in troubleshooting data analysis and cleaning.

Ms. Samiksha Rakesh Patil is an enthusiastic second-year student at Rizvi college or engineering afflicted with mumbai University where she is working towards a bachelor's degree in Artificial Intelligence Data Science. she is interested In computational intelligence and database system,her course work in a python and c programming language is finished.She wants to improve her research in AI tools and AI technology for improving Indian educational system.Her ability to write reports made sure that complicated technical information was communicated clearly which helped the project with her ML knowledge.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details