



GROUP 58

PROJECT-III

InterviewPro

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Why Interview Pro?

- Emerged from a crucial need within the software industry.
- Aimed to make technical hiring smoother and fairer.
- Companies struggled to find skilled tech talent efficiently and without bias.
- Blended advanced technology like NLP and DL for a seamless, remote-friendly interview process.
- Focuses on simplifying processes for both companies and candidates.





**Emily
Johnson**

AGE - 22

HOMETOWN - Bombay

EDUCATION - IIT Delhi

OCCUPATION - Software Engineer

“Success is not measured by what you accomplish, but by the obstacles you overcome.“

GOALS

- Secure interviews with top tech companies to explore better career opportunities.
- Showcase her skills and experience effectively during interviews.
- Find a company with a good cultural fit and opportunities for career advancement.

CHALLENGES

- Finding interview opportunities with top companies can be challenging due to stiff competition.
- Navigating through the interview process can be overwhelming, especially when there's limited feedback available.
- Ensuring she presents herself in the best possible way during interviews to increase her chances of success.

DESCRIPTION

Emily is a software engineer with three years of experience working in a mid-sized tech company. She's ambitious and always looking for opportunities to advance her career. Recently, she has been considering applying to top tech companies to further her career growth.



Marcus Lee

AGE - 35

HOMETOWN - Singapore

EDUCATION - Singapore
University

OCCUPATION - Human Resources
Manager

“Efficiency is doing things right; effectiveness is doing the right things.”

GOALS

- Find qualified candidates efficiently to fill open positions within the company.
- Ensure a smooth and professional interview process for both candidates and hiring managers.
- Improve the company's reputation as an employer of choice by providing a positive interview experience.

CHALLENGES

- Sorting through numerous job applications to identify qualified candidates is time-consuming.
- Coordinating interviews between candidates and hiring managers can be challenging, especially when schedules conflict.
- Ensuring consistency and fairness in the interview process while providing valuable feedback to candidates.

DESCRIPTION

Marcus is an experienced HR manager working in a large corporation. He is responsible for recruiting top talent for the company's various departments. Marcus is always looking for efficient ways to streamline the hiring process and find the best candidates for open positions.



**David
Nguyen**

AGE - 42

HOMETOWN - Delhi

EDUCATION - NSUT Delhi

OCCUPATION - Freelance IT
Consultant

“Success is not just about the opportunities you find, but the ones you create with your expertise, determination, and relentless pursuit of excellence.“

GOALS

- Find contract opportunities with reputable companies that require his expertise.
- Showcase his skills and experience effectively.
- Maximize his earning potential by securing high-paying contracts.

CHALLENGES

- Finding new clients and contract opportunities in a competitive market.
- Convincing potential clients of his capabilities.
- Negotiating favorable contract terms and rates with clients.

DESCRIPTION

David is a seasoned IT consultant with over 15 years of experience in the industry. As a freelancer, he's always on the lookout for new opportunities to expand his client base and take on challenging projects.

STORYBOARD 1



1
Meet Sarah. She's tired of giving multiple rounds just to reach to the interview round for a job at a company.



2
A company she applied at, informed her about her interview getting scheduled at Interview Pro.

STORYBOARD 2



A company wants to hire new employees, but they do not have time to perform interviews.



One of the employees suggest Interview Pro, where the company can hire qualified professionals to take the interviews in place of the company.



3
Sarah is immediately impressed by the experience, where she just have to go through one round, where the interviewer assessed her on all aspects.



4
Sarah soon gets a job confirmation from the company based on her interview, without any hassle, all thanks to Interview Pro.



The company receives a report on the performance of the applicant by the interviewer.



5
The company makes an informed decision and hires the applicant based on the feedback given by the interviewer, all thanks to Interview Pro.

STORYBOARD 3



Meet Max, a working professional with 15 years of experience, he's looking for ways to earn some extra income without learning any new skill.



Max's friend suggest him to become an interviewer at Interview Pro.

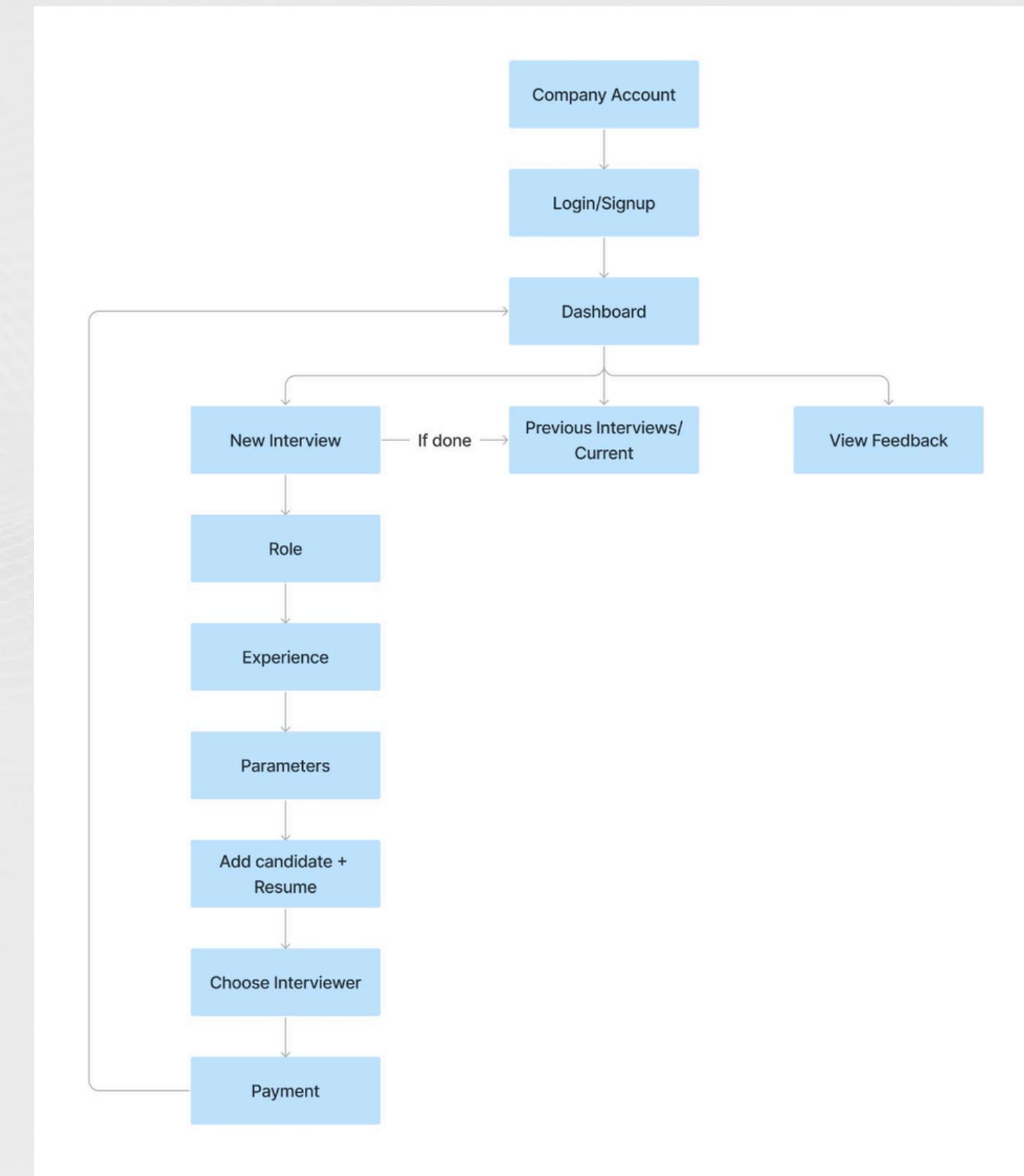


Max registers at Interview Pro as an interviewer, and starts taking interviews on behalf of top companies.

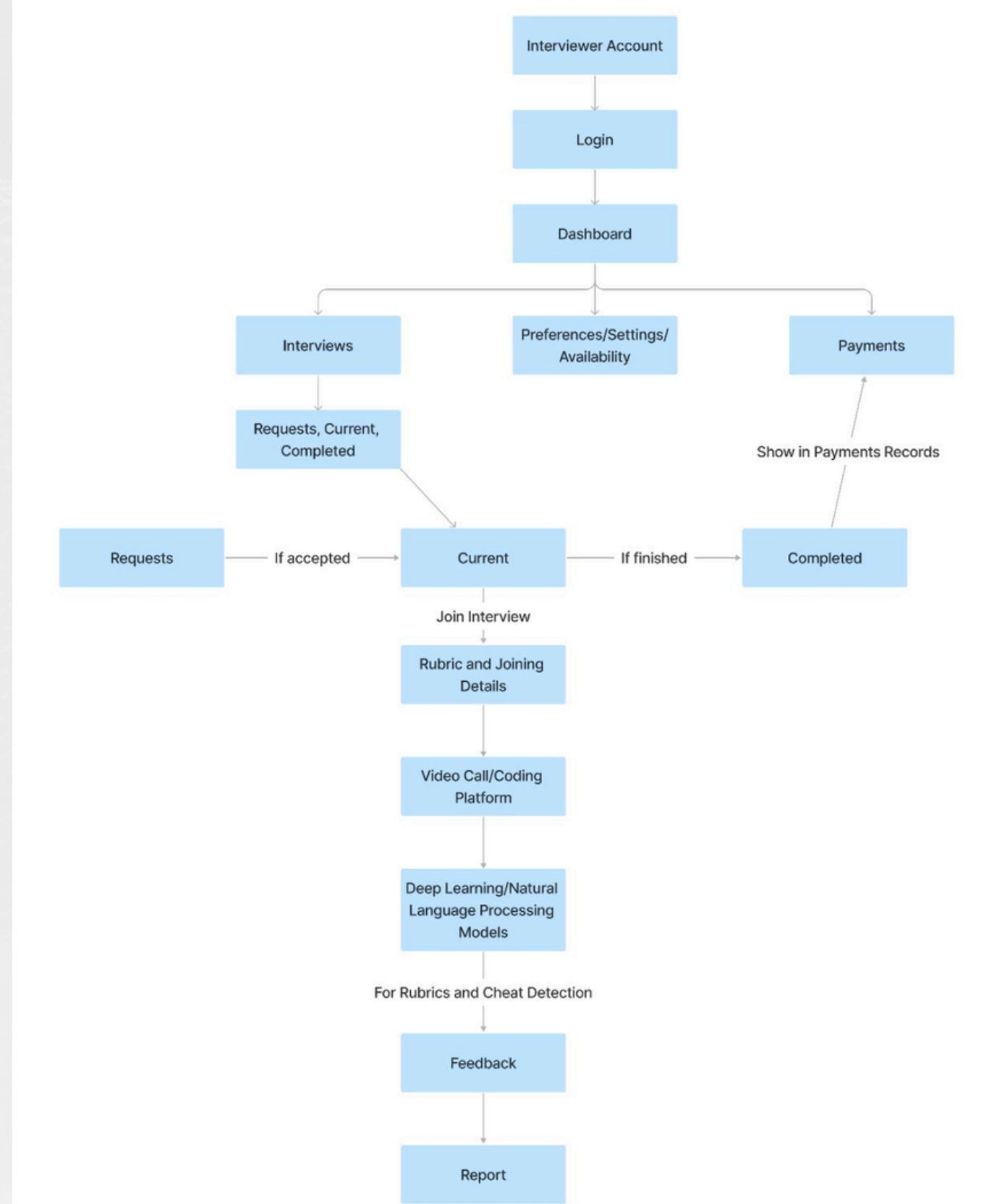


Max provides his feedback about applicants to the company, and receives payment for a job well done, all thanks to Interview Pro.

DATA FLOW DIAGRAM 1



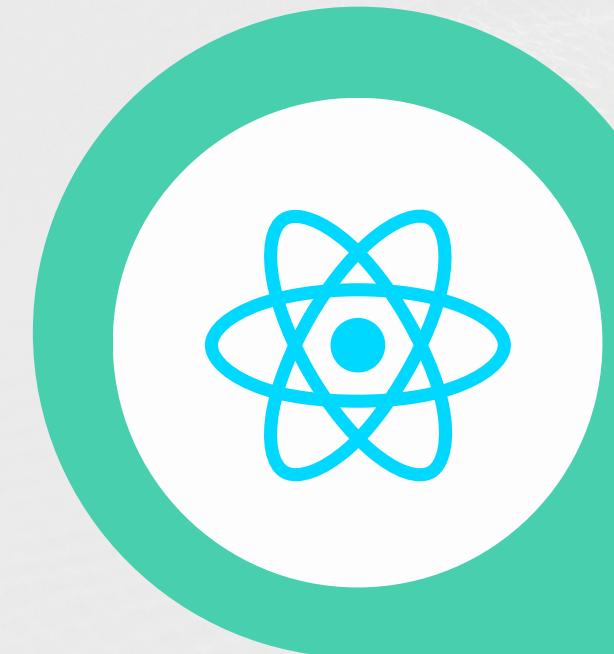
DATA FLOW DIAGRAM 2



TECH STACK

React.Js

React.js powers InterviewPro's frontend, offering efficiency, flexibility, and interactivity. Its dynamic library enables highly interactive user interfaces, while the Virtual DOM ensures smooth rendering. React enhances reusability and simplifies development, enabling InterviewPro to adapt swiftly to evolving technical hiring needs.



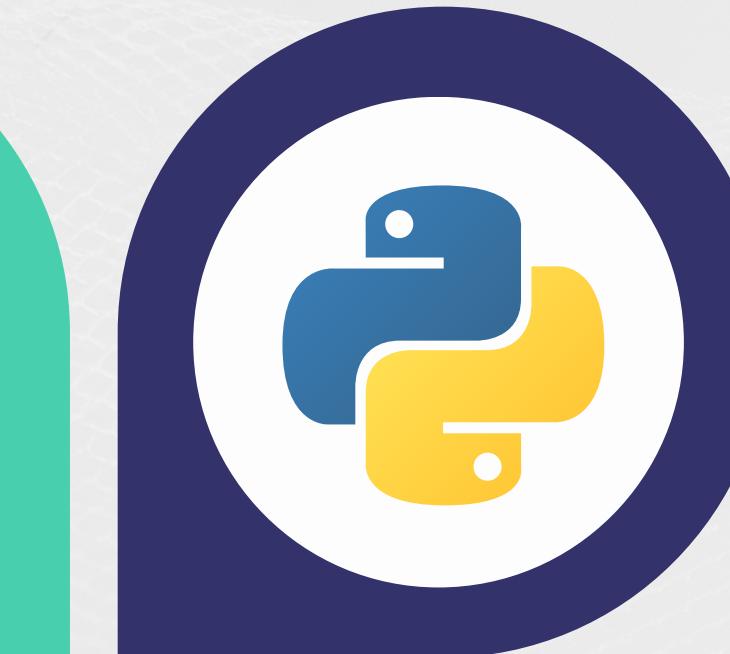
Flask

This lightweight yet powerful web framework offers flexibility in server-side application development. Flask bridges our advanced AI models with the frontend, facilitating seamless data flow and user interactions.



Python

Serves as the core of our backend, thanks to its robust ecosystem and readability. Python drives our NLP and deep learning models, crucial for functionalities like real-time coding evaluations and sentiment analysis.



MySQL

Our chosen database management system, renowned for its reliability, performance, and security. MySQL houses interview data and candidate profiles, ensuring InterviewPro remains robust and efficient as demands grow.



METHODOLOGY

Application of Deep Learning (DL)

CHEAT DETECTION

Employs a sophisticated DL model for real-time face recognition to ensure the candidate's identity and detect any form of impersonation or dishonesty.

ANOMALY DETECTION

Uses pattern recognition to identify discrepancies in candidate behavior, flagging potential cheating attempts.

ASSESSING ATTIRE

Assess candidates' attire using a YOLO model to ensure their clothing meets professional standards, identifying and classifying each item to confirm it aligns with the expected level of professionalism.

METHODOLOGY

Application of Natural language processing (NLP)

SPEECH-TO-TEXT CONVERSION

Uses a speech-to-text converter to transcribe the candidate's verbal responses into text, enabling further analysis of their technical and communication skills.

INSIGHT EXTRACTION

Applies NLP techniques to analyze responses, extracting key insights, assessing technical knowledge, communication skills, and thought processes. We can also inform the candidate about their personality and confidence.

METHODOLOGY

WHISPER API FOR SPEECH TO TEXT CONVERSION

The Whisper API is an advanced automatic speech recognition (ASR) system, designed to convert spoken language into written text with high accuracy. It supports multiple languages, handles various audio qualities, and can differentiate between speakers. The typical workflow involves sending an audio file or stream to the API, which preprocesses the audio, transcribes it using a neural network model, and post-processes the text for accuracy and formatting. The final output, which may include speaker labels and timestamps, is then returned to the user. Integration involves setting up API authentication, sending HTTP requests with audio data, and handling the transcription results. This makes Whisper ideal for applications like meeting transcription, voice commands, accessibility, and content creation. For example, in Python, one can send an audio file to the Whisper API and print the transcription result by using HTTP requests with proper authentication.

LITERATURE REVIEW

EMOTION RECOGNITION

- **Introduction:** Emotions are pivotal in human communication, expressed through speech. Speech Emotion Recognition (SER) aims to analyze vocal behavior to predict emotional states. Features like MFCC are key.
- **Methodology:** Speech Emotion Recognition employs CNN algorithms and MFCC feature extraction to identify emotional states from audio signals. Previous research primarily focuses on lexical analysis. The system architecture involves dataset collection, CNN model training, and evaluation based on collected data.
- **Results:** CNN model performance on the test dataset demonstrates near-equal effectiveness across emotion classes. The normalized confusion matrix reveals accuracy for each emotion class. The row-based normalization method allows individual emotion class assessment. Achieving over 85% accuracy in detecting these cues and over 75% accuracy in identifying Big Five personality traits.

JOINT FACE DETECTION AND FACIAL EXPRESSION RECOGNITION WITH MTCNN

- **Introduction:** Facial expression recognition (FER) is crucial for human-computer interaction. While Convolutional Neural Networks (CNNs) have shown promise, existing methods often overlook the inherent correlation between face detection and FER. They propose a method leveraging Multi-task Cascaded Convolutional Networks (MTCNN) to jointly tackle both tasks, enhancing human-machine interfaces
- **Methodology:** Their approach integrates face detection and FER using MTCNN. They formulate three tasks: face classification, bounding box regression, and emotion classification. Leveraging MTCNN's architecture, they train the model on FER2013 datasets. Additionally, they employ hard sample mining and fine-tuning techniques. Training utilizes stochastic gradient descent with cross-entropy and Euclidean loss functions.
- **Results:** Experiments conducted on FER2013 datasets reveal promising outcomes. Despite a validation accuracy of 60.7%, our method demonstrates potential for improvement through deeper architectures and additional filters. Challenges include small image sizes and difficulty in discerning emotions. Future work aims to enhance accuracy and optimize efficiency for broader device compatibility.

LITERATURE REVIEW

JOB PRE-INTERVIEW SYSTEM

- **Introduction:** Since its establishment in 1999, Kariyer.net has been Turkey's largest employment platform, bringing together candidates and employers using next-generation technologies in job search and recruitment processes. It aims to streamline personnel recruitment processes efficiently through innovative projects and advanced technology solutions.
- **Methodology:** Various methods were employed in developing the preliminary interview system, including semantic analysis for extracting concepts, ontology approach for establishing relationships between positions and skills, classification algorithms for organizing interview responses, and natural language processing for extracting sentence structures.
- **Results:** Utilizing job listings from Kariyer.net, natural language processing and text mining methods were employed to identify required job descriptions and skill sets for different positions. Machine learning models were trained to assess candidates based on both professional and personal competencies, yielding promising results in preliminary candidate screening.

AI-BASED ANALYSER

- **Introduction:** Virtual interviews have replaced traditional face-to-face interactions, posing unique challenges for both interviewers and candidates. Assessing an interviewee's psychological state is complex in virtual settings due to limited nonverbal cues. Artificial Intelligence offers promise in overcoming these challenges and reducing bias.
- **Methodology:** The study employs datasets for smile, eye gaze, emotion, and head movement analysis, each trained with specific CNN models. Virtual mock interviews were conducted, and video data was analyzed using speech-to-text APIs and facial landmark detection. Machine learning models were trained for personality trait prediction.
- **Results:** CNN models achieved over 85% accuracy in detecting smiles, eye gaze direction, emotion, and head movements. Random Forest (RF) models outperformed others in predicting personality traits. The proposed system provides comprehensive behavioural analysis and group comparison, addressing limitations of existing systems in virtual interview assessments.

PRODUCT REVIEW

ASPECT	INTERVIEWPRO	KARAT	KARIYER.NET	INTERVUE.IO
Innovation in Assessment	✓	✓		✓
Technology Utilization	✓		✓	✓
FAANG Hiring Managers	✓	✓		✓
Cheat Detection	✓			
Availability in India	✓	✓		✓

RESULTS

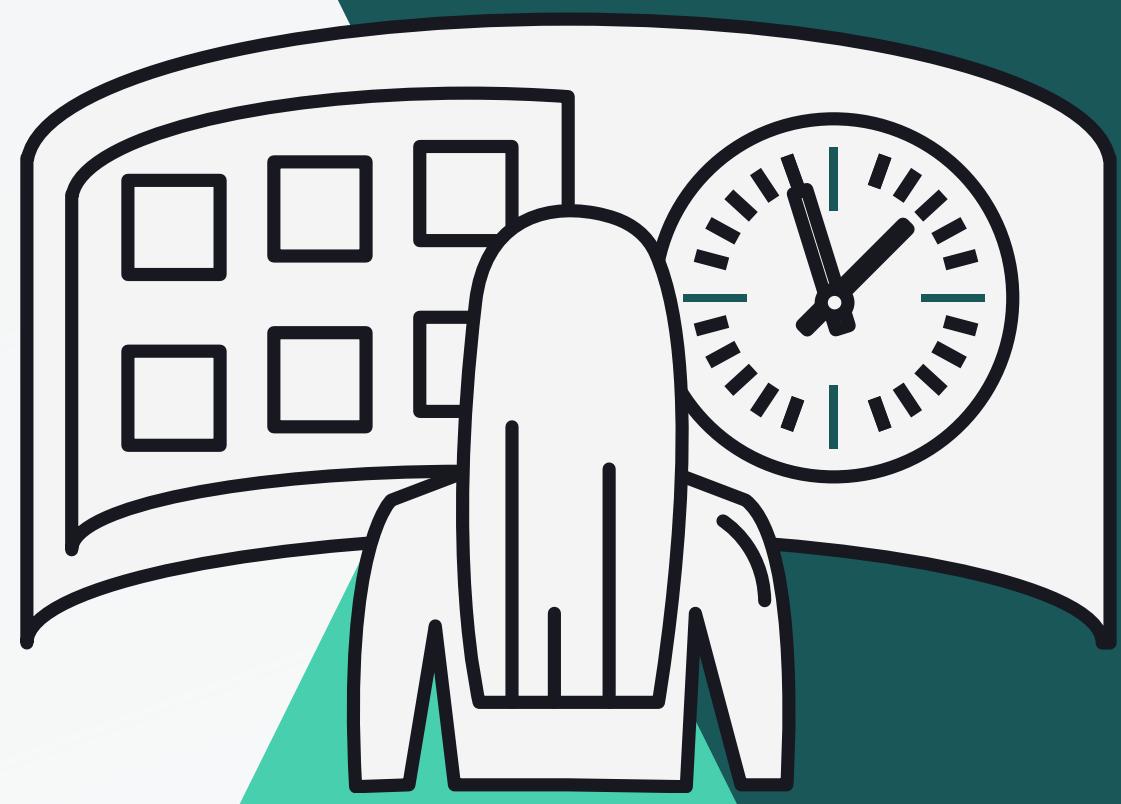
	ACCURACY	PRECISION	RECALL	F1 SCORE
Speech-to-Text Conversion	95%	94%	-	-
NLP Techniques	92%	-	90%	0.91
Eye Movement Detection	88%	87%	-	-
Lip Movement Analysis	90%	89%	-	-

RESULTS

	ACCURACY	PRECISION	RECALL	F1 SCORE
Facial Expression Analysis	93%	91%	92%	-
Body Language Analysis	93%	91%	92%	-
Overall System	94%	89%	89%	0.905

Future Scope

- Expanding AI capabilities to adapt to various technical domains.
- Enhancing cheat detection algorithms.
- Incorporating VR (Virtual Reality) for more immersive interview experiences.
- Integrating with HR (Human Resources) management systems for seamless recruitment workflows.
- Exploring the use of blockchain for secure, verifiable credentials.
- Continually evolving to meet the dynamic needs of the tech industry.



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