

A PROJECT REPORT

on

**“HRPro: A Machine Learning Approach to
Recruitment Process Automation”**

**Submitted to
KIIT Deemed to be University**

In Partial Fulfilment of the Requirement for the Award of

**BACHELOR’S DEGREE IN
INFORMATION TECHNOLOGY**

BY

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**UNDER THE GUIDANCE OF
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May 2020**

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CERTIFICATE

This is certify that the project entitled
“HRPro: A Machine Learning Approach to Recruitment Process
Automation”
submitted by

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is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor of Engineering (Computer Science & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work is done during year 2022-2023, under our guidance.

Date: 15/04/2022

(Rajdeep Chatterjee)
Project Guide

Acknowledgements

We are profoundly grateful to **Rajdeep Chatterjee** of Department of **Computer Science, KIIT University** for his expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion. The many accolades received by the project wouldn't be possible without his constant help, support and initiatives.

Atri Biswas
Debarshi Deb
Shourjya Chakroborty

ABSTRACT

The project includes implementation of the HRPro Python model into a mobile framework using Flutter and Flask frameworks. We have considered the usability tests and conducted them with few of our peers. We have made a portfolio, including personas, user journey maps, and solved the problem statement we had formulated.

We have used many flask libraries to make the application as visually pleasing and interesting as possible. Moreover, we have kept the kernel of the application—the Interview module—intact with new and interesting additions to the back end of the application.

Keywords: AI/ML, PYTHON, RECRUITMENT-AUTOMATION, FLUTTER, MOBILE APP.

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Chapter 1

Introduction

Recruitment process automation has been a question and a new wave in the industry ever since the onset of COVID 19 protocols have made it imperative to stay at home throughout long durations. There have been many angles from which the question has been tackled, including but not pertaining strictly to online tests, digital interviews, and virtual domain knowledge assessments. In response to the resurgence of the business and recruitment market in the dusk of the pandemic, there is a need to automate a screener test and a initial test that churns out the better of the candidates in order for companies to understand the capabilities of the candidates and better judge them. For that very purpose we have devised a product that helps the recruiters run an initial screener full of HR and domain related questions that can help them understand the candidate's capabilities better and find a role in the company that would better suit them.

Moreover, on the flip side, it has become ever so important for a student, fresher or experienced professional to understand and improve their own interview capabilities. This application can also be a true to form bot or a sparring partner for those who wish to work on themselves before an interview and find loopholes in their understanding of how to approach an interview.



Figure 1.1: HRPro Framework

Chapter 2

Basic Concepts/ Literature Review

The tools used for this particular application include the mobile app development framework **Flutter**, the popular coding language **Python**, The python web server framework **Flask** and various other python libraries that include video processing libraries such as OpenCV[1], audio libraries such as gTTS[2] and many more.

2.1 Flutter

Flutter is a popular mobile app development framework that supports linking to other back-end coding platforms such as python, firebase etc. We have chosen the use of Flutter so as to ease into the project and so that we can create the application without much difficulties due to the simple setup and required technology available to us.

2.2 Python

Python is a popular coding language notorious for its easy to use AI/ML libraries and packages. We have used various libraries in this application including, gTTS(Google Text To Speech) api, OpenCV, speech recognition api, web scraping api[3], and more. Python comes with pre loaded data structuring and modelling frameworks such as pandas, numpy, etc which have helped us clean the data collected and use it for processing our interviews.

2.3 Flask

Flask is another framework in python that has played a major role in the creation of this application. It is essentially middleware for the project—a server that transfers files and information from the python back end to the flutter(dart)[4] front end for smooth flow of data throughout the program.

Chapter 3

Problem Statement / Requirement Specifications

The problem statement trying to be solved is the issue of lack of applications for interview preparations. Additionally the project drives to automate the recruitment process of any industry program.

3.1 Project Planning

The project essentially has 3 major steps that can be de composed into further steps. The three major steps are-

- Development of the front end of the application or mobile app.
- Development of the back end AI/ML driven program that executes the instructions required to evaluate a candidate using the machine learning algorithm.
- Middleware that integrates the two—back end and front end.

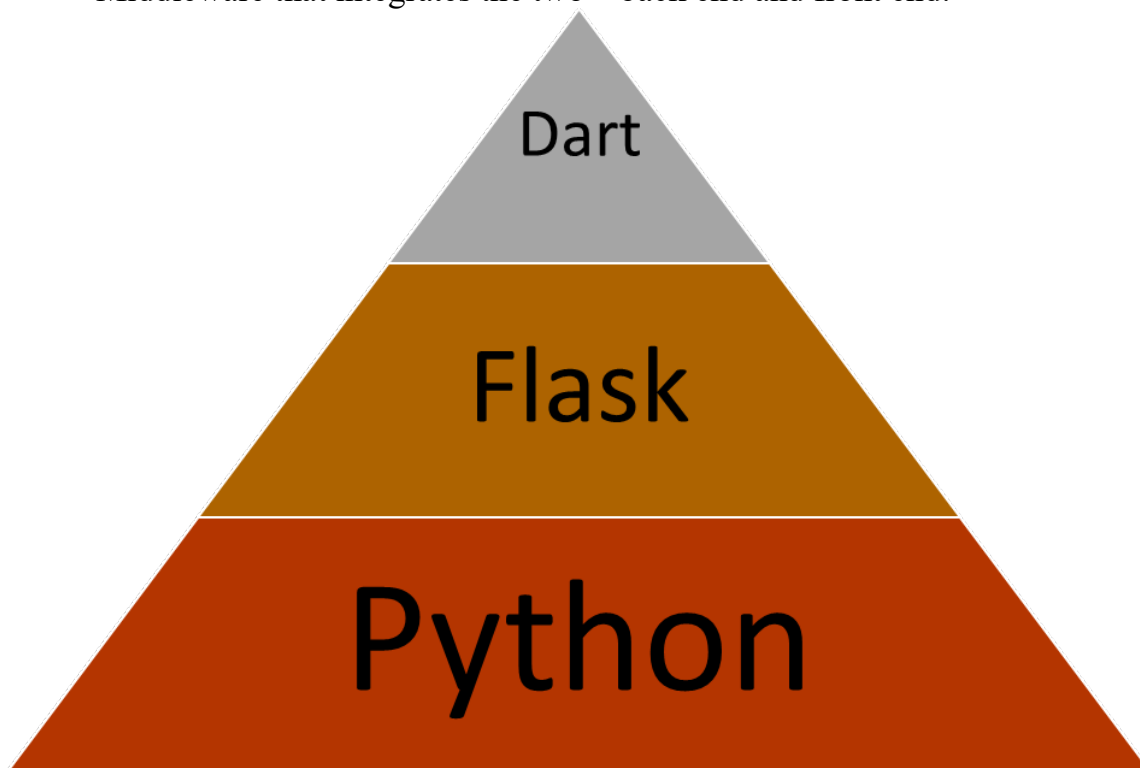


Fig 3.1 Used frameworks for the application.

3.2 Project Analysis

The analysis of the project proves that the application is not robust enough for industry usage yet, but has proven to be a useful tool for fresher or student use for sharpening their skillset when it comes to interview preparation.

3.3 System Design

3.3.1 Design Constraints

The software used for development of the program are-

1. Visual studio code
2. Android development kit
3. Java development kit
4. Android emulator
5. Python 3.8
6. Adobe XD

3.3.2 System Architecture **OR** Block Diagram

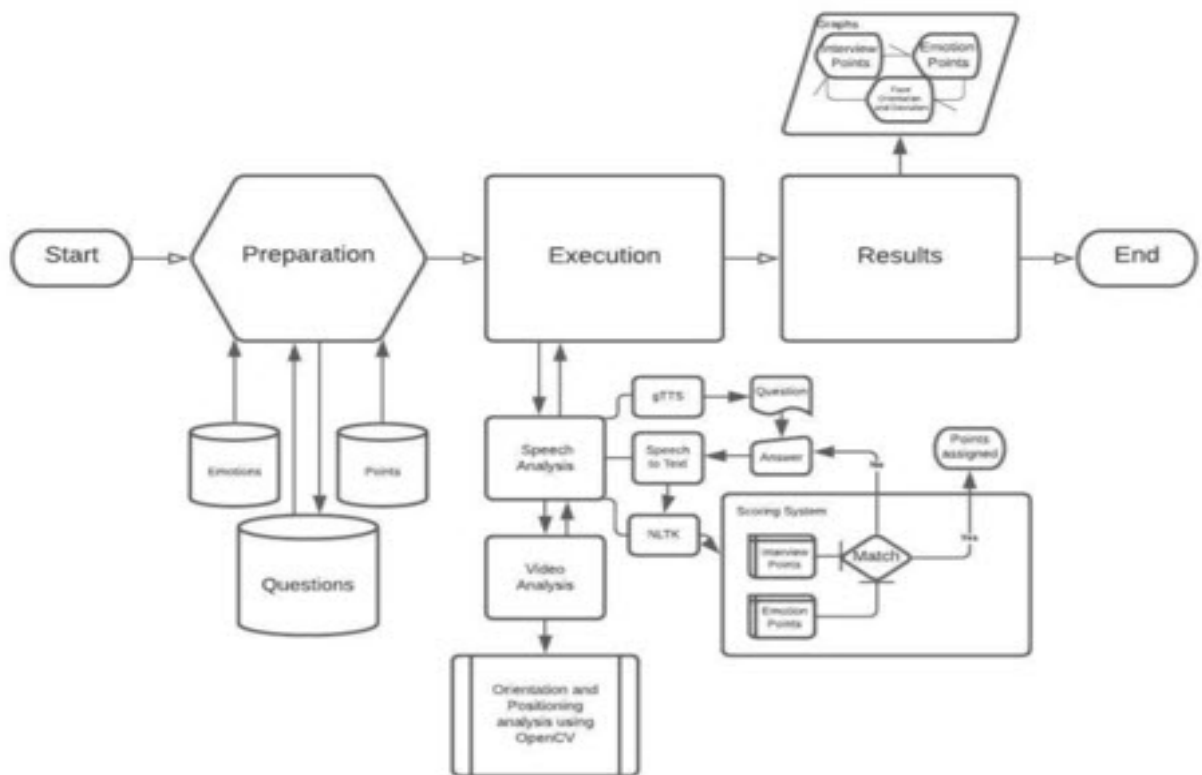


Fig 3.2 The design flow diagram

Chapter 4

Implementation

The implementation of the project will be done on **Android** mobile, and development on iOS is still under consideration.

4.1 Methodology OR Proposal

We will follow the standard waterfall model of SDLC for this particular project and assign various modules (Back-end, front-end, middleware) to each of the team members according to their expertise.

4.2 Testing OR Verification Plan

The testing and verification of the project will be conducted via usability studies through the team lead, who will take surveys, conduct interviews and test the application to revert back to the lab and improve upon the model functionally and visually.

4.3 Result Analysis OR Screenshots

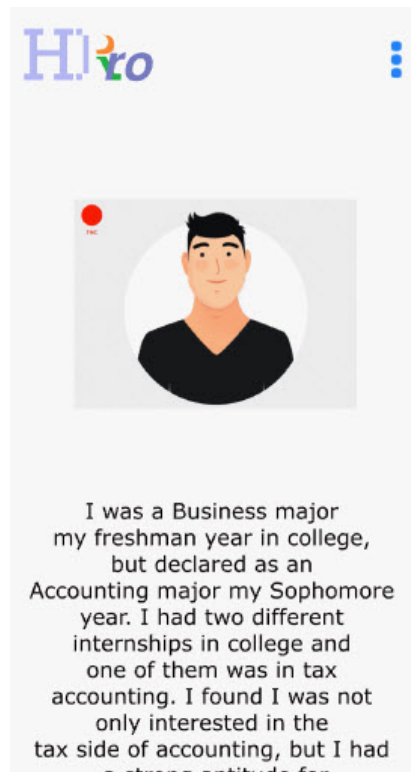


Fig 4.1 Mockups for the application(1)

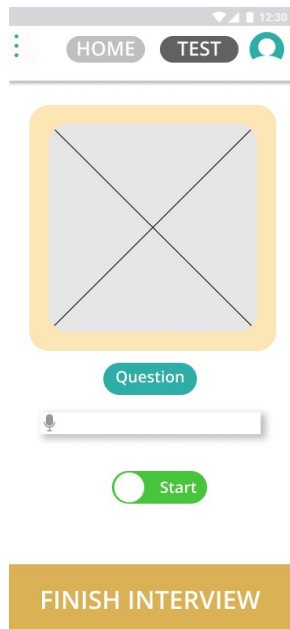


Fig 4.2 Mockups(2)

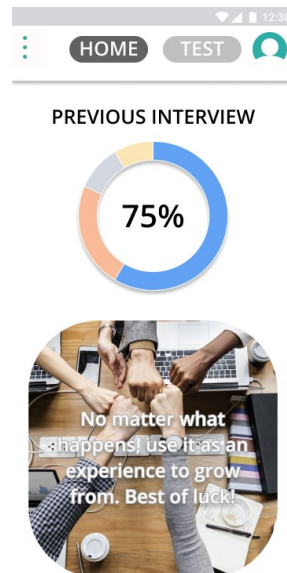


Fig 4.3 Mockups(3)



Fig 4.4 Mocups (4)

Chapter 5

Standards Adopted

5.1 Design Standards

The Leading standards use throughout the industry today will be implemented into the design of HRPro. We will maintain IEEE Design standards for our application.

5.2 Coding Standards

The coding standards maintained in our application development process are:

1. The names of variables are assigned intently with relevant information about the variable or function or object within the name itself.
2. Comments will be implemented to help the collaborative effort to be fruitful
3. There will be short and precise functions and subfunctions for lengthy processes.

5.3 Testing Standards

We will test our application with users of a diverse background keeping in mind the use cases for those who have special needs or have disabilities. Usability tests will be run at every phase of the application to ensure the best possible product.

Chapter 6

Conclusion and Future Scope

6.1 Conclusion

In conclusion, we would say that the application that has evolved from the basic .exe application to a fully fledged mobile is a success for the team. The application will be handy for any student or applicant in need of support and guidance before an interview and will surely satisfy the needs of the interviewee down the line.

6.2 Future Scope

The future scope of the application would involve matching it with industry standard practices and applications to make it of use to actual recruiters and companies, and not just applicants.

References

- [1] Open CV documentation: <https://docs.opencv.org/4.x/>
- [2] gTTs documentation: <https://gtts.readthedocs.io/en/latest/>
- [3] Web scraping APIs: <https://www.webscrapingapi.com/>
- [4] Flutter documentation: <https://docs.flutter.dev/>

SAMPLE INDIVIDUAL CONTRIBUTION REPORT:

HRPro: A Machine Learning Approach to recruitment process automation

Atri Biswas
1829138

Abstract: The project includes implementation of the HRPro Python model into a mobile framework using Flutter and Flask frameworks. We have considered the usability tests and conducted them with few of our peers. We have made a portfolio, including personas, user journey maps, and solved the problem statement we had formulated.

Individual contribution and findings: I am the UX designer, researcher and interviewer and lead developer in the project. I was also spearheading the previous versions of the HRPro project that received many praises for its novelty and innovativeness. I am currently working on the front end development of the HRPro mobile application.

Individual contribution to project report preparation: I made the abstract, introduction and the figures for this particular report.

Individual contribution for project presentation and demonstration: I made the “evolution of HRPro” slides, the introduction, overview and user personas for the ppt.



Full Signature of Supervisor:

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Full signature of the student:

.....

SAMPLE INDIVIDUAL CONTRIBUTION REPORT:

HRPro: A Machine Learning Approach to recruitment process automation

Debarshi Deb
1829216

Abstract: The project includes implementation of the HRPro Python model into a mobile framework using Flutter and Flask frameworks. We have considered the usability tests and conducted them with few of our peers. We have made a portfolio, including personas, user journey maps, and solved the problem statement we had formulated.

Individual contribution and findings: I am the Python developer for this project. I worked in improving the application back end.

Individual contribution to project report preparation: I made the Similar literature and testing.

Individual contribution for project presentation and demonstration: I made the introduction and the images for the ppt.

Debarshi De

Full Signature of Supervisor:

.....

Full signature of the student:

.....

SAMPLE INDIVIDUAL CONTRIBUTION REPORT:

HRPro: A Machine Learning Approach to recruitment process automation

Shourjya Chakroborty
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Abstract: The project includes implementation of the HRPro Python model into a mobile framework using Flutter and Flask frameworks. We have considered the usability tests and conducted them with few of our peers. We have made a portfolio, including personas, user journey maps, and solved the problem statement we had formulated.

Individual contribution and findings: I am the flask developer for this project.

Individual contribution to project report preparation: I made the conclusion for this particular report.

Individual contribution for project presentation and demonstration: I made the takeaways and challenges for the ppt.

Shourjya Chakraborty

Full Signature of Supervisor:

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Full signature of the student:

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(This report is mandatory for all the projects and plagiarism must be below 25%)

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