



Pimpri Chinchwad Education Trust's
Pimpri Chinchwad College of Engineering, Pune

DEPARTMENT OF COMPUTER ENGINEERING

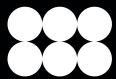


ALPHA BYTE 1.0

PROBLEM STATEMENTS

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MARCH

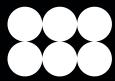




GENERAL INSTRUCTIONS:

- You are free to utilize any technology stack of your preference. There are no restrictions on the use of technology.
- You have the liberty to develop any kind of application, including mobile or web applications, with the option to integrate technologies such as AI, ML, Blockchain, etc.
- It is imperative that the projects developed are original and not copied from any existing internet sources. Plagiarism checks will be conducted on all submissions.
- The evaluation in the first round will be based on **innovation, creativity, user-friendly interface, unique selling points (USPs), and the quality of presentation**. This includes the README.md file in your GitHub repository and a demo video.
- **While we have provided an idea of the problem statement and some features, participants are encouraged to exercise creativity by incorporating their own features and USPs. It is not mandatory to develop the solution exactly as described in the problem statement; participants can introduce their own ideas and enhancements.**





< PROBLEM STATEMENT 1 >

PS ID : ABO1

Introduction:

Traditional interview processes are often cumbersome, involving manual scheduling, multiple back-and-forths via email, and limited visibility during the coding assessment phase. These inefficiencies can lead to delays in the hiring process and hinder candidate experience.

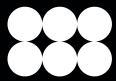
Solution Expected:

Introducing our innovative interview platform tailored exclusively for companies seeking to streamline their interview processes. Our platform offers a seamless experience, revolutionizing the way interviews are conducted. With a focus on efficiency, transparency, and advanced features, we aim to address the drawbacks of traditional methods while providing a superior experience for both recruiters and candidates.

Unique Selling Points and Features:

- **Effortless Scheduling:** Our platform simplifies the interview scheduling process, allowing recruiters to easily schedule multiple interviews at once by uploading Excel files containing candidate data.
- **Automated Communication:** Candidates receive automated email notifications with interview details, including date, time, and a unique meeting link for seamless connectivity.
- **Real-Time Coding Assessment:** Unlike traditional interviews, our platform provides a built-in compiler, enabling candidates to showcase their coding skills directly on the same screen. Recruiters can observe and even edit the code in real-time, enhancing collaboration and assessment efficiency.
- **Customizable Interview Templates:** Recruiters can create and save customizable interview templates tailored to different roles and skillsets, streamlining the interview preparation process.
- **Seamless Integration:** Our platform seamlessly integrates with popular HR management systems, enabling recruiters to access candidate data and interview insights in one centralized location.



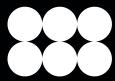


Expectation:

We anticipate that our innovative interview platform will significantly reduce time-to-hire, improve candidate experience, and enhance the overall efficiency of the recruitment process. By leveraging advanced technologies and intuitive features, we aim to set a new standard for interview platforms in the industry.

Conclusion:

In conclusion, our interview platform represents a paradigm shift in how interviews are conducted, offering unparalleled convenience, transparency, and security. We look forward to empowering companies to conduct more effective and efficient interviews, ultimately leading to better hiring decisions and long-term success.



< PROBLEM STATEMENT 2 >

PS ID : ABO2

Introduction:

In today's educational landscape, traditional examination systems often lack the flexibility and efficiency needed to cater to diverse assessment needs. Conventional methods typically rely on manual processes, leading to administrative burdens, limited question types, and challenges in ensuring fair evaluation. Our solution aims to revolutionize this paradigm by offering a comprehensive examination system that seamlessly combines multiple question formats, AI proctoring, instant results, and user-friendly interfaces for both institutes and students.

Drawbacks of Traditional Process:

Traditional examination systems are plagued by several limitations:

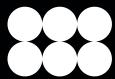
- Limited question formats: Conventional systems often restrict assessments to multiple-choice questions (MCQs) or text-based responses, limiting the scope for assessing diverse skills and knowledge domains.
- Manual processes: The manual creation, distribution, and evaluation of exams are time-consuming and prone to errors, leading to administrative burdens for institutes.
- Lack of flexibility: Traditional systems lack the flexibility to adapt to evolving assessment needs, such as incorporating image-based questions or code-upload for programming assessments.
- Security concerns: Ensuring the integrity and security of exams, particularly in remote settings, is challenging without robust proctoring mechanisms.

Solution Expected:

Our solution offers a cutting-edge examination system that addresses the shortcomings of traditional processes while introducing innovative features to enhance the assessment experience:

- Multiple question formats: Our platform supports various question types, including text-based, image-based, and code-upload questions, allowing institutes to design comprehensive assessments tailored to their requirements.



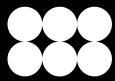


- AI proctoring: Leveraging advanced AI technology, our platform ensures the integrity of exams by monitoring student behavior, detecting anomalies, and flagging potential instances of cheating in real-time.
- Instant results: With our system, students receive immediate feedback upon completing exams, streamlining the assessment process and enabling timely performance evaluation.
- **User-friendly interfaces (**)** : We provide intuitive dashboards for both institutes and students, simplifying exam scheduling, administration, and result dissemination.
- Secure exam access: Students receive personalized links to access exams during designated time slots, ensuring secure and controlled exam environments. Additionally, each student receives a unique passkey via email, which serves as an additional layer of authentication to start the exam, enhancing exam security.

Bonus Features:

- Adaptive Assessments: Our platform utilizes adaptive assessment algorithms to dynamically adjust the difficulty level of questions based on individual student performance, ensuring a personalized and optimized testing experience.
- Interactive Exam Analytics: We provide detailed analytics and insights into student performance, including question-wise analysis, time taken per question, and comparative performance metrics, empowering educators to identify areas for improvement and tailor instruction accordingly.
- Collaborative Exam Creation: Our platform facilitates collaborative exam creation, allowing multiple educators to collaborate in real-time to develop assessments, share feedback, and ensure the quality and relevance of exam content.





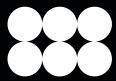
Expectation

We anticipate that our innovative examination system will redefine the assessment landscape by offering unparalleled flexibility, efficiency, and security. By incorporating cutting-edge technologies and user-centric design principles, we aim to streamline the examination process, enhance student engagement, and improve the overall assessment experience for both institutes and students.

Conclusion

In conclusion, our comprehensive examination system represents a significant step forward in the evolution of assessment methodologies. By addressing the limitations of traditional processes and introducing advanced features such as multiple question formats, AI proctoring, and instant results, we are poised to revolutionize the way exams are conducted and evaluated. We are confident that our platform will empower institutes to deliver more effective assessments, foster academic integrity, and ultimately drive positive outcomes for students and educators alike.





< PROBLEM STATEMENT 3 >

PS ID : AB03

Problem Statement:

The traditional hiring process can be time-consuming and inefficient for both job applicants and recruiters. Applicants are often required to manually apply for multiple jobs and recruiters must sift through numerous resumes to find suitable candidates. It involves a lot of manual work and is often time consuming and expensive. Sorting through numerous applications and resumes can be overwhelming, and sometimes candidates with the right qualifications are overlooked. This can lead to missed opportunities for both parties and a lack of diversity in the hiring process.

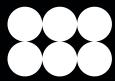
Drawbacks of the traditional process include

- Traditional hiring processes can take an average of 42 days to fill a position, resulting in longer hiring cycles and increased costs. (Source: Society for Human Resource Management).
- Manual filtering of applications is time-consuming and prone to human errors and bias, with recruiters spending an average of 23 hours per hire on manual screening. (Source: Glassdoor).
- A poor candidate experience can lead to negative reviews and deter future applicants. About 60% of job seekers report a negative candidate experience. (Source: Talent Board).
- Poor hiring decisions can result in costs of up to 30% of the employee's first-year earnings, including recruitment and training costs. (Source: Society for Human Resource Management).
- Lack of transparency and feedback in the hiring process can lead to a poor candidate experience, with 83% of candidates reporting that a negative interview experience can change their opinion about a role or company. (Source: LinkedIn)

Solution Expected:

A web /mobile based application that simplifies and automates the hiring process by allowing applicants to create detailed profiles with all their relevant information and recruiters to post jobs and filter through the applicants based on their eligibility criteria. The app uses machine learning algorithms to match the best candidates for the job and provide recruiters with a list of top candidates, eliminating the need for manual filtering of applications.





The proposed application aims to simplify the hiring process by offering the following features:

- Job seekers can upload their resumes and create profiles with their personal information, education, work experience, skills, certifications, test scores, and other relevant information.
- The app will automatically extract information from the applicant's resume. This will eliminate the need for manual input, resulting in a smoother and faster application process for both recruiters and applicants. There should be no need for entering the details manually (for applicants) except for rectifying the information extracted from the resume
- Recruiters can create job postings with the eligibility criteria, job description, required skills, responsibilities, salary and set the duration of the job posting. The job postings should NOT be visible to the applicants.
- To further improve the UX, the app should provide feedback to candidates on their application status, improving the candidate experience. It should also let them know about what skills they are missing, what skills are in high demand, salary statistics, why they didn't get shortlisted for a certain job posting, etc

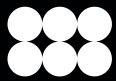
Solution Expected

- Automatic resume parsing to extract relevant information.
- Suggested applicants list for recruiters based on job requirements and eligibility criteria.
- Secure storage and handling of sensitive data.
- Feedback mechanism for applicants to improve their profiles.
- In addition to the core features, the application can have endless opportunities for expansion and customization. The possibilities for additional features are only limited by your imagination.

Remember:

The ultimate objective of this project is to enhance the efficiency of the recruitment process by reducing the time required by both the recruiters and the applicants.





< PROBLEM STATEMENT 4 >

PS ID : AB04

Introduction

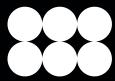
The healthcare system can be complicated and stressful for patients. One problem they often face is managing their medical records and sharing them with their doctors. We want you to develop a web or mobile application that can make it easier for patients to store, manage, and share their medical records.

Requirements

- User-friendly Interface: Your application should be easy to use and accessible to patients of all ages and technological abilities. This means that the design and layout should be simple and intuitive.
- Secure Storage: Patients should be able to store their medical records securely, without any fear of their data being stolen or misused. Make sure that your application is compliant with all relevant data protection regulations.
- Record Management: Your application should allow patients to enter and manage their medical history, diagnosis, treatment, and medication details. Patients should also be able to upload medical reports, prescription details, and other relevant documents.
- Record Sharing: Patients should be able to share their medical records with doctors or healthcare providers of their choice. Your application should have features to control the level of access given to doctors, such as viewing or editing permissions.

Bonus Features

The flavor of Blockchain: In addition to the above requirements, we encourage you to incorporate blockchain technology into your application. Blockchain can provide a tamper-proof and decentralized way of storing medical records, ensuring that patient data is secure and cannot be modified without permission. It can also enable patients to have more control over their data and decide who has access to it. Furthermore, blockchain can facilitate secure and transparent sharing of medical records between patients and healthcare providers, potentially reducing duplication of tests and improving overall healthcare efficiency. You can explore 



various blockchain-based solutions, such as using smart contracts, decentralized storage, and private key encryption to enhance the security and privacy of the patient data. We believe that by leveraging blockchain technology, your application can provide a more innovative and effective solution for managing electronic health records.

The flavor of AI

We encourage you to consider leveraging the power of artificial intelligence (AI) in your application. AI can help patients better manage their medical records by automatically analyzing and categorizing their data. For instance, natural language processing (NLP) can be used to extract relevant information from medical reports, such as diagnosis and treatment details, and add them to the patient's record. Machine learning algorithms can also be used to provide personalized recommendations to patients based on their medical history, such as suggesting preventative measures or lifestyle changes. Additionally, AI can assist doctors in diagnosing and treating patients by providing them with relevant information and insights from medical records, potentially leading to better outcomes. By incorporating AI into your application, you can provide a more advanced and intelligent solution for managing electronic health records, ultimately improving patient care and outcomes.

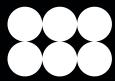
Expectation

We expect you to develop a working **MVP**[Minimum Viable Product]. Your application should be user-friendly, secure, and compliant with all relevant data protection regulations. We encourage you to think outside the box and come up with innovative solutions that can improve the patient-doctor experience.

Conclusion

Your application should help patients manage their medical records and share them with their doctors easily and securely. It should ultimately lead to better patient outcomes by improving diagnosis, treatment, and reducing medical errors





< PROBLEM STATEMENT 5 >

PS ID : AB05

Problem Statement

Developing a Conversational Recommender System for Stock Investments

Description

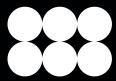
In the changing landscape of financial markets, investors face the challenge of navigating a vast sea of information to make sound and timely investment decisions. The need for a sophisticated, user-friendly solution becomes evident as traditional methods often fall short in delivering personalized and real-time insights. To address this pressing issue, we aim to develop a cutting-edge Conversational Recommender System tailored to guide investors in selecting the most suitable stocks for their unique financial goals and risk profiles.

A Conversational Recommendation System is a model that is capable of communicating with a user in fluent natural language about a particular topic and is able to provide good recommendations for the same. The system goes beyond traditional recommendation engines by facilitating interactive dialogues, enabling users to receive tailored suggestions and information in a conversational manner.

Challenges in current scenario:

- **Information Overload:** Investors are provided with a constant stream of financial data, making it challenging to distill relevant information for effective decision-making.
- **Timeliness of Recommendations:** The volatile nature of financial markets demands real-time analysis and recommendations. Existing systems often struggle to provide up-to-the-minute insights, leaving investors at a disadvantage.
- **Complexity in Decision-Making:** The intricacies of stock market dynamics can be overwhelming, particularly for novice investors. The application should simplify the decision-making process, offering clear explanations and insights to empower users with the knowledge needed to make informed investment choices.





- Risk Management: The inherent risks associated with stock investments necessitate a robust risk management strategy. The system must incorporate advanced risk assessment capabilities to guide users towards investments that match their risk tolerance, ensuring a balanced and secure portfolio.
- Complex Financial Instruments: The availability of complex financial instruments, such as derivatives and options, adds a layer of complexity for investors. Understanding and effectively utilizing these instruments require a higher level of financial literacy and expertise.

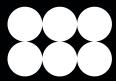
Expected Solution:

- A conversational recommendation model that can handle natural, human language input and output. The model should possess some basic Natural Language Understanding.
- The model's responses should be sound and up-to-date.
- The UI for the model should be user-friendly and intuitive. It should cater to the needs of an everyday investor and provide them with a strong recommendation based on the current market situation.
- The model should be able to understand the complex constructs about the functioning of the market conditions.
- The model must not hallucinate.
- The model should possess some level of unbiased recommendation.
- While we expect you to fine-tune your own LLM, usage of LLM APIs are allowed. We encourage your creativity and originality.
- Although it is expected that your model learns from historical data, while making predictions, real-time data should be considered.

Bonus Points;

- Models with Natural Language Output will be given preference.
- Models with no inherent bias whatsoever will be given preference.
- Models which are able to minimize the risk in investing, thus minimizing the overall risk of the portfolio would be given preference.
- Models which are able to handle personalized and individualistic biases of the user towards a particular investment resource, would be given preference.
- Models that will be able to simulate market conditions and give a strong, accurate opinion about the stock in question, will be given a preference.
- An intuitive analytics dashboard that visually presents key performance indicators, portfolio metrics, and market trends, would be given a preference.





< PROBLEM STATEMENT 6 >

PS ID : AB06

Problem Statement:

Design an effective recognition system for fingerprints.

Description:

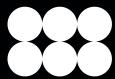
The increasing popularity of fingerprints and the corresponding rise in database sizes captured by diverse sensors pose challenges for recognition systems. High processing complexity, exacerbated by multi-sensor data gathering, hinders system efficiency. The problem statement revolves around creating an application that can efficiently and accurately classify fingerprints based on data from different sources.

Challenges in current scenario:

Current fingerprint recognition systems encounter several challenges, including:

- **High Processing Complexity:** The growing size of fingerprint databases, especially when captured by various sensors in smart devices, contributes to increased processing complexity, impacting system efficiency.
- **Manual Architecture Design:** Designing architectures for fingerprint classification is a laborious and time-consuming task, hindering the development of efficient systems.
- **Multi-Sensor Data Handling:** Fingerprint recognition systems often struggle with the integration of data collected from multiple sensors, leading to difficulties in achieving consistent and accurate recognition across diverse sources.
- **Adaptability to Noisy Data:** Handling noisy and low-quality fingerprints, especially those obtained through live scan devices and cross-sensor sources, remains a challenge for current recognition systems.
- **Performance Comparison:** Benchmarking and comparing the performance of recognition systems against state-of-the-art techniques can be complex, requiring rigorous evaluation on diverse databases.





Expected Solution:

- A method that automatically determines the architecture of the system for fingerprint classification, reducing the manual effort and time required in designing robust models.
- The system must be capable of handling fingerprint datasets captured by various sensors, ensuring adaptability to different sources and reducing processing complexity in multi-sensor scenarios.
- Your system should have a basic UI that implements the model.
- Please refrain from using any LLM/transformer API for implementation of the solution. The model should be original and creative.

Bonus Points;

- Lightweight system architectures that outperform SOTA architectures will be given preference.
- Development of a lightweight yet rigorous testing and validation procedure will be preferred.
- The system developed should be able to handle noisy and bad quality inputs to generate accurate responses as well.
- The search time required for identifying and classifying a fingerprint in a database should be minimized. Such a system would be preferable.
- A model that can handle data from diverse sources would be given preference.
- The UI that implements the system in the most user friendly, and approachable manner, would be given preference.



< PROBLEM STATEMENT 7 >

PS ID : ABO7

Welcome to the Open Innovation Track of our Hackathon!

What is Open Innovation?

Open innovation is a paradigm that promotes collaboration and knowledge sharing across boundaries, allowing individuals and organizations to leverage external ideas, technologies, and resources to drive innovation. In this track, we invite participants to embrace the spirit of open innovation by engaging with diverse communities, leveraging existing resources, and exploring unconventional approaches to problem-solving.

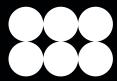
Track Objective:

The objective of the Open Innovation Track is to foster creativity, collaboration, and cross-disciplinary exchange among participants. By encouraging open-mindedness and resourcefulness, this track aims to inspire novel solutions to real-world challenges that transcend traditional boundaries.

Key Features:

- **Collaboration:** Participants are encouraged to form interdisciplinary teams and collaborate with external stakeholders, including mentors, experts, and community members, to co-create innovative solutions.
- **Resourcefulness:** Participants are challenged to explore and utilize a wide range of resources, including open-source technologies, public datasets, APIs, and existing tools, to develop inventive solutions.
- **Diversity and Inclusion:** We value diversity in perspectives, backgrounds, and skill sets. Participants are encouraged to embrace inclusivity and leverage diverse viewpoints to drive innovation.
- **Out-of-the-Box Thinking:** Creativity knows no bounds. Participants are encouraged to think creatively and explore unconventional approaches to problem-solving, pushing the boundaries of what's possible.
- **Impact Focus:** While creativity is important, solutions should also be practical and have the potential for real-world impact. Participants are encouraged to consider the scalability, sustainability, and social impact of their solutions.





IF YOU HAVE ANY QUERIES REGARDING PS CONCAT :

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