# PrepGenius

# CONTENT

# List of figure

# ABSTRACT

The "AI-Based Web Application for Placement Preparation" is a smart, interactive, and user-centric platform developed to streamline and enhance the placement preparation journey for students. Built using the **MERN Stack** (MongoDB, Express.js, React.js, Node.js), **Python**, and **Generative AI**, the application is engineered to offer a structured and data-driven approach to mastering technical interviews, aptitude evaluations, and core subject fundamentals.

The platform integrates multiple advanced features that collectively aim to bridge the gap between academic learning and industry requirements. The **Course Monitoring System**, powered by the YouTube API, enables real-time tracking of video-based learning progress. The **AI-Based Interview Assistant** simulates personalized mock interviews with intelligent, real-time feedback—mirroring real-world technical interview scenarios. Additionally, the platform incorporates a **DSA Sheet Integration** feature that offers categorized problem sets and visual progress tracking, empowering students to practice data structures and algorithms effectively.

Further enhancing the preparation experience, the system includes an **AI-Generated MCQ Engine** that dynamically creates domain-specific questions for subjects like DBMS, OS, CN, and Aptitude, facilitating deeper conceptual understanding. A **CV Analyzer** module utilizes AI to provide automated, actionable feedback on resumes, ensuring students present their profiles in the best possible manner.

To ensure students are aware of placement-related activities, the **Event Notification System** allows administrators to schedule virtual events, workshops, and webinars while sending real-time alerts. The **Placement Analytics Dashboard** offers insights into hiring trends, company-specific demands, and preparation success metrics, allowing students to optimize their learning strategy accordingly.

This project demonstrates a forward-thinking approach to **educational technology**, combining machine intelligence, real-time analytics, and personalized learning to prepare students holistically for the recruitment process. Our participation in this project competition reflects our commitment to innovation, employability enhancement, and the development of scalable solutions that address real-world academic challenges.

# INTRODUCTION

In today's highly competitive world, placement preparation is not just about learning subjects—it's about smart planning, consistent practice, and personalized improvement. As students gear up for placements, they often face challenges like lack of structured guidance, inadequate mock practice, limited awareness of hiring trends, and poor resume feedback. To bridge this gap, we propose an intelligent, AI-powered solution: *AI-Based Web Application for Placement Preparation*.

This project aims to create a smart and interactive platform that combines the power of Artificial Intelligence, real-time data, and modern web development to assist students in preparing for campus placements more effectively. The application is developed using the MERN stack (MongoDB, Express.js, React.js, Node.js) and Python for AI and Machine Learning functionalities. It focuses on core areas such as technical interviews, aptitude tests, DSA (Data Structures and Algorithms), and core subject assessments like DBMS, OS, and CN.

The system is designed to simulate a complete placement preparation environment through innovative features like:

- **AI-Based Interview Assistant** for real-time mock interview simulations.
- **AI-Generated MCQs** to provide unlimited, subject-specific assessment questions.
- **Course Monitoring System** to track progress from learning videos via YouTube API.
- **DSA Sheet Integration** to allow users to solve categorized problems and visualize their progress.
- **CV Analyzer** to give AI-generated feedback and tips for resume improvement.
- **Placement Analytics Dashboard** for insights into hiring trends and preparation benchmarks.

- **Event Notification System** to inform users about virtual placement events and webinars.

Each component of the application works together to deliver a personalized and performance-driven preparation experience. Unlike static platforms, it adapts to individual progress using AI-powered feedback and analytics, helping students strengthen their academic skills while boosting confidence and strategic thinking.

This mini project contributes to the field of educational technology by combining AI, data analytics, and full-stack development to build a scalable and intelligent placement preparation platform. It showcases how AI can be practically applied in academic scenarios to improve career readiness and enhance employability.

### Purpose and Scope

This application aims to **bridge those gaps** by leveraging Artificial Intelligence, Machine Learning, and the MERN stack to provide a comprehensive **solution** that assists students in:

- **Practicing technical and aptitude-based assessments.**
- **Simulating real-time interview environments.**
- **Monitoring learning progress.**
- **Receiving AI-based CV feedback.**
- **Staying updated with placement events.**
- **Analyzing personal performance and current hiring trends.**

By centralizing various placement preparation tools into a single platform, the project ensures that **students are better equipped**, more confident, and industry-ready.

### Technological Implementation

The website is developed using **modern full-stack web development tools and technologies** that ensure performance, scalability, and maintainability:

- **Frontend**:
    - Built using **HTML5**, **CSS3**, and **JavaScript** to provide a structured and interactive UI.

    - **Bootstrap** is used to make the design responsive and mobile-friendly.
- **Backend**:
    - Developed using **Node.js** and **Express.js**, offering a fast and scalable server-side environment.
    - RESTful APIs are implemented to handle communication between the frontend and backend.
    - We connect the python features using FastAPI.
- **Database**:
    - Utilizes **MongoDB**, a flexible and powerful NoSQL database, to store user information, book data, seller listings, and order details.
- **Tools**:
    - Tools like **Git**, **GitHub**, and **Postman** are used for version control, API testing, and collaborative development.

# METHODOLOGY

The development of this web application follows a modular and iterative approach, combining frontend and backend technologies along with AI integrations to achieve a scalable and intelligent solution.

- **Web technologies used:**

**Frontend**: HTML, CSS, JavaScript, React.js

**Backend**: Node.js, Express.js, Python (for AI modules)

**Database**: MongoDB

**APIs Used**: YouTube Data API, OpenAI API (for Generative AI), Resume Parser APIs

**Tools & Libraries**: Redux, Axios, Chart.js, Flask (for ML integration)

- **Frontend development:**

The frontend of the application is built using **React.js**, enabling the creation of a dynamic and responsive user interface. Components are structured for reusability, and the use of React hooks and Redux ensures state management across different modules like user progress tracking, event notifications, and DSA sheet visualization. UI is enhanced with Tailwind CSS and libraries like Chart.js for analytics display.

- **Backend development:**

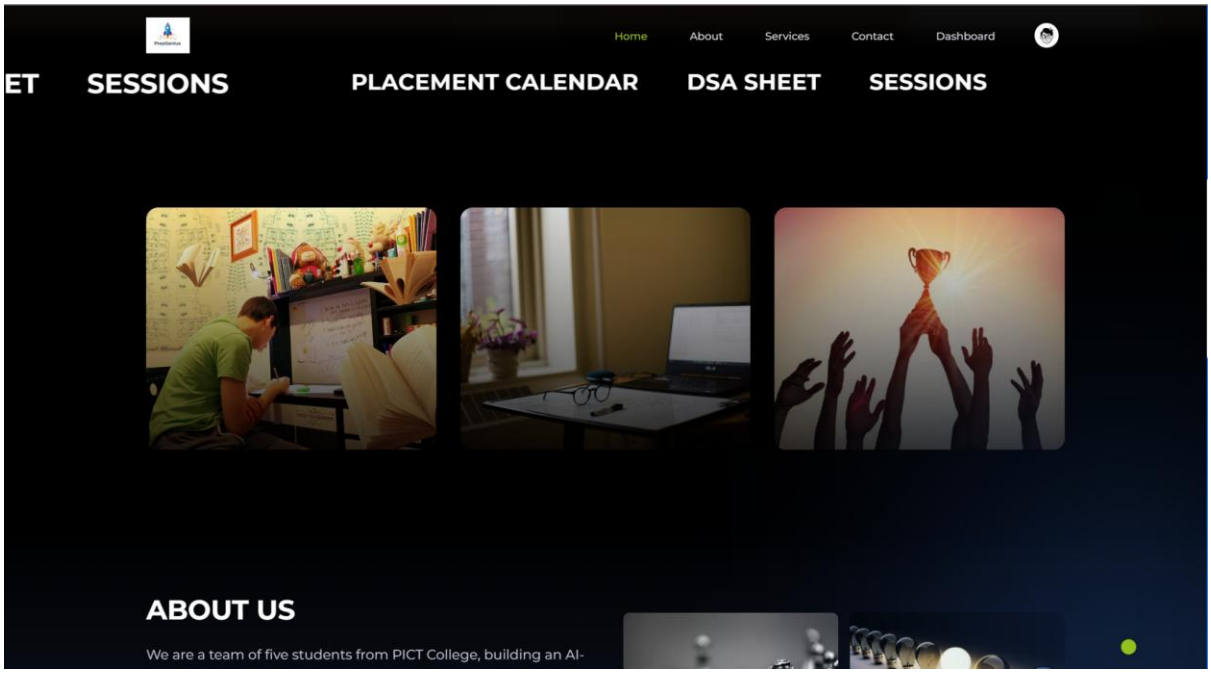
The backend is developed using **Node.js** and **Express.js**, providing a robust REST API for data exchange between the frontend and database. Authentication, user data storage, and event handling are managed through these APIs. The backend also handles API calls to external services like YouTube and integrates with **Python-based AI modules** using **Flask** for ML functionalities such as mock interviews and resume feedback.

- **Integration:**

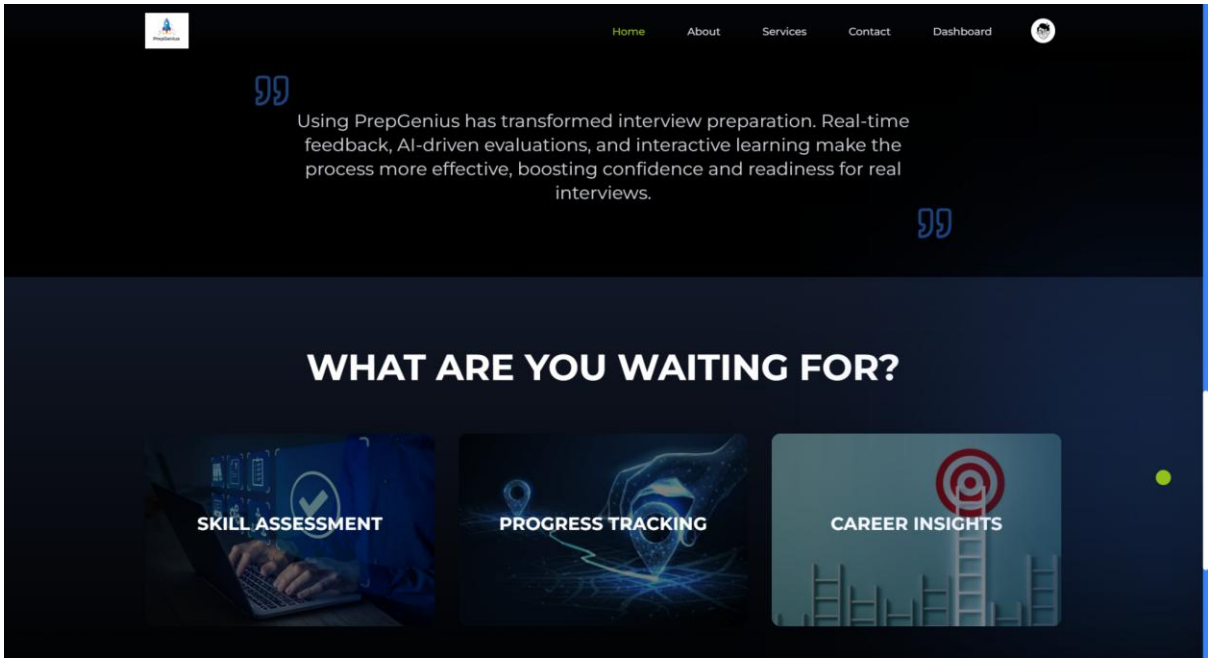
The integration phase binds the frontend, backend, and AI modules into a seamless, real-time web application. Communication between Node.js and Python scripts is established through RESTful APIs and JSON data exchange. MongoDB is used for persistent storage of user profiles, course progress, and placement data. Real-time updates such as event notifications are implemented using sockets or polling mechanisms

# RESULT SCREENS

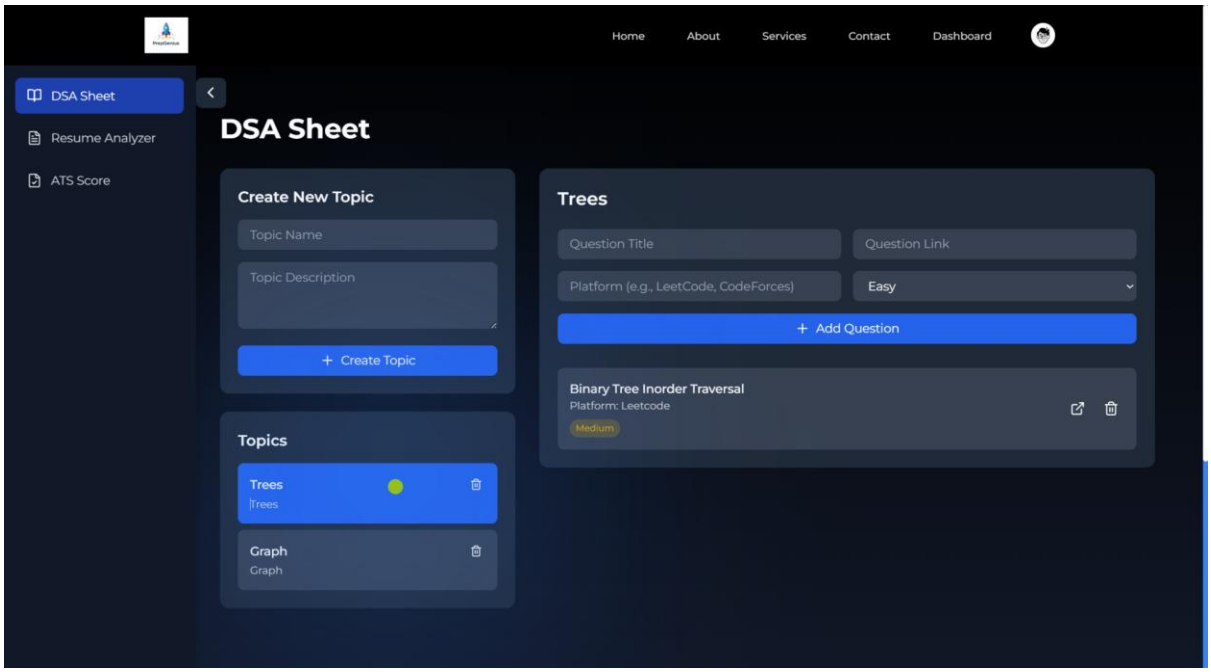

*1 landing page*



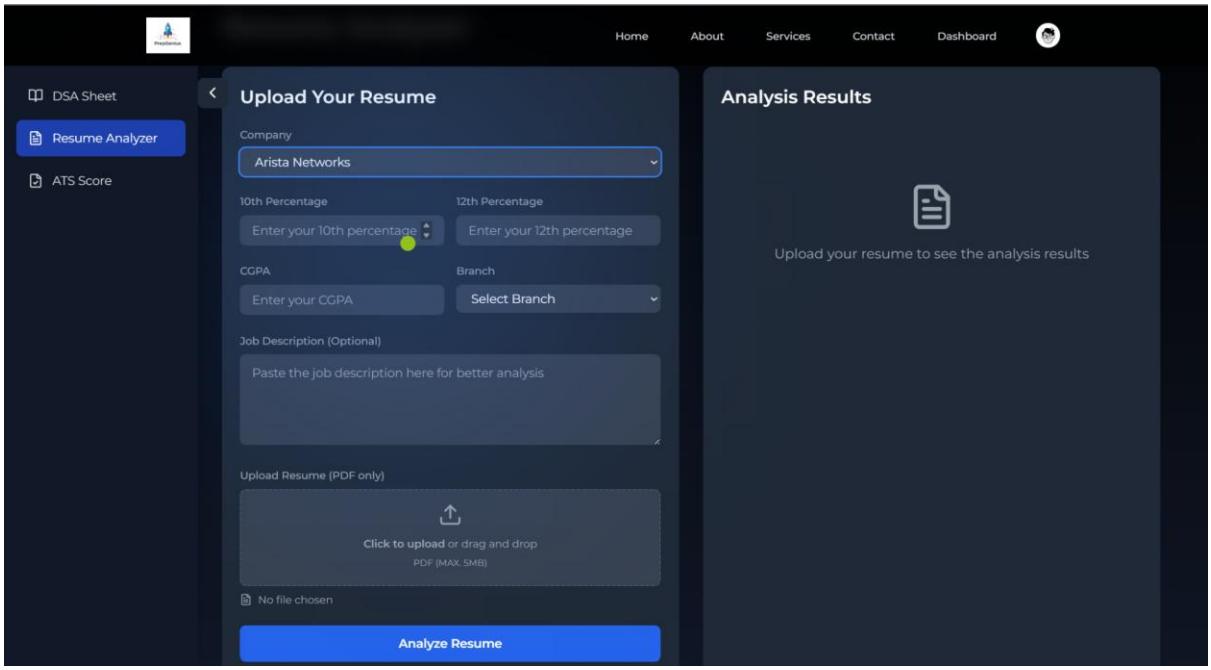

*2 UI/UX*



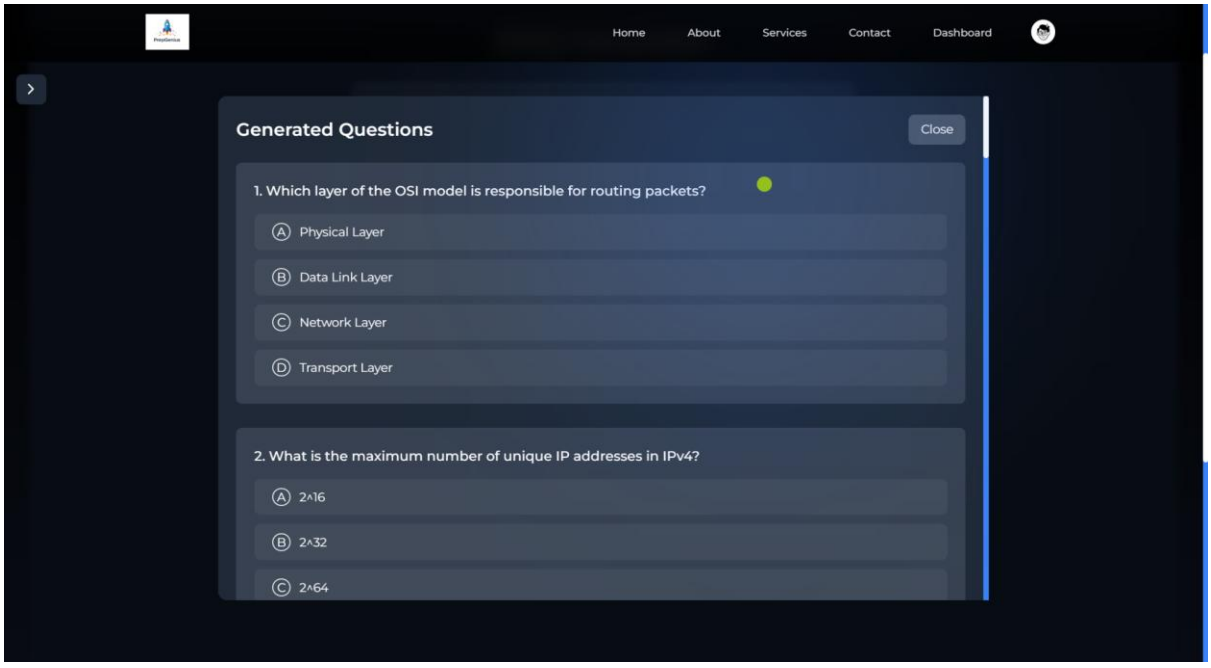

*3 Home page*




*4 DSA sheet*




*5 Resume related Functionalities*




*6 MCQ Questions*

# CONCLUSION

The *AI-Based Web Application for Placement Preparation* successfully bridges the gap between conventional placement preparation and the need for smart, personalized learning. By integrating Artificial Intelligence with modern web technologies, this platform offers students a comprehensive solution for technical, aptitude, and soft skill development. Features like AI-based interview simulations, dynamic MCQ generation, DSA progress tracking, and real-time resume analysis ensure students are well-prepared and confident to face placement challenges.

This project not only enhances individual learning but also demonstrates the potential of AI in education. It paves the way for scalable, data-driven academic tools that can adapt to learners' needs. Moving forward, the application can be expanded with more advanced AI modules and company-specific training paths to further boost its impact and usability.

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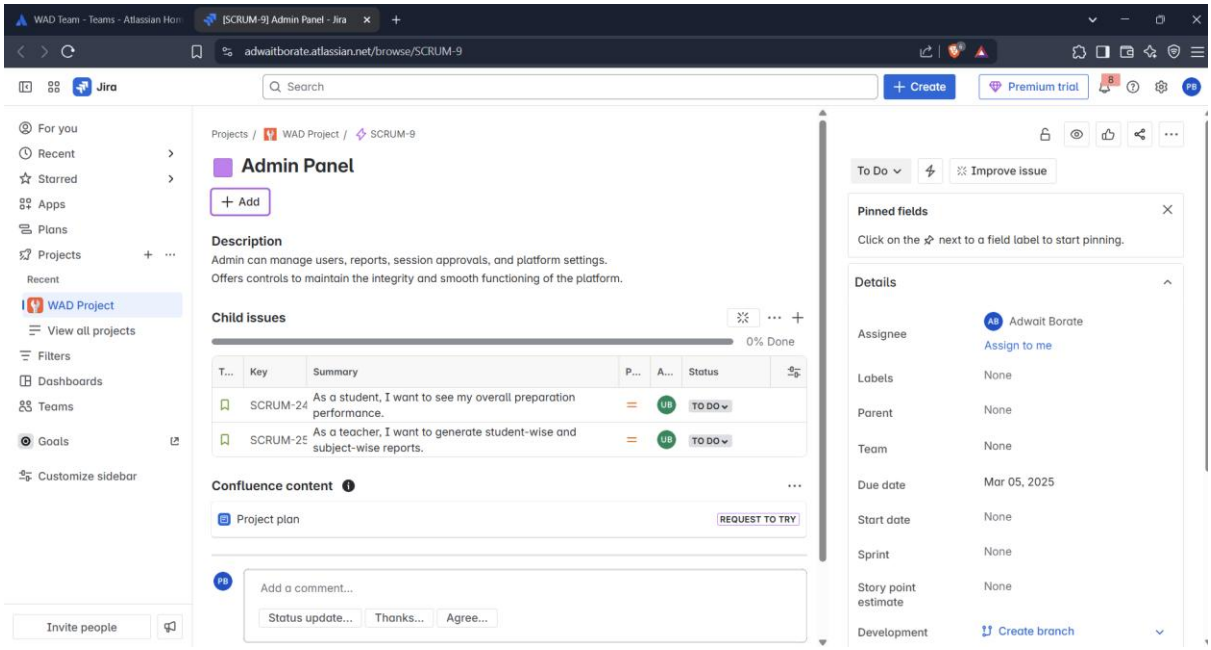
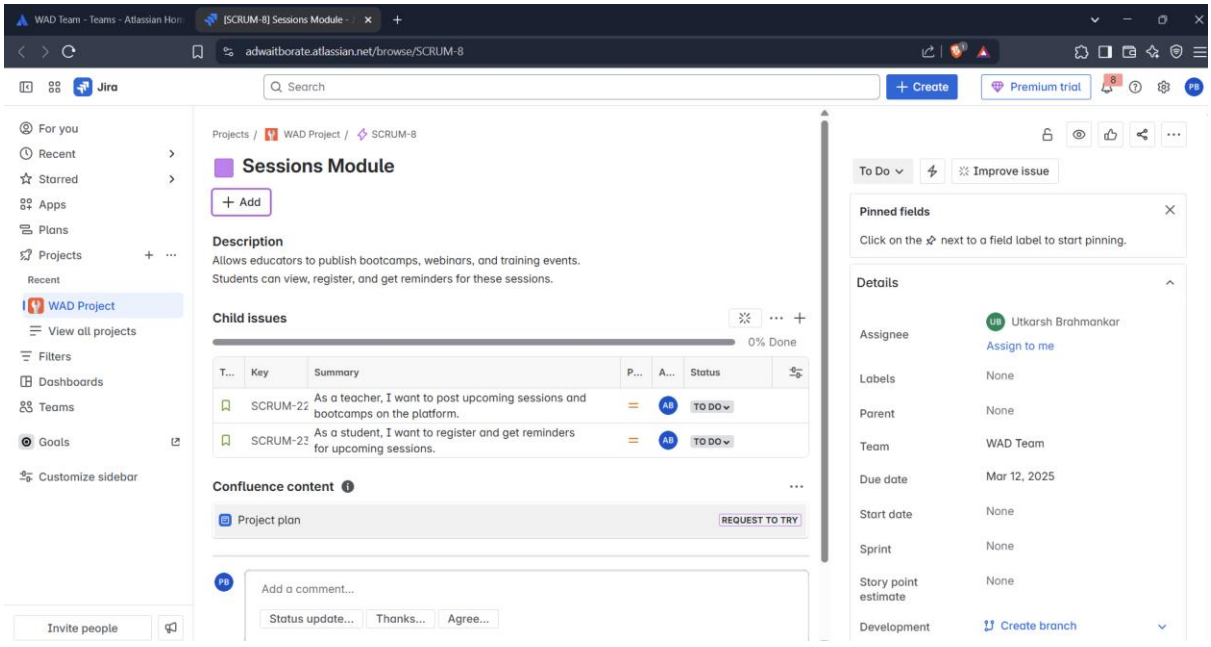
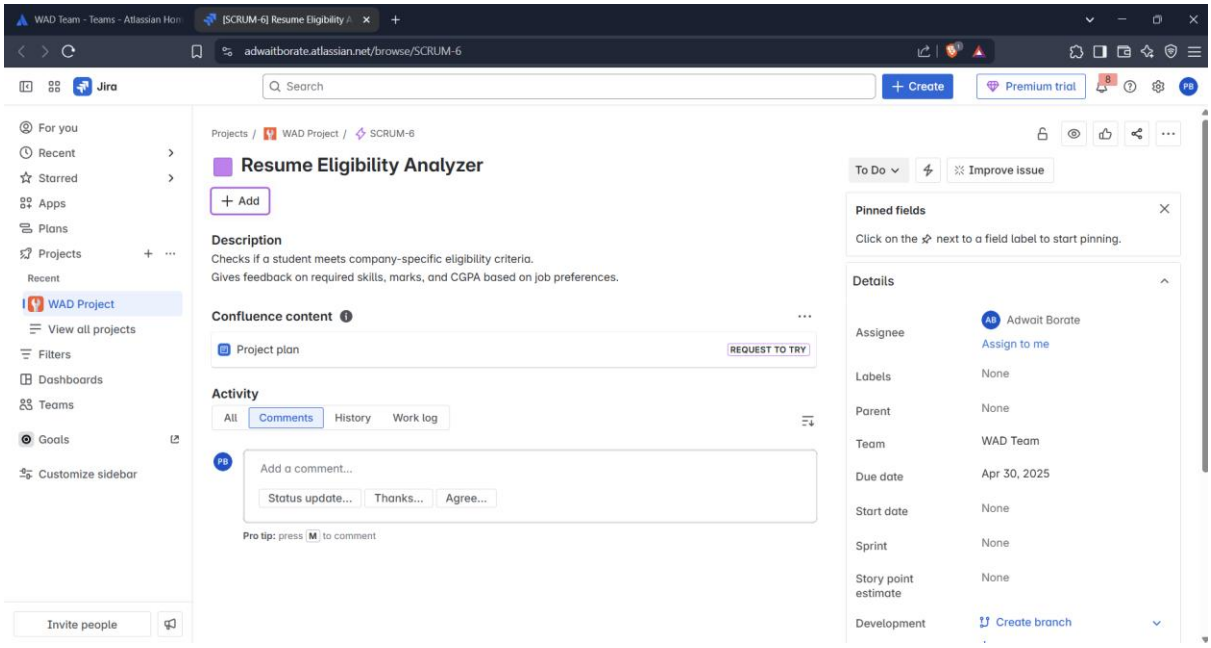
# JIRA SCREENS



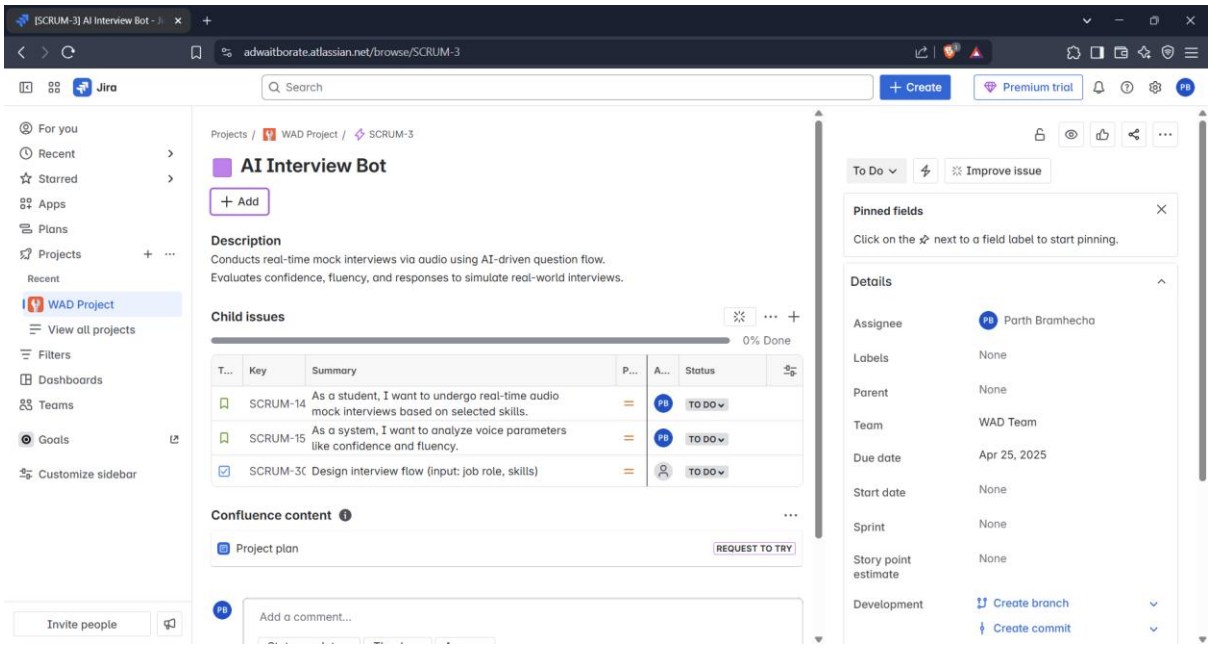

*7 Admin panel*



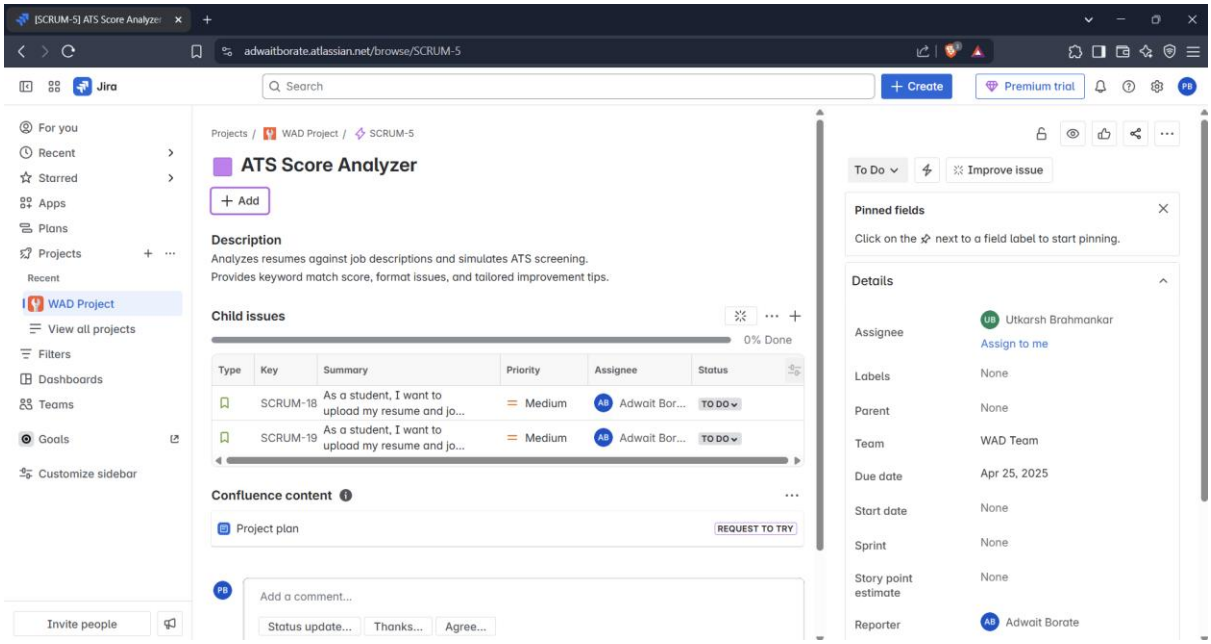

*8 Sessions Module*



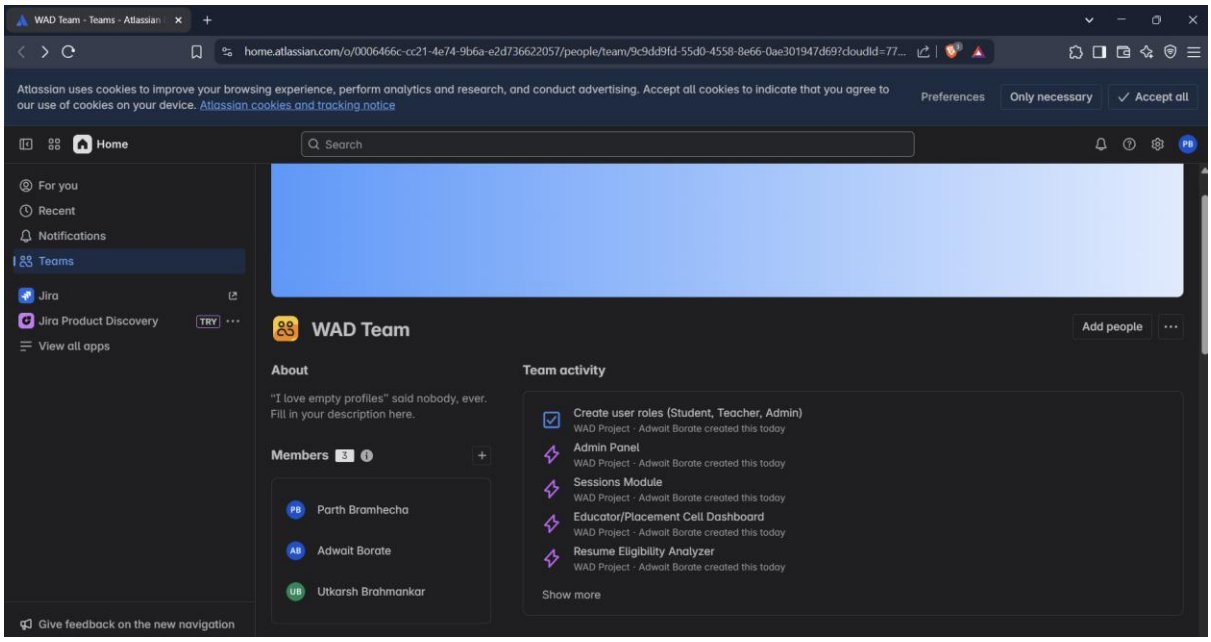

*9 Resume Analyzer*




*10 Interview bot*




*11 ATS score*




*12 Jira team board*