Industry Project Report on Integrated Learning Journey: From Discovery to Advanced Application Development

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Submitted to

Faculty of Engineering and Technology

Institute of Computer Technology

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CERTIFICATE

This is to certify that the **Industry** Project & Task work by Meet Prajapati (Enrolment No.20162121010) of Ganpat University, towards the partial fulfillment of requirements of the degree of Bachelor of Technology – Computer Science and Engineering, carried out by them in the CSE(BDA) Department. The results/findings contained in this Project have not been submitted in part or full to any other University / Institute for award of any other Degree/Diploma.

Name & Signature of Internal Guide

Name & Signature of Head

Place: ICT - GUNI

Date:

ACKNOWLEDGEMENT

Industry Internship project is a golden opportunity for learning and self-development. I consider myself very lucky and honored to have so many wonderful people lead me through in completion of this project. First and foremost, I would like to thank Dr. Rohit Patel, Principal, ICT, and Prof. Dharmesh Darji , Head, ICT who gave us an opportunity to undertake this project. My grateful thanks to Prof. Sonam Singh & Namrata Telgi, Shirley Sequeira (Internal & External Guides) for their guidance in project and Task work on **Django, FastAPI, ReactJS and Secuity**, who despite being extraordinarily busy with academics, took time out to hear, guide and keep us on the correct path. We do not know where would have been without his/her help. CSE department monitored our progress and arranged all facilities to make life easier. We choose this moment to acknowledge their contribution gratefully.

MEET PRAJAPATI (Enrollment No:20162121010)

ABSTRACT

This abstract outlines a comprehensive six-week program integrating cybersecurity and web development skills with a focus on optimizing the Viaje.ai product. Beginning with Weeks 1 and 2, participants deepen their understanding of the product and undergo knowledge assessments. Week 3 involves task allocation and codebase overview discussions. Weeks 4 and 5 concentrate on identifying and resolving bugs in the login page, enhancing security and functionality. Transitioning to cybersecurity, Weeks 7 and 8 delve into Vulnerability Assessment and Penetration Testing standards, followed by practical implementation. Weeks 9 to 12 are dedicated to advancing web development skills, mastering DataTables, SQL, NoSQL databases, Django, FastAPI, and ReactJS. Through this structured approach, participants develop a holistic skill set, optimize the product's security, and refine coding proficiency, ensuring robust cybersecurity practices and superior product functionality.

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WEEK 1: Discovery Phase

The first week marked the beginning of the development journey, focusing on the discovery phase to understand Viaje.ai comprehensively. Key activities included:

1. Thorough research on product and the travel industry landscape.
2. Delving into the features and modules of the product to gain insights.
3. Completion of assignments related to product calculations, setting the stage for further development.
4. Testing and research reports to identify potential challenges and opportunities.
5. Commencement of UI template building to visualize the product's interface.
6. Initial testing on a range of technologies including Django, HTML, CSS, Bootstrap, MongoDB, and MySQL to assess feasibility and compatibility.

Week 2: Evaluation Phase (Knowledge Test)

During the second week, the focused on evaluating knowledge and understanding, setting the groundwork for subsequent phases. Key highlights included:

1. Rigorous testing of queries related to MySQL and MongoDB databases, ensuring proficiency in database management.
2. Overview of web scraping techniques to gather relevant data.
3. Scripting for Scraping, enhancing data acquisition capabilities.
4. Guidelines and demonstration of wireframes for the login page, laying the foundation for UI design.

Week 3: Planning Phase (Codebase Assignation & Overview discussion)

Week three transitioned into the planning phase, where detailed discussions and assignments took place to streamline the development process. Key activities encompassed:

1. Installation of essential tools and technologies required for development.
2. Setting up servers on PCs to facilitate collaboration and testing.
3. Knowledge transfer sessions to ensure aligned with the codebase.
4. Configuration of servers with databases for seamless data management.
5. Bug resolution and UI enhancements, refining the product's foundation.
6. Documentation of design decisions for the product login page, guiding future development efforts.
7. Designing database models to establish a robust data structure for the application.
8. Building the login page UI according to wireframes, ensuring consistency and usability.

Week 4/5: Identification & Resolution Phase (Login Page & Bug Discussion, Bug Solving)

Weeks four and five were dedicated to identifying and resolving issues encountered during development, ensuring the product's stability and functionality. Key activities included:

1. Prompt identification and resolution of bugs to maintain progress momentum.
2. Development of APIs for the login page to enhance user authentication.
3. Conducting compatibility checks for MacOS and Windows platforms, ensuring a seamless user experience across devices.
4. Updating code as per evolving requirements to adapt to changing project needs.
5. Thorough unit testing for bugs to validate the integrity of the product.
6. Implementing quality assurance changes and deploying the product live

Week 6: Implementation Phase (Login page & feature implementation)

The final week focused on implementing the login page and integrating additional features to enhance the product's functionality. Key activities included:

1. Finalizing bug fixes to ensure a polished user experience.
2. Integrating all APIs into the login page to streamline user authentication processes.
3. Implementing wireframe changes and enhancements based on user feedback and evolving requirements.
4. Enhancing the overall site design to improve user engagement and satisfaction.
5. Mapping URLs to ensure seamless navigation within the application.
6. Leveraging JQuery/AJAX calls to enhance user interactions and responsiveness.

Week 7: Understanding Vulnerability Assessment and Penetration Testing Standards

Week 7 focuses on understanding Vulnerability Assessment and Penetration Testing (VAPT) standards, covering methodologies, tools, and best practices. Participants delve into password policy standards, login security, CAPTCHA functionality, and account lockout mechanisms to fortify system defenses against cyber threats.

1. Participants gain a comprehensive understanding of Vulnerability Assessment and Penetration Testing (VAPT) standards, focusing on foundational concepts.
2. Exploration of methodologies, tools, and best practices essential for effective VAPT procedures.
3. Detailed examination of password policy standards, emphasizing the importance of robust password management for security.
4. Analysis of login security measures, including techniques to secure authentication processes and prevent unauthorized access.
5. Implementation and significance of CAPTCHA functionality to enhance security by distinguishing between human users and bots.
6. Understanding the concept of account lockout and its role in preventing brute force attacks and unauthorized access attempts.

Week 8: Implementing Vulnerability Assessment and Penetration Testing Standards

Week 8 focuses on implementing vital security measures including password policies, login security protocols, CAPTCHA integration, account lockout mechanisms, and secure password reset functionalities to bolster system defenses against cyber threats.

1. Password Policy Implementation: Participants learn to establish and enforce robust password policies, emphasizing complexity, expiration, and uniqueness to enhance security posture.
2. Login Security Protocols: Understanding and implementation of secure login protocols, including multi-factor authentication and session management techniques, to prevent unauthorized access.
3. Captcha Integration: Integration of CAPTCHA functionality into login forms to deter automated attacks by distinguishing between human users and bots.
4. Account Lockout Mechanisms: Implementation of account lockout mechanisms after a specified number of failed login attempts, safeguarding against brute force attacks.
5. Reset Password Functionality: Implementing secure password reset functionalities, incorporating verification steps to ensure the legitimacy of password change requests and enhance user account security.

Week 9: Exploring DataTables, SQL, and NoSQL Databases

Week 9 focuses on database management, covering relational and NoSQL databases. Participants learn SQL for relational databases and explore NoSQL principles. Practical exercises involve DataTables for data organization, CRUD operations in SQL, and NoSQL database implementation, providing essential skills for effective data handling in web applications.

1. Relational Database Exploration: Participants delve into the fundamentals of relational databases, learning about SQL (Structured Query Language) for data manipulation and management.
2. NoSQL Database Understanding: Understanding the principles and applications of NoSQL databases, exploring various types such as document-based, key-value, and graph databases.
3. Data Modeling with DataTables: Practical application of DataTables for organizing, sorting, and filtering tabular data, essential for efficient data representation in web applications.
4. SQL Database Operations: Participants learn to perform CRUD (Create, Read, Update, Delete) operations in SQL databases, mastering techniques for data retrieval, modification, and deletion.
5. NoSQL Database Implementation: Exploration of NoSQL database operations, including document insertion, querying, and indexing, to handle unstructured data effectively in modern web applications.

Week 10: Mastering Django Framework

Weeks four and five were dedicated to identifying and resolving issues encountered during development, ensuring the product's stability and functionality. Key activities included:

1. Introduction to Django: Participants are introduced to the Django web framework, understanding its architecture and key components.
2. Model-View-Template (MVT) Pattern: Exploration of Django's MVT pattern, understanding the roles of models, views, and templates in web application development.
3. Database Integration: Integration of databases with Django using its built-in ORM (Object-Relational Mapping) for seamless data manipulation.
4. URL Routing and Views: Learning URL routing techniques and creating view functions to handle HTTP requests and generate dynamic responses.
5. Template Engine: Understanding Django's template engine for rendering HTML templates, facilitating the creation of dynamic web pages.
6. Admin Interface: Exploration of Django's admin interface for rapid development of administrative panels, simplifying data management tasks.
7. Security Features: Understanding Django's built-in security features, including CSRF protection, authentication, and authorization mechanisms, ensuring robust application security.
8. Deployment: Overview of deployment options for Django applications, including server setup, deployment strategies, and best practices for production environments.

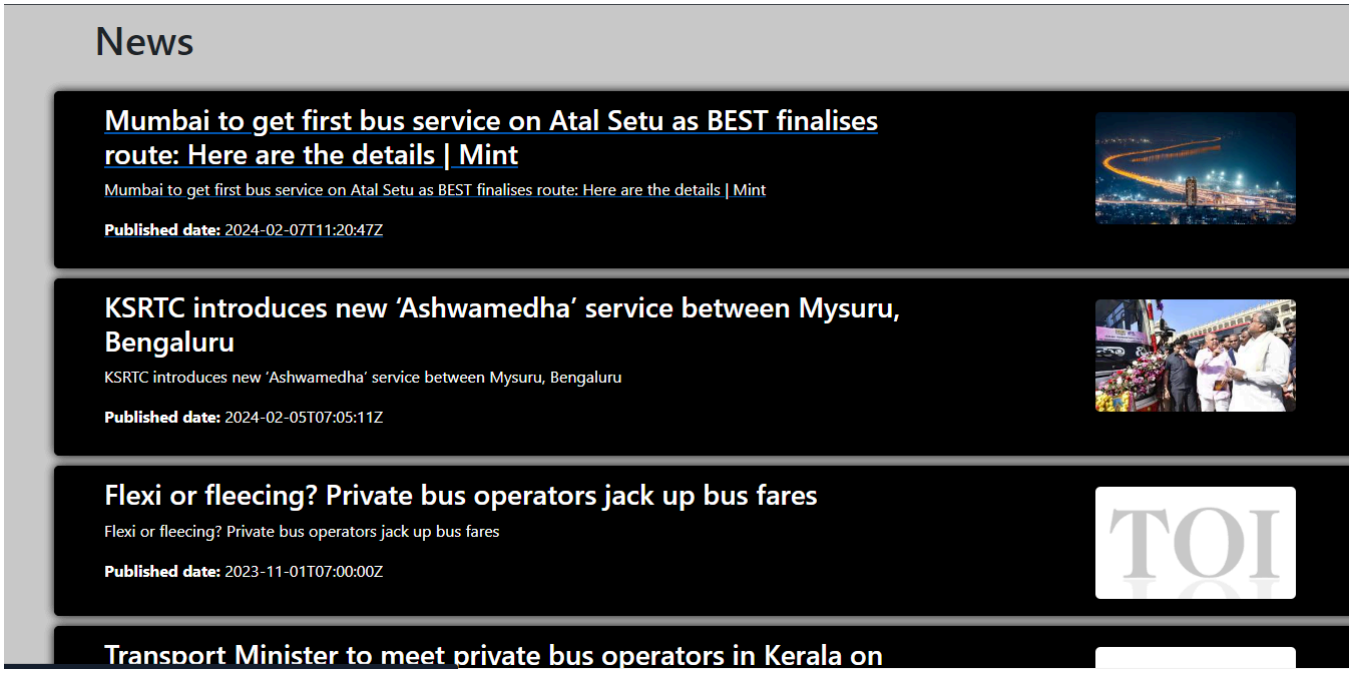
Week 11/12: Advanced Applications with FastAPI and ReactJS

The final week focused on implementing the login page and integrating additional features to enhance the product's functionality. Key activities included:

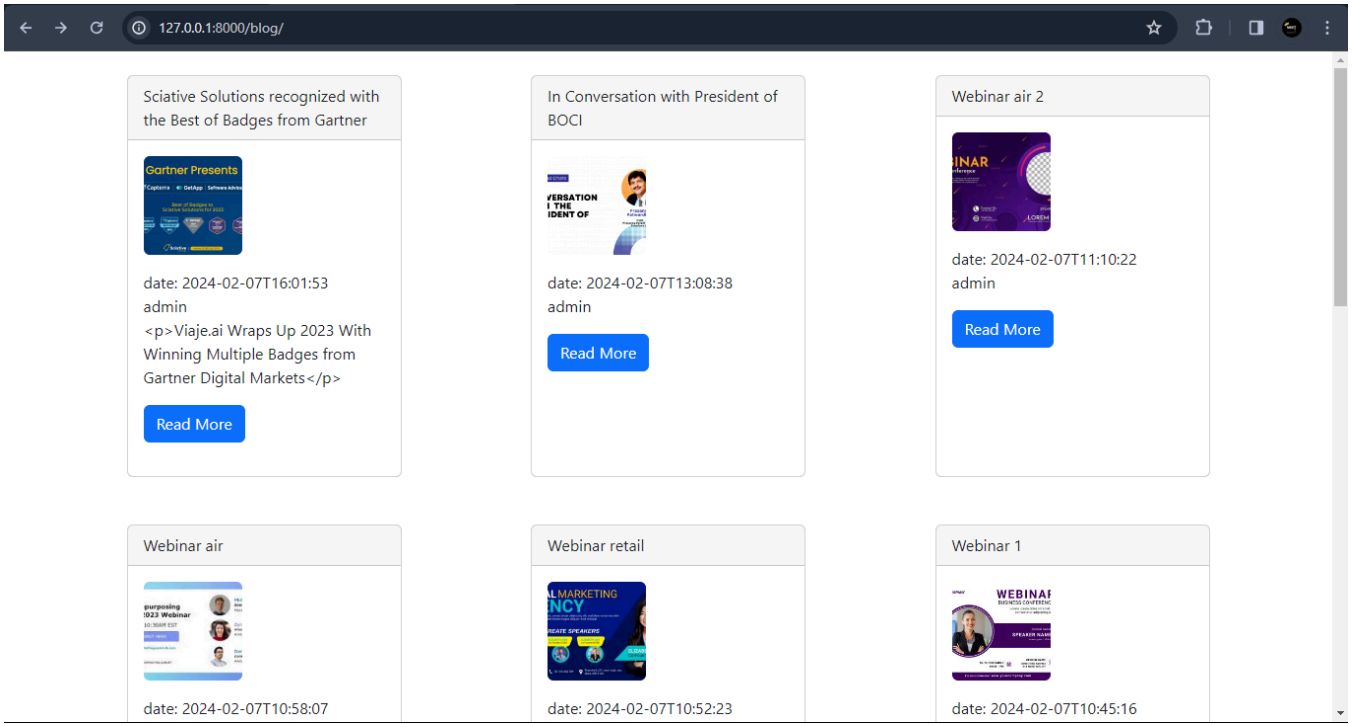
1. Building APIs with FastAPI: Understanding how to create RESTful APIs using FastAPI, including route definitions, request handling, and response generation.
2. Frontend Development with ReactJS: Introduction to ReactJS for building interactive and dynamic user interfaces, including components, state management, and event handling.
3. Integration of FastAPI and ReactJS: Exploring methods to integrate FastAPI backend with ReactJS frontend, enabling seamless communication and data exchange between the two layers.
4. Authentication and Authorization: Implementing authentication and authorization mechanisms in FastAPI backend and ReactJS frontend to secure access to resources and routes.
5. State-of-the-Art User Interfaces: Leveraging ReactJS libraries and frameworks to create modern user interfaces with responsive design, animations, and user-friendly interactions.
6. Asynchronous Programming: Understanding asynchronous programming concepts in both FastAPI and ReactJS to handle concurrent operations and improve application responsiveness.
7. Deployment and Hosting: Deployment strategies for FastAPI and ReactJS applications, including options for hosting backend APIs and frontend applications on cloud platforms or dedicated servers.

Screenshots:

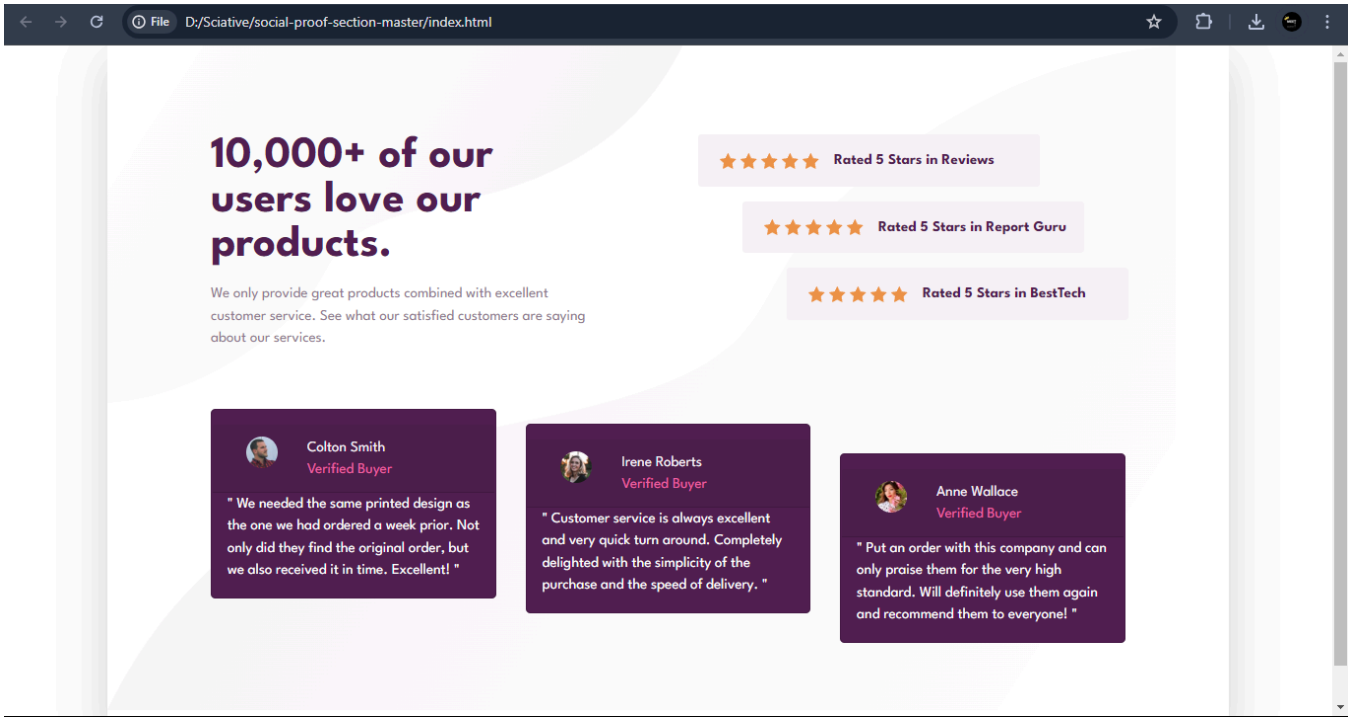
News Scrape API:



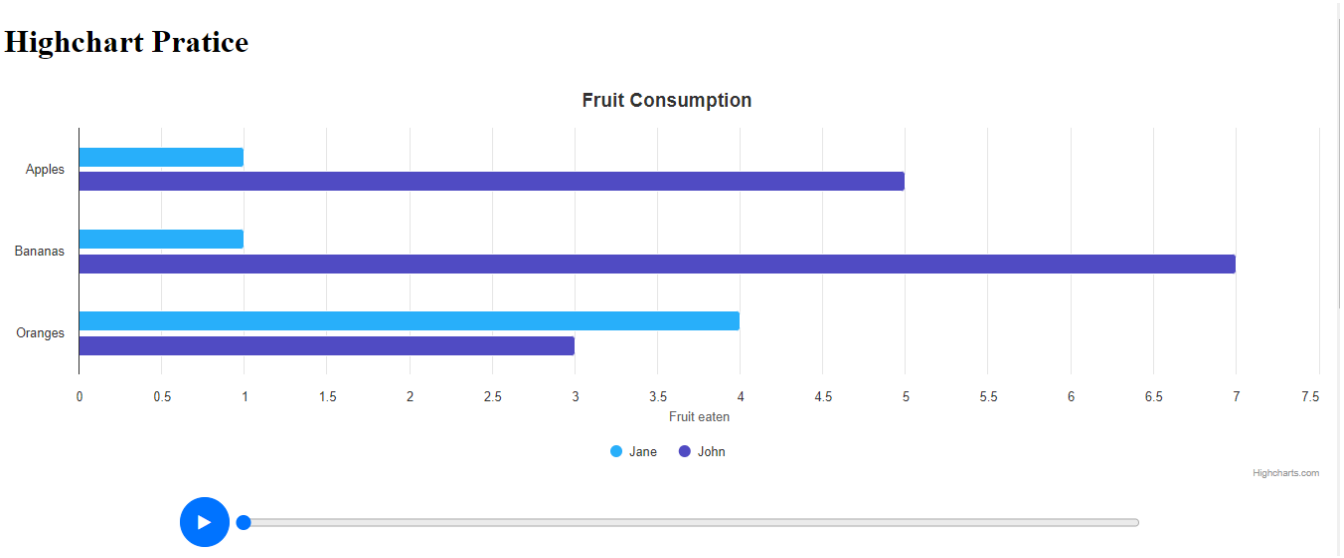
Wordpress api integration with Django



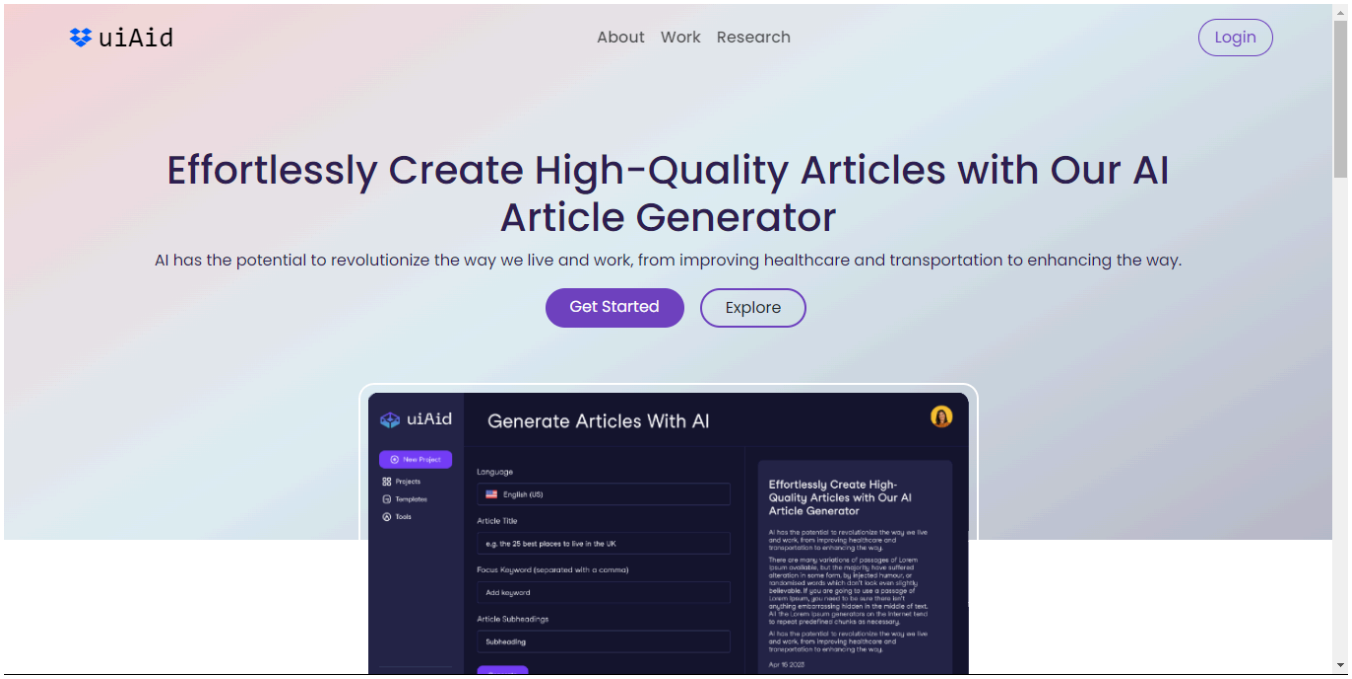
FRONTEND Challenge (bootstrap):



Highchart Pratice



Frontend: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Focus Keyword (separated with a comma)
Add keyword
Article Subheadings
Subheading
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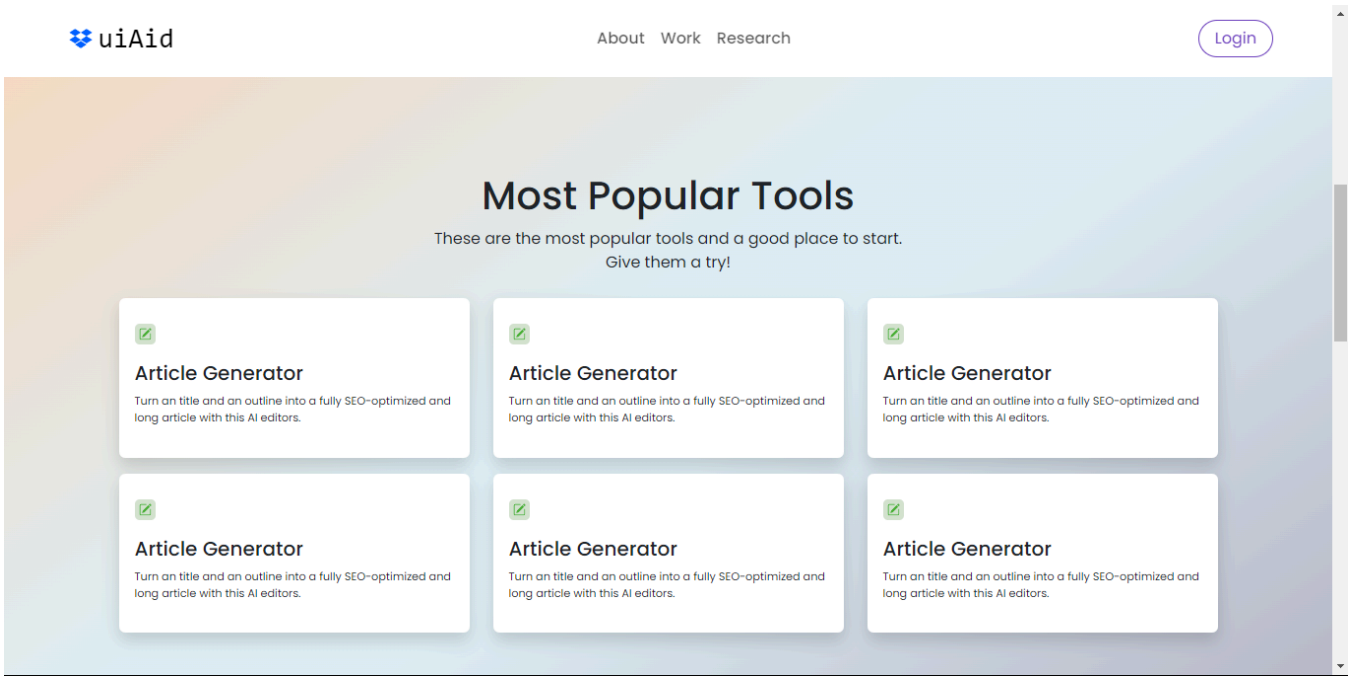
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CONCLUSION

In this multi-week program, participants embarked on an immersive journey through cybersecurity and web development realms. Initially, they delved into Vulnerability Assessment and Penetration Testing (VAPT) standards, understanding methodologies and practical implementations to fortify systems against cyber threats. This foundational knowledge extended to hands-on exercises covering password policies, login security, CAPTCHA integration, and account lockout mechanisms, fostering robust defense strategies.

Transitioning to web development, participants explored database management, mastering SQL and NoSQL databases for efficient data handling. They then ventured into web frameworks like Django, FastAPI, and ReactJS, where they honed skills in backend development, API creation, and frontend design. Throughout, emphasis was placed on integrating security measures seamlessly into application development processes.

By program's end, participants emerged equipped with a holistic skill set, capable of navigating cybersecurity challenges and building sophisticated web applications with confidence. They gained practical insights and hands-on experience essential for real-world scenarios, ensuring their readiness to tackle evolving cybersecurity threats and meet the demands of modern web development.