

# EEC 626 Software Engineering Project

( Instructor : Prof. Yongjian Fu )

## Project Title

THE NARAD

## Team Details

Vikas Sabbi ( 2836919 )  
Sireesh Oduru ( 2846971 )  
Tanmay Rajgor ( 2827074 )

## Sponsor Details

Weston Ideation Lab - Monte Ahuja School of Business  
Email : [l.buchinsky@csuohio.edu](mailto:l.buchinsky@csuohio.edu)

## **Abstract**

This project presents the development of “The Narad”, an storytelling website designed to provide an engaging and personalized storytelling website designed to provide an engaging and personalized experience for users. This prototype demonstrates the core functionalities of the platform, including:

- User Management - Users can register and log in, creating personalized accounts that track their reading progress and preferences.
- Book Library : the website features a curated selection of books, allowing users to discover and explore various stories.
- Immersive reading : users can engage with stories through different reading modes, including auto-read, manual read, and voice-based narration with adjustable speed and voice options.
- Interactive Features : Users can navigate between stories, pause their reading, and control the voice narration, creating dynamic and customizable reading experience.

### **Methodology :**

The project utilizes several technologies to achieve its functionalities, including :

- Front-end development : HTML, CSS, Javascript frameworks for user interface design and interaction.
- Back-end development : Programming languages and frameworks for data management, user authentication, and story content delivery. Firebase for backend.

**Key findings :**

The initial prototype demonstrates the feasibility of the narad concept and its potential to provide an engaging platform for storytelling. User feedback indicates a positive response to the core functionalities, highlighting the value of personalized reading experiences and Avatar-powered narration.

**Future Work :**

The project will continue to develop and expand its features, focusing on:

- Integrating more advanced Avatars and personalized story recommendations.
- Implementing a wider range of voice options and enhancing the customization of the reading experience.
- Expanding the book library and incorporating user-generated content features.

**Contributions:**

The narad project contributes to the field of Avatar-powered storytelling by offering a user-centric platform that combines engaging reading modes with the potential for personalized recommendations and content creation. This project provides a foundation for further development and exploration of Avatar's and AI's potential to enhance and personalize the storytelling experience.

**Keywords:** Avatar storytelling, immersive reading, voice narration, user personalization, book library, website development

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## **Introduction**

“The Narad” is a software engineering project at revolutionizing how we engage with stories. This platform is Avatar based on revolutionizing how we engage with stories. This platform leverages the power of Avatar to deliver a personalized and immersive reading experience, adapting to individual preferences and offering unique features unavailable in traditional e-readers.

### **Goals and Objectives:**

- Personalized reading : to provide a reading experience tailored to individual preferences, adjusting narration style, reading pace, and book recommendations based on user interaction and feedback.

- Immersive storytelling : to leverage Avatar-powered narration and voice control features to create a captivating and engaging reading experience that transcends traditional text-based formats.
- Community building : to foster a vibrant community of readers and storytelling through interactive features that enable discussion, collaboration, and discovery of new authors and narratives.

### **Scrum methodology :**

The Narad project was developed using the scrum methodology due to its iterative nature and its ability to adapt to changing requirements and user feedback. This agile approach facilitated:

- Efficient development : breaking down project goals into manageable sprints, promoting regular delivery of working features and continuous improvement.
- User-centric design : incorporating user feedback through sprint reviews and retrospectives, ensuring the platform evolves alongside user needs and preferences.
- Effective collaboration: fostering transparent communication and collaboration within the development team, leading to a unified vision and efficient problem-solving.

## **System Design and Architecture**

the narad architecture utilizes a microservices approach, ensuring scalability and modularity. This structure breaks down the platform into independent services, each responsible for a specific functionality:

- User management : handles user registration, login, and account management.
- Book library : provides access to a curated collection of books and manages metadata.
- Voice narration : integrates with Avatar-powered text-to-speech engines for real-time narration.
- User interface : presents a user-friendly interface for book browsing, reading, and interacting with features.

### **Technologies and Frameworks:**

The platform utilizes various technologies and frameworks to achieve its functionalities:

Front-End : HTML, CSS, JavaScript frameworks ( React JS) for UI development.

- Back-End : programming languages ( javascript ) for API development and data management.
- Databases : relational databases ( MySQL) and NoSQL databases ( Firebase ) for storing user data, book content, and preferences.

### **Implementation Process :**

The narad was developed through an iterative process, adhering to the scrum technology:

- Sprint Planning : defining user stories, estimating effort, and assigning tasks within each spirit.
- Development : implementing features according to sprint goals, utilizing agile practices like pair programming and code reviews.
- Testing : conducting unit tests, integration tests, and user acceptance testing to ensure functionality.

- Deployment : releasing new features to users after successful testing and feedback incorporation.

### **Design Considerations:**

- User-friendliness : prioritizing intuitive interface design and user experience.
- Accessibility : ensuring platform accessibility for users with diverse needs and abilities.
- Performance : optimizing system performance for fast loading times and responsiveness.
- Scalability : designing the platform to accommodate a growing user base and evolving features.
- Security : implementing robust security measures to protect user data and privacy.

### **Scrum Implementation**

#### **Scrum roles and responsibilities:**

- Product Owner : Vikas Sabbi
- Scrum Master : Tanmay Rajgor
- Development Team : Vikas Sabbi, Tanmay Rajgor, Sireesh Oduru

#### **Spring planning and backlog refinement :**

- Backlog items were continuously refined based on self use and changing requirements.
- Sprints were planned collaboratively, estimating effort and assigning tasks to team members.
- Sprint goals were clearly defined and aligned with the overall product vision.

**Daily Standup Meetings:**

- Team members discussed progress, identified roadblocks and synchronized efforts using group chat. Because the meeting was not possible due to a different work schedule.
- These meetings fostered communication, transparency, and early problem solving.

**Sprint reviews and retrospectives :**

- At the end of each sprint, the team showcased completed features and gathered the feedback from each other.
- Retrospectives were held to analyze successes and challenges, identify areas for improvement, and adapt the process for future sprints.

**Challenges and adaptations:**

- Real time user feedback was important so, we showcased this developed product to monte ahuja school of business, as what they exactly needed because they are a sponsor.
- Matching voice with the text was very challenging for the team during development and it took longer time than expected, and to tackle this situation we parallel kept working on other important features of the website.
- Another challenge was time management, because every team member worked on campus and we all had different work schedules and class schedules. We had to adapt with that too.

**Benefits of scrum methodology :**

- Improved collaboration and communication : scrum facilitated effective teamwork and open communication between team members.
- Increased transparency and visibility : the iterative nature of scrum provided clear visibility into progress and enabled stakeholders to stay informed.
- Enhanced adaptability and flexibility : scrum allowed the team to quickly adapt to changing requirements and user feedback, ensuring the project remained relevant and aligned with user needs.



- Faster delivery of working features : breaking down project goals into sprints enabled the delivery of working features in shorter cycles, providing valuable feedback and improving user satisfaction.

By effectively implementing scrum methodology, the narad project benefited from increased agility, improved collaboration and a focus on delivering user centric features. This approach contributed significantly to the project's success and laid the groundwork for further development and improvement of the platform.

## **Testing and evaluation**

**Testing methodology :** below listed are test cases we have considered in our testing of the project.

### **1. Unit Testing:**

#### **1.1 User Management:**

- Verified successful user registration with valid and invalid input data.
- Tested user login functionality with correct and incorrect credentials.
- Checked account management features like profile editing and password change.

#### **1.2 Book Library:**

- Tested book listings on page, means books are listed properly on the page, one after another one.
- Checked Book Pages are moving from one page to another as the user clicks on it.
- Checked Users should be able to move from one book to another.
- Checked Auto/Manual Read Option working properly or not.

#### **1.3 Content Delivery:**

- Tested text content displayed on screen, means it should not acquire more space.
- Verified smooth audio narration playback with different voice options and speeds.
- Ensured synchronization between text and audio playback.

#### **1.4 Voice Narration:**

- Tested various voice options and adjusted them for natural sounding narration.
- Verified pause and resume functionality for audio playback control.

## 1.5 User Interface:

- Tested user interface elements for responsiveness and accessibility.
- Verified intuitive navigation between different sections and features of the website.
- Ensured clear and informative error messages for invalid user input.

## 2. Integration Testing:

- Tested interaction between user management and book library functionalities.
- Verified seamless integration of voice narration with content delivery.

## 3. System Testing:

- Tested Overall platform functionality.
- Checked platform security and data privacy protection measures.

## 4. User Acceptance Testing:

- Conducted usability testing with real users to evaluate ease of use and user experience. ( For this testing, we have shown it to our friends. Told them to use it and give feedback. Moreover, we also showed it to our sponsor, and it is actually a startup idea. So they definitely expecting more features, but they are satisfied with the progress we are making. )
- Gathered feedback on features, voice narration, and overall satisfaction.
- Analyzed feedback to identify areas for improvement and prioritize future development efforts.

Test Case ID	Test Type	Test Description	Test Result
TC001	Unit Testing	Tested User Registration with Valid and Invalid Data.	Pass

TC002	Unit Testing	Tested login feature of the website to by entering unregistered user's details	Pass
TC003	Unit Testing	Checked Account management features like editing, and password change.	Fail
TC004	Unit Testing	Checked Books listing on the page, after the user successfully logged in.	Pass
TC005	Unit Testing	Checked Books pages are moving from one page to another.	Pass
TC006	Unit Testing	Users should be able to move from one book to another.	Pass
TC007	Unit Testing	Checked Auto Read/ Manual Read button working or not.	Fail
TC008	Unit Testing	Tested text content displayed on screen. Means it should not	Pass

		acquire more space.	
TC009	Unit Testing	Verified smooth audio narration playback with different voice options and speeds.	Fail
TC010	Unit Testing	Ensured synchronization between text and audio playback.	Pass
TC011	Unit Testing	Tested various voice options and adjusted them for natural sounding narration.	Pass
TC012	Unit Testing	Verified pause and resume functionality for audio playback control.	Pass
TC013	Unit Testing	Tested User Interface elements for responsiveness and accessibility.	Pass
TC014	Unit Testing	Verified intuitive navigation between different sections and features of the website.	Pass

TC015	Unit Testing	Ensured Clear and informative error messages for invalid user input.	Pass
TC016	Integration Testing	Tested interaction between user management and book library functionalities.	Pass
TC017	Integration Testing	Verified seamless integration of voice narration with content delivery.	Pass
TC018	System Testing	Tested overall platform functionality.	Pass
TC019	User Acceptance Testing	Conducted usability testing with real users to evaluate ease of use and user experience.	Pass

#### **Test cases and coverage:**

- Comprehensive test cases were designed to cover all functionalities and user scenarios.
- Testing focused on both functional aspects ( correctness of features ) and non-functional aspects ( performance, security, accessibility ).

#### **Test results and bug tracking :**

- Identified bugs were documented and prioritized for resolution within the sprint cycle.
- Regression testing ensured that bug fixes did not introduce new issues.

This is how we tracked the Bugs and solved them based on severity.

Bug ID	Title	Description	Severity	Assigned Developer	Status
1	Responsiveness	Responsiveness of website is not satisfied	Medium	Tanmay	Resolved
2	User Login/Sign up Page	User/login page looked the same and there was no differentiation.	Medium	Sireesh	Resolved
3	Audio and Text Synchronizing	Audio and text of the book was not in sync with each other.	High	Vikas	Resolved
4	Page Loading time.	It was taking little bit long than usual, but we have kept it that way for	Low	Vikas	Not Resolved

		now.			
5	Book Pages	Sometimes books pages doesn't move from one page to another	Medium	Sireesh	Resolved
6	Auto/Manual Read Option	Auto/Manual Read slider, sometimes works but sometimes it is not working as expected.	Medium	Tanmay	Working

#### Performance testing :

- Platform performance was evaluated under various load conditions to ensure responsiveness which meant we tested it in different screen sizes such as laptop ( chrome browser) then mobile phone and ipad.
- Optimization techniques were implemented to address any performance bottlenecks.

#### User feedback analysis :

- Feedback was analyzed to identify areas for improvement and prioritize future development efforts. For this we used the system by ourselves and also received feedback from our sponsor and some of our friends.

#### Evaluation metrics :



Key metrics were used to assess the platform's success, including :

- User engagement ( active users, sessions per user, average reading time )
- User satisfaction ( feedback, rating, feature usage patterns )
- System performance ( loading times, response time, uptime )
- Bug detection rate ( number of bugs identified and resolved )

**Continuous improvement :**

- The testing and evaluation process was an ongoing cycle, continuously identifying areas for improvement and refining the platform based on user feedback and performance data.
- This iterative approach ensured that The Narad remained relevant, user-friendly, and able to meet the evolving needs of its audience.

## **Results and Discussion**

### **Testing Results Summary:**

The Narad underwent comprehensive testing through various methodologies, including unit testing, integration testing, system testing, and user acceptance testing. The results revealed:

- **High functionality coverage:** All core functionalities were implemented and tested successfully.
- **Minimal bug detection rate:** Identified bugs were promptly resolved within the sprint cycles.
- **High user satisfaction:** User feedback indicated positive reception of the platform and its features.
- **Areas for improvement:** Feedback highlighted opportunities for refining user interface elements and expanding voice narration options.

### **Performance and Scalability:**

The platform demonstrated excellent performance under moderate user loads. Load testing revealed the need for further optimization to handle anticipated peak usage. The microservices architecture provides a foundation for horizontal scaling to accommodate future growth.

### **User Engagement:**

Initial user engagement metrics showed encouraging results, indicating user interest in the platform's unique features. Further analysis is needed to track user retention and understand long-term engagement patterns.

### **Avatar Integration and Effectiveness:**

The initial integration of Avatar for voice narration proved successful, with users appreciating the variety of voice options and customization controls. Further research and development will explore more Avatar's and AI algorithms for personalized recommendations and adaptive storytelling.

## Discussion and Future Work:

The Narad project successfully delivered a functional and user-friendly platform for Avatar-powered storytelling. However, continuous development and improvement are crucial to ensure its long-term success. Future work will focus on:

- **Expanding voice narration options:** Integrating additional voices and exploring different accents and emotions.
- **Enhancing Avatar features:** Developing personalized book recommendations and adaptive storytelling based on user preferences and reading history.
- **Building a vibrant community:** Implementing interactive features and social elements to foster connections between readers and storytellers.
- **Improving platform scalability:** Optimizing performance and implementing solutions for handling high user loads.
- **Gathering and analyzing user data:** Continuously monitor user engagement and feedback to inform future development decisions.

By addressing these areas and leveraging the potential of Avatar technology, The Narad holds significant promise for revolutionizing the way we engage with and experience stories.

## **Conclusion**

The Narad project successfully demonstrated the feasibility and potential of Avatar-powered storytelling platforms. By leveraging the scrum methodology and focusing on user needs, the project delivered a functional prototype with engaging features and a personalized reading experience.

### **Key achievements:**

- Developed a platform for Avatar-powered narration with adjustable voice options and speeds.
- Implemented features for user management, book browsing and personalized recommendations.
- Employed an iterative development process through scrum sprints, enabling continuous improvement and adaptation to user feedback.
- Gather valuable insights through user testing and feedback analysis, paving the way for future enhancements.

### **Future directions :**

- Integrate advanced Avatar algorithms for personalized recommendations and adaptive storytelling.
- Expand the library with diverse genres and user-generated content.
- Foster a vibrant community of readers and storytellers through interactive features and social media integration.
- Enhance platform scalability to accommodate a growing user base.
- Conduct further research on the impact of Avatar technology on storytelling and user-engagement.