**Software Requirements Specification Document**

|  | <JalaJeevanaKirthi, UG2\_Team3, CS23B054,8,11,12,14,16 >  Team Members: Anirudh, BhanuPrakash, Charan, Chitraksh, Dhyanam, Surya |
| --- | --- |

# Brief problem statement

Our interactive website offers a unique educational experience that immerses users in marine ecosystems and sustainable fishing. By taking on the roles of fishermen, scientists, or students, players explore various aquatic environments, face real-world challenges like overfishing, and learn about marine biodiversity. Users gain a deep understanding of their decisions's impact on the ocean by engaging in real-life scenarios or stories randomly generated by AI, quizzes, and real-time weather updates. Additionally, our platform aims to contribute to marine research by streamlining marine data collection about fish catch, myths, unsolved scientific issues, etc. We invite users to upload valuable information, such as datasets or blog posts, which can be converted into usable info for researchers to study and advance in their research.

# System requirements:

**System Requirements for Running/Using:**

* Internet Connection
* The System should be able to run on any platform with a browser installed.

**Technologies:**

* MERN Stack
* Vercel/Render for deployment
* Socket.io
* APIs

**System Requirements for Development:**

* i3 processor or higher.
* Basic graphic card
* RAM - 6GB or above

# Users profile:

# Marine Scientist/Researchers:

* Computer Skills: Proficiency in downloading and handling different types of files and writing blogs, so they need basic computer skills with knowledge of file types and prompting or using AI.
* Platform Usage: Primarily used for uploading datasets, accessing and analysing weather updates, contributing to blog posts, and interacting with the chatbot for scientific inquiries.
* Needs: A platform seamlessly integrates with existing scientific knowledge, provides a secure data storage and sharing environment and facilitates collaboration with other scientists and researchers.

### Fisherman(Note: We are not concerned with any country the domain of fishermen is global)

* Computer Skills: Moderate or low proficiency in basic computer knowledge is required. Needs to know how to open website on browser.
* Platform Usage: Primarily used for accessing weather updates, reading blog posts, and interacting with the chatbot for information on fishing conditions, then to access real-life scenarios, marine life, and pollution concerns.
* Needs: A user-friendly interface, clear and concise information, and features that support local languages and dialects.

### General Public

* Computer Skills: Varying levels of proficiency, ranging from basic to intermediate.
* Platform Usage: Primarily used for reading blog posts, interacting with the chatbot for general questions, and exploring the story generation feature.
* Needs: A visually appealing and engaging platform with accessible content tailored to different levels of understanding and interest.

# Feature requirements (user stories)

| No. | User Story Name | Description | Which Release |
| --- | --- | --- | --- |
|  | Enter the Website | Upon Entering the website :   * + Each person can experience our visually aesthetic website and look at all the available features.   + Each person can know about the motto of our website. | R1 |
|  | Game Initialization | Each person can start the game from the homepage and enter the interactive game to explore the world of fishing. Each player starts with a hook and a drop and pull option. | R2 |
|  | Drop the hook | When a player clicks the drop hook button, the hook slowly drops into the ocean, the hook can drop until it hits sea bottom. | R2 |
|  | Pull the hook | When a player clicks the pull hook button, the hook quickly comes up and catches a fish if it is in the path of the hook, or else returns empty. | R2 |
|  | Know the Fish | When a player catches a fish, the information about the fish’s origin,the fish’s cost in the market, its population and some info about it is displayed on a flash card then the fish is released, the user can ask more questions about this in the chatbot too! | R2 |
|  | User login | The users can click on the login button and enter the details for authentication, if their details are right then the system logs them in and makes them eligible for all the features accessible to logged in users only. | R1 |
|  | Tell the community(Blogging) | The users can share their experiences and knowledge about marine life, the ocean , its myths and mysteries with others on the platform through blogs, people can like their blogs and get ideas or be inspired by them. But for this the user has to login in into the system | R2 |
|  | Discuss with others | Every day the system will generate a topic for the users to discuss, the users like scientists, students or even fishermen. can discuss and put comments below the post, and have a good information exchange. For this too the user has to login into the system | R2 |
|  | Share important information | The system enables the users who have logged in as a scientist or researcher or students can share important information such as datasets, doc files, ppts etc with the community. The cool thing is anyone can download these files for free if they are logged in. | R1 |
|  | Weather Forecast | Our weather forecasting system provides real-time updates on wind speed and direction, helping fishermen navigate safely by avoiding the dangers of strong winds. The system also offers comprehensive information on wave height, wave period, swell direction, and overall sea state, ensuring that fishermen can make informed decisions about sea conditions. Additionally, it delivers critical alerts on extreme weather conditions, enabling timely responses to sudden environmental changes that could pose serious risks. | R1 |
| *11.* | Radio Forecast | Marine VHF radios with NOAA weather channels are capable of receiving weather information and alerts from the NOAA Weather Radio network. These radios typically have a specific channel or frequency range dedicated to receiving NOAA weather broadcasts. NOOA(National Oceanic and Atmospheric Adminstration) | R2 |
| *12.* | Chat with our AI | As a user interested in learning about marine life, I want access to a hovering button on the website that leads me to a chatbot page where I can ask questions and get insightful information about marine life. The chatbot will provide responses based on the content from the website's blogs (RAG), and verified scientists can add new data to continuously update and improve the chatbot’s knowledge base. | R1 |
| *13.* | Upgrading the ChatBot | As a user seeking a better learning experience about marine life, I want the chatbot to be contextually aware so that it can maintain the flow of conversation across multiple queries, improving the overall interaction and making it feel more natural and intuitive. | R2 |
| *14.* | Role Play Experience for Marine Learning | As a user looking for an engaging and immersive experience on the platform, I want to be able to step into the role of a fish, fisherman, or marine biologist and read an interactive from their point of view. The story will be generated using an LLM, making each narrative unique and informative. | R1 |
| *15.* | Audio Transcription for Story Role Play | As a user who enjoys audio content like podcasts, I want the generated story to be transcribed into an audio format, allowing me to listen to the narrative as I engage with the role-playing experience. This feature will make the interaction more entertaining and immersive. | R2 |

# Use case diagram

<https://drive.google.com/file/d/1CWWZWMd_GVnNuPLmceuNGke__bPxAw85/view?usp=sharing>

**Use case description**

| Use Case Number: | UC-01 |
| --- | --- |
| Use Case Name: | Enter the Website |
| Overview: | We can avail all features of our website and the motto of the website is displayed |
| Actors: | Common People,Marine Scientists/Researcher,FisherMen |
| Pre condition: | Availability of internet connection and device compatibility |
| Flow: | Main (success) Flow:   1. The system displays the homepage with various options. 2. The system displays detailed information and options related to the selected feature. 3. System displays the motto and alerts about disaster and weather. |
|  | Alternate Flow if not logged in:  2.1.The system informs the user of the features they can access as a guest.  2.2.The system updates the user's account status and allows access to all features.  2.3 The system retrieves and displays current weather conditions for the specified location. |
| Post Condition: | The user can interact with the selected features, such as playing games, reading blogs, chatting with the chatbot, or checking weather conditions. |

# 

| Use Case Number: | UC-02 |
| --- | --- |
| Use Case Name: | Game Initialization |
| Overview: | Each person can start the game from the homepage and enter the interactive game to explore the world of fishing. Each players starts with a hook and a drop and pull option. |
| Actors: | Common People |
| Pre condition: | The player must use a device that supports the game (PC, tablet, or smartphone) and has a compatible web browser and presence of internet connection. |
| Flow: | Main (success) Flow:   1. The system indicates whether there is a fish nibbling. If there is, the player can pull the hook. 2. The system loads the game environment and presents the player with an interactive fishing world. 3. The player starts with a basic hook and the option to drop and pull to catch fish. 4. The player clicks the "Drop Hook" option to cast their line into the water. |
|  | Alternate Flow:  2.1.The system informs the user of the features they can access as a guest.  2.2.The system updates the user's account status and allows access to all features.  2.3 The system retrieves and displays current weather conditions for the specified location. |
| Post Condition: | The player has the option to continue playing, explore other features, or exit the game. |

# 

| Use Case Number: | UC-03 |
| --- | --- |
| Use Case Name: | Drop the hook |
| Overview: | When a player clicks the drop hook button, the hook slowly drops into the ocean, the hook can drop until it hits sea bottom. |
| Actors: | Common People |
| Pre condition: | The player must have successfully entered the interactive fishing game. |
| Flow: | Main (success) Flow:   1. The player initiates the action by clicking the "Drop Hook" button on the user interface. 2. The system begins an animation sequence showing the hook slowly dropping into the ocean. 3. The hook continues to drop until it reaches the designated sea bottom depth, indicated by a visual cue or sound effect. |
|  | Alternate Flow :  2.1.If the player attempts to drop the hook in an area with obstacles (like rocks or plants), the system prevents the hook from dropping completely..  2.2The system provides feedback indicating the hook cannot drop due to the obstruction.  2.3 If a fish bites the moment the hook is dropped, the system triggers a reaction, prompting the player to pull the hook immediately. |
| Post Condition: | The system is now monitoring for fish bites, allowing the player to engage in other actions while waiting.. |

# 

# 

| Use Case Number: | UC-04 |
| --- | --- |
| Use Case Name: | Pull the hook |
| Overview: | When a player clicks the pull hook button, the hook quickly comes up and catches a fish if it is in the path of the hook, or else return empty. |
| Actors: | Common People |
| Pre condition: | The player must have previously dropped the hook into the ocean and it must be in position at the sea bottom. |
| Flow: | Main (success) Flow:   * The player initiates the action by clicking the "Pull Hook" button on the user interface * The system begins an animation sequence showing the hook slowly rising from the sea bottom to the surface. * If a fish has bitten, the system prepares to trigger a catch event. * If a fish was caught, the system displays a success message along with the type of fish. |
|  | Alternate Flow:  2.1.If a fish bites while the hook is rising, the system triggers a catch event.  2.2.If no fish interacted with the hook, the system confirms that the hook was pulled up without any catch. |
| Post Condition: | The hook is successfully retrieved from the ocean, either empty or with a caught fish.The player can choose to drop the hook again, explore other fishing spots, or exit the game. |

# 

# 

# 

# 

# 

# 

| Use Case Number: | UC-05 |
| --- | --- |
| Use Case Name: | Know the fish |
| Overview: | When a player catches a fish, the information about the fish’s origin,the fish’s cost in the market, its population and some info about it displayed on a flash card then the fish is released. |
| Actors: | Common People |
| Pre condition: | The player must have pulled the hook from the water and successfully caught a fish. |
| Flow: | Main (success) Flow:   * The system checks if a fish has been caught during the pull and retrieves relevant information about the fish. * If a fish was caught it tells all about the information about the fishes and even about the species. * The player receives visual and audio feedback celebrating the catch, enhancing the sense of accomplishment. * The player can choose to acknowledge the information and either proceed to the next action or view additional details about the fish in their inventory. |
|  | Alternate Flow:  2.1.If no fish was caught, the system displays a message indicating that the hook was pulled up empty.  2.2.The player can then choose to drop the hook again or explore other fishing spots. |
| Post Condition: | The player receives complete information about the caught fish, enriching the knowledge of the people and making it more fun by the usage of the game. |

# 

| Use Case Number: | UC-06 |
| --- | --- |
| Use Case Name: | User Login |
| Overview: | When users click on the login button, they are prompted to enter their login credentials. If the credentials are correct, the system grants access, allowing users to utilize all features available to logged-in users. If users enter incorrect details, they are asked to re-enter them correctly. If the user does not have an account, they are directed to sign up, create a new account, and then return to the homepage. Users can also initiate the password recovery process if they forget their login details. |
| Actors: | User |
| Pre condition: | User should have a compatible web browser and presence of internet connection. The user is on the login page of the system. |
| Flow: | Main (success) Flow:   1. The user clicks on the Login button. 2. The system prompts the user to enter their login credentials (username and password). 3. The user submits the login details. 4. The system validates the credentials:  * If the credentials are correct, the system logs the user in. * The system redirects the user to the homepage, granting logged-in users access to all features.   5)The system displays the user’s profile information on the homepage. |
|  | Alternate Flow 1: User doesn’t have an account: 2.1. The system prompts the user to enter credentials.  2.2. The user clicks on the Sign Up link instead of logging in.  2.3. The system redirects the user to the Sign Up page.  2.4. The user creates a new account by providing necessary details.  2.5. Upon successful sign-up, the system logs the user in automatically and redirects them to the homepage  2.6. Go to Step 5 of the Main Flow. Alternate Flow 2: Incorrect login details: 3.1. The system detects incorrect username or password.  3.2. The system prompts the user with an error message: "Incorrect username or password. Please try again."  3.3. The user enters the correct credentials and resubmits.  3.4. Go to Step 4 of the Main Flow. Alternate Flow 3: Forgot Password: 2.1. The user clicks on the Forgot Password link.  2.2. The system asks the user to enter their registered email address.  2.3. The user submits the email address.  2.4. The system sends a password reset link to the email.  2.5. The user follows the link, resets the password, and returns to the login page.  2.6. The user logs in with the new password and is redirected to the homepage.  2.7. Go to Step 5 of the Main Flow. |
| Post Condition: | If the login is successful, the user is redirected to the homepage, and their profile is displayed.  If the user signs up, a new account is created, and the user is logged in.  If the user forgets the password and resets it, they can log in with the new password. |
|  |  |

| Use Case Number: | UC-07 |
| --- | --- |
| Use Case Name: | Tell the Community (Blogging) |
| Overview: | The system allows users to share their experiences and knowledge about marine life, the ocean, and its myths and mysteries with the community through blog posts. Other logged-in users can read, like, and get inspiration from these blogs. However, users must be logged in to post blogs or interact with others' posts (e.g., liking blogs). |
| Actors: | Common People,Marine Scientists/Researcher,FisherMen |
| Pre condition: | The user must be logged into the system to create or interact with blog posts. |
| Flow: | Main (success) Flow:   1. The user logs into the system and navigates to the Blogging section. 2. The system displays the option to create a new blog post. 3. The user clicks on Create New Blog. 4. The system prompts the user to enter the blog title, content, and relevant tags. 5. The user submits the blog for review. 6. The system validates and stores the blog post in the database. 7. The blog is published and made visible to other logged-in users on the platform. 8. Other users can read, like, and interact with the blog post. 9. The system notifies the blog author about any likes or feedback received from the community. |
|  | Alternate Flow 1: User Not Logged In: 1.1. The user tries to create a blog post without being logged in.  1.2. The system redirects the user to the Login page.  1.3. The user logs in and is redirected back to the blogging section.  1.4. Go to Step 2 of the Main Flow Alternate Flow 2: Incomplete Blog Submission: 5.1. The user submits a blog post without completing required fields (e.g., missing title or content).  5.2. The system prompts the user with an error message: "Please fill in all required fields (title, content)."  5.3. The user completes the necessary fields and resubmits the blog.  5.4. Go to Step 6 of the Main Flow. |
| Post Condition: | The blog is successfully published and visible to the community.  Logged-in users can read, like, and interact with the blog, and the blog author can view the engagement metrics (likes, comments). |

# 

| Use Case Number: | UC-08 |
| --- | --- |
| Use Case Name: | Discuss with Others(Group chat) |
| Overview: | The system generates a new discussion topic daily, allowing logged-in users, such as scientists, students, and fishermen, to engage in discussions by posting comments below the topic. This enables information exchange and idea sharing within the community. Users must be logged in to participate in discussions. |
| Actors: | Common People,Marine Scientists/Researcher,FisherMen |
| Pre condition: | Availability of internet connection and device compatibility  The user must be logged into the system to view, comment, and participate in discussions.  The system generates a daily discussion topic. |
| Flow: | Main (success) Flow:   1. The user logs into the system and navigates to the Discussion Forum. 2. The system displays the daily generated topic for discussion. 3. The user reads the topic and clicks on the Comment button to participate. 4. The system prompts the user to enter a comment or reply. 5. The user submits the comment. 6. The system validates the comment and stores it in the database. 7. The comment is published below the discussion topic, visible to other users. 8. Other logged-in users can view, reply to, and like the comments, facilitating information exchange. |
|  | Alternate Flow 1: User Not Logged In:1.1. The user tries commenting on the discussion without logging in.1.2. The system redirects the user to the Login page.1.3. The user logs in and is redirected back to the discussion topic.1.4. Go to Step 3 of the Main Flow. |
| Post Condition: | The user’s comment is posted and visible to other community members.  Other users can like or reply to the comment, exchange of ideas. |

# 

| Use Case Number: | UC-09 |
| --- | --- |
| Use Case Name: | Share Important Information |
| Overview: | The system allows logged-in users, including scientists, researchers, and students, to share important information such as datasets, document files, and presentations (PPTs) with the community. The shared files can be accessed and downloaded for free by other logged-in users. |
| Actors: | Scientist , Researcher,Student ,Community Member . |
| Pre condition: | The user (Scientist, Researcher, or Student) is logged into the system.  The user has the necessary permission to upload and share files. |
| Flow: | Main (success) Flow:   1. The user (Scientist/Researcher/Student) navigates to the Share Information section. 2. The system prompts the user to upload a file (dataset, document, or presentation). 3. The user selects the file(s) and enters relevant details (e.g., file description, title, category). 4. The user submits the file for sharing. 5. The system validates the file upload and stores it in the database. 6. The system makes the file publicly available to other logged-in users for download. 7. The system confirms the file has been successfully shared and displays a success message to the user. |
|  | Alternate Flow 1: File Format Not Supported: 4.1. The user uploads a file in an unsupported format.  4.2. The system prompts the user with an error message: "Unsupported file format. Please upload a supported file type (e.g., PDF, DOC, PPT, CSV)."  4.3. The user selects a file with a valid format and resubmits.  4.4. Go to Step 5 of the Main Flow. Alternate Flow 2: No Internet Connection: 5.1. The system detects a connectivity issue during file upload.  5.2. The system prompts the user with an error message: "Network error. Please check your connection and try again."  5.3. The user waits for the connection to be restored and resubmits the file.  5.4. Go to Step 5 of the Main Flow. |
| Post Condition: | The uploaded file is now accessible to the entire logged-in community.  Other logged-in users can browse, search, and download the file for free.  . |

# 

| Use Case Number: | UC-10 |
| --- | --- |
| Use Case Name: | Weather Forecast |
| Overview: | This use case describes the process by which fishermen receive real-time weather updates, including wind speed, direction, wave height, period, swell direction, and extreme weather conditions. The system is designed to help fishermen make informed decisions, ensuring safer navigation and optimal fishing operations. |
| Actors: | Fishermen |
| Pre condition: | Fisherman should have access to the internet |
| Flow: | .Fishermen access the weather forecasting system.  The system retrieves real-time data on:   * Wind speed and direction * Wave height and period * Swell direction * Sea state * Extreme weather alerts   The system displays relevant weather information and alerts.  Fishermen use the information to decide on navigation routes and fishing operations.  Alerts are updated in real-time as weather conditions change. |
|  |  |
| Post Condition: | Fishermen are updated on current and upcoming weather conditions, enabling safe and informed decision-making.  Alerts are triggered in case of extreme weather, providing a warning to avoid dangerous conditions. |

# 

# 

| Use Case Number: | UC-11 |
| --- | --- |
| Use Case Name: | Radio |
| Overview: | Each person can start the game from the homepage and enter the interactive game to explore the world of fishing. Each players starts with a hook and a drop and pull option. |
| Actors: | Fishermen |
| Pre condition: | The fishermen have access to the app.  The app has an internet connection to stream NOAA Weather Radio channels.  NOAA radio channels are available for streaming. |
| Flow: | Fishermen access the "NOAA Radio" feature on the app.  The app connects to the live NOAA Weather Radio channel.  Fishermen listen to real-time weather alerts, forecasts, and emergency warnings.  The app provides the option to switch between different NOAA Radio channels based on the fishermen's location or preference.  Audio streaming continues as long as the fishermen remain connected to the internet. |
|  |  |
| Post Condition: | Fishermen receive continuous audio updates on weather conditions, ensuring they stay informed while at sea. |

# 

# 

| Use Case Number: | UC-12,13 |
| --- | --- |
| Use Case Name: | ChatBot |
| Overview: | Each person can start the game from the homepage and enter the interactive game to explore the world of fishing. Each players starts with a hook and a drop and pull option. |
| Actors: | Students <<Primary>> |
| Pre condition: | The player must use a device that supports the game (PC, tablet, or smartphone) and has a compatible web browser and presence of internet connection. The user has clicked the button that opens the chatBot. |
| Flow: | Main (success) Flow:  1. The system displays the chatbot interface on the homepage.  2. The system retrieves the relevant information using the RAG model. The data is the Blogs and the default data.  4. The chatbot displays the answer to the user.  5. The user can continue interacting with the chatbot by asking more questions. |
| Post Condition: | 1. The user receives an informative response to their question or an immersive role-based story.  2. The system updates its knowledge base based on the interaction and any new information added by verified scientists. |
|  |  |

# 

# 

| Use Case Number: | UC-14,15 |
| --- | --- |
| Use Case Name: | POV Story |
| Overview: | A user can engage in a point-of-view (POV) story where they assume the role of a fish, fisherman, or marine biologist. The story is dynamically generated using a LLM and can be presented in text and audio formats. This feature immerses users in a narrative experience that is both educational and entertaining. |
| Actors: | Any User <<Primary>> |
| Pre condition: | The player must use a device that supports the game (PC, tablet, or smartphone) and has a compatible web browser and presence of internet connection. |
| Flow: | Main (success) Flow:  1. The system displays a prompt for the user to choose a POV (fish, fisherman, or marine biologist).  2. The user selects their preferred role.  3. The system generates a story from the chosen POV using a LLM.  4. The system presents the story to the user in text format, with the option to listen to it via audio transcription.  5. The user reads or listens to the story and can choose to engage with additional stories by selecting another POV or replaying the current one. |
|  |  |
| Post Condition: | The user completes the story experience and can choose to replay the current story, select a different role, or exit the POV feature. |

# 

# 