

# **Flood Guard: Safeguarding Communities Against Flooding**

Community Service Project Report Submitted to the Faculty of Engineering of  
**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA, KAKINADA**

In partial fulfillment of the requirements for the award of the Degree of

**BACHELOR OF TECHNOLOGY**

**IN**

**INFORMATION TECHNOLOGY**



**By:**

K. Mounika

(22481A1288)

K. Geethika

(22481A1281)

M. Leela Devi

(23485A1213)

J. Love Kumar

(23485A1211)

Under the Supervision of

**Dr.D.N.V.S.L.S.INDIRA,** M.Tech.,Ph.D.

Professor&Head

DEPARTMENT OF INFORMATION TECHNOLOGY

**SESHADRI RAO GUDLAVALLERU ENGINEERING COLLEGE**

(An Autonomous Institute with Permanent Affiliation to JNTUK, Kakinada)

SESHADRIRAO KNOWLEDGE VILLAGE, GUDLAVALLERU – 521 356

ANDHRA PRADESH

2024-2025

# **Program Book**

## **For**

### **Community Service Project**



**Name of the Student :** Kolli Mounika

**Name of the College:** Seshadri Rao Gudlavalleru Engineering College

**Registration Number:** 22481A1288

**Period of CSP: From** 20-05-2024 **To** 29-06-2024 **And**  
**From** 15-07-2024 **To** 27-07-2024

**Name & Address of the Community/Habitation:**  
Gopu vanipalem, Machilipatnam, 521001.

# Community Service Project Report

*Submitted in accordance with the requirement for the degree of Bachelor of Technology*

**Name of the College:** Seshadri Rao Gudlavalleru Engineering College

**Department:** Information Technology

**Name of the Faculty Guide:** Dr.D.N.V.S.L.S.INDIRA, M.Tech., Ph.D.

**Duration of the CSP: From 20-05-2024 To 29-06-2024 And  
From 15-07-2024 To 27-07-2024**

**Name of the Student:** Kolli Mounika

**Programme of Study:** Bachelor of Technology

**Year of Study:** III B. Tech, I Sem

**Register Number:** 22481A1288

**Date of Submission:** 15-11-2024

## **Student's Declaration**

I , Kolli Mounika, a student of Community Service Program , Reg.No. 22481A1288 of the Department of Information Technology, Seshadri Rao Gudlavalleru Engineering College do hereby declare that I have completed the mandatory community service 20-05-2024 to 29-06-2024 and 15-07-2024 to 27-07-2024 in Gudlavalleru, Gudivada , Krishna district of Andhra Pradesh under the Faculty Guideship of **Dr.D.N.V.S.L.S.Indira**, Department of Information Technology in Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru.

(Signature and Date)

### **Endorsements**

Faculty Guide:

Master of Trainer(S):

Head of the Department:

Principle:

### **Certificate from Official of the Community**

This is to certify that Kolli Mounika Reg. No. 22481A1288 of Seshadri Rao Gudlalleru Engineering College underwent Community Service Project in Gopuvanipalem , Machilipatnam , Krishna district of Andhra Pradesh about Natural Disaster Management from 20-05-2024 to 29-06-2024 and 15-07-2024 to 27-07-2024. The overall performance of the community service volunteer during her community service is found to satisfactory.

Authorized Signatory with Date and Seal

## ACKNOWLEDGEMENTS

The satisfaction that accompanies the successful completion of any task would be incomplete without the mention of people who made it possible and whose constant guidance and encouragements crown all the efforts with success. We would like to express our deep sense of gratitude and sincere thanks to **Dr.D.N.V.S.L.S.Indira** Professor, Department of Information Technology for her constant guidance, super vision and motivation in completing the project work.

We feel elated to express our heartfelt gratitude and sincere thanks to **Dr.D.N.V.S.L.S.Indira**, Head of the Department, Information Technology for her encouragement all the way during analysis of the project.

We would like to thank **Sri.T.Balaji**, our Community Service Project Coordinator for his support and guidance throughout the project.

We would like to take this opportunity to thank our beloved principal **Dr. B. Karuna Kumar** for providing a great support for us in completing our project and giving us the opportunity for doing project. Our Special thanks to the faculty of our department and programmers of our computer lab. Finally, we thank our family members, non-teaching staff, attendants and our friends, who had directly or indirectly helped and supported us in completing our project in time.

### Project Associates:

K. Mounika(22481A1288)

M. Leela Devi(23485A1213)

K. Geethika(22481A1281)

J. Love Kumar(23485A1211)

# INDEX

<b>Contents</b>	<b>Page</b>
<b>Chapter 1:</b> Executive Summary .....	<b>1</b>
<b>Chapter 2:</b> Overview of the community .....	<b>3</b>
<b>Chapter 3:</b> Community Service Part .....	<b>5</b>
<b>Chapter 4:</b> Weekly Report .....	<b>6</b>
<b>Chapter 5:</b> Outcome Description .....	<b>22</b>
Questionnaire .....	<b>22</b>
Describe the problem you identified .....	<b>23</b>
Short-term and long-term action plan for possible solutions .....	<b>24</b>
Community awareness programs and outcomes.....	<b>25</b>
Report.....	<b>26</b>
<b>Chapter 6:</b> Recommendations and Conclusions .....	<b>39</b>
Student Self-Evaluation.....	<b>40</b>
Evaluation by the person in-charge .....	<b>41</b>
Photos and Video links .....	<b>42</b>

## CHAPTER 1: EXECUTIVE SUMMARY

This project mainly focuses on a flood-prone rural village where seasonal rains and nearby river systems increase the risk of frequent flooding. The community primarily relies on agriculture for income, making it highly vulnerable to weather extremes that disrupt daily life and cause significant economic losses. The project, titled **Flood Guard: Safeguarding Communities Against Flooding**, aimed to improve local flood preparedness by providing real-time weather alerts, flood risk assessment, and safety guidance.

During the project, activities included collecting weather and location data to assess flood risk, developing and implementing the FloodGuard mobile app, and educating community members on flood preparedness. The app was designed to provide live weather updates, flood warnings, and practical tips for flood prevention, offering a comprehensive tool to help the community protect lives and property.

### **Learning Objectives**

- **Understand Flood Risks:** Learn about the causes of floods and the weather signs that indicate a flood might happen.
- **Use Real-Time Data to Predict Floods:** Gain skills in using live weather data to predict the chances of a flood.
- **Learn Flood Prevention Steps:** Understand ways to reduce the impact of floods on communities, such as keeping drainage systems clear and building flood walls.
- **Help Communities Stay Safe:** Discover how to share important flood information that helps communities prepare and respond to flood threats.



## **Learning Outcomes**

- **Predict Floods Using Weather Data:** Use weather information like rainfall and temperature to assess the risk of flooding.
- **Build a User-Friendly App:** Create a simple and useful app that helps people prepare for floods.
- **Share Safe Practices:** Learn how to effectively communicate safety tips and preventive actions to users.
- **Develop Problem-Solving Skills in Disaster Management:** Build skills in creating technology solutions that help people prepare for and reduce the damage caused by natural disasters.

## **CHAPTER 2: OVERVIEW OF THE COMMUNITY**

### **Historical Profile of the Community**

The community targeted by the FloodGuard project is situated in a flood-prone region where heavy rainfall and seasonal weather patterns have historically led to frequent flooding. Traditionally, the community has relied on agriculture as its main source of income, with farms and livestock integral to their livelihood..

Over time, the community has developed informal systems for managing floods, such as building homes on elevated foundations and storing emergency supplies. These traditional practices are passed down through generations, highlighting the community's resilience and adaptability.

### **Community Diversity, Traditions, Ethics, and Values**

The community is diverse in terms of age, occupation, and family structure, with an emphasis on strong family bonds and mutual support. During flood situations, members come together to assist each other, showcasing values of solidarity and cooperation.

Ethical practices such as resource-sharing, communal support for vulnerable individuals, and respect for cultural rituals are common. The community also observes certain cultural and religious practices tied to nature, such as river and land worship, reflecting their deep connection to the land and water bodies that surround them.

### **Socio-Economic Conditions of the Community**

Socio-economically, the community faces challenges such as limited infrastructure, access to healthcare, and educational resources. The economy is primarily rural, dependent on farming, fishing, and livestock, with incomes fluctuating based on seasonal changes and crop yields. Floods disrupt this economic stability, damaging crops, homes, and livestock, leading to financial stress and, in severe cases, displacement. Access to

technology and emergency resources is limited, which hinders disaster preparedness and effective response during floods.

The introduction of FloodGuard in this community aims to empower residents with accessible flood prediction and early warning information. By providing real-time weather alerts and safety guidance, FloodGuard seeks to enhance the community's resilience, reduce economic losses, and support a safer, more informed response to flood risks.

## **CHAPTER 3: COMMUNITY SERVICE PART**

This Community Service Project (CSP) focuses on a flood-prone rural village where seasonal rains and nearby river systems increase the risk of frequent flooding. During the Community Service Project, several key activities were undertaken to support the flood-prone village and enhance its resilience against flooding. The project involved both technical implementations and direct engagement with the community to increase awareness, prepare resources, and support preventive measures. Below are the main activities conducted:

### **Community Needs Assessment**

The project began with an assessment of the village's specific needs regarding flood preparedness. Meetings were held with local leaders and residents to understand their experiences with past floods, identify vulnerable areas, and discuss their current coping strategies. This assessment helped in customizing the FloodGuard app to meet the community's particular needs.

### **Educational Workshops on Flood Preparedness**

To improve community awareness, educational workshops were organized, covering essential flood preparedness and safety measures. These sessions taught participants about flood risk indicators, the importance of early warning systems, and emergency response actions.

### ACTIVITY LOG FOR THE FIRST WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 20 May 2024</b>	Interacted with project guide on natural disaster management and selected flood topic for the project.	Learned about natural disaster management and selected a flood-related topic for the project.	
<b>Day –2 Tuesday 21 May 2024</b>	Discussed how floods occur and their effects on communities.	Gained a deeper understanding of flood causes, types, and effects.	
<b>Day –3 Wednesday 22 May 2024</b>	Researched and reviewed flood-related data and case studies.	Enhanced knowledge of flood dynamics and case study analysis.	
<b>Day –4 Thursday 23 May 2024</b>	Prepared survey questions focusing on flood occurrences, causes, and effects.	Learned how to develop targeted questions for flood data collection.	
<b>Day –5 Friday 24 May 2024</b>	Consulted guide for feedback on survey questions and revised accordingly.	Improved survey design based on feedback.	
<b>Day –6 Saturday 25 May 2024</b>	Finalized survey questions and prepared for data collection.	Completed the survey preparation process.	

## WEEKLY REPORT

### WEEK-1(From Dt.20-05-2024 to Dt. 25-05-2024)

**Objective of the Activity Done:** To gain a comprehensive understanding of flood dynamics, including their causes and effects, and to develop survey questions for data collection to support the flood-related project.

#### **Detailed Report:**

- Interacted with the project guide to gain insights into the domain of natural disaster management.
- After discussion, the topic of floods was selected as the primary focus for the project, aligning with the objectives of disaster awareness and management.
- Explored how floods occur, their types (such as riverine, flash, and coastal floods), and the conditions that lead to flooding events.
- Discussed the effects of floods on communities, infrastructure, and the environment, including loss of life, property damage, and displacement of people.
- Conducted extensive research to review flood-related data and case studies from past events, both locally and globally.
- Analyzed factors contributing to major flood incidents, government response, and community resilience.
- Prepared a list of targeted survey questions to gather field data on flood occurrences, causes, and effects.
- Questions focused on understanding flood history, frequency, impact, and local awareness and preparedness in flood-prone areas.
- Presented the initial draft of survey questions to the project guide for feedback on structure, clarity, and relevance.
- Incorporated suggested revisions to make the questions clearer and more focused on gathering actionable insights.
- Completed all necessary revisions and finalized the survey questions, ensuring they cover all essential aspects of flood-related information.

## ACTIVITY LOG FOR THE SECOND WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 27 May 2024</b>	Researched in-depth how floods occur and studied the environmental impact.	Gained a better understanding of flood formation and environmental effects.	
<b>Day –2 Tuesday 28 May 2024</b>	Investigated how floods impact local communities, economies, and infrastructure.	Learned about the broader social and economic effects of floods.	
<b>Day –3 Wednesday 29 May 2024</b>	Analysed various flood mitigation strategies used worldwide.	Developed a broader perspective on potential flood prevention and mitigation strategies.	
<b>Day –4 Thursday 30 May 2024</b>	Prepared and finalized survey questions to capture data on flood effects.	Refined survey questions based on research findings.	
<b>Day –5 Friday 31 May 2024</b>	Conducted peer review on the survey questions for feedback and improvements.	Received valuable feedback to improve survey structure.	
<b>Day –6 Saturday 01 June 2024</b>	Finalized survey questions and shared with the guide for approval.	Ready for implementation of the survey.	

## WEEKLY REPORT

**WEEK-2(From Dt. 27-05-2024 to Dt. 01-06-2024)**

**Objective of the Activity Done:** In-depth research on how floods occur and their environmental impact. Studied the social, economic, and infrastructure effects of floods while developing survey questions for data collection.

### **Detailed Report:**

- Conducted an in-depth study on the mechanisms behind flood formation, including factors like heavy rainfall, river overflow, dam failure, and climate change.
- Examined the environmental consequences of floods, such as soil erosion, habitat loss, water contamination, and effects on biodiversity
- Explored how floods affect communities, including displacement, loss of life, and disruptions to daily activities.
- Researched economic impacts, including financial loss from property damage, recovery costs, and loss of income.
- Examined infrastructural damage, particularly to transportation, communication, and utility networks.
- Investigated various flood mitigation and prevention strategies used worldwide, such as levees, flood walls, early warning systems, and green infrastructure.
- Reviewed case studies on the effectiveness of these methods in different countries and environments.
- Conducted a peer review session to gather feedback on the survey questions, assessing clarity, relevance, and structure.
- Finalized all survey questions and submitted them to the project guide for final review and approval.



### ACTIVITY LOG FOR THE THIRD WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 03 June 2024</b>	Conducted the survey in Gopuwanipalem, Machilipatnam, and collected flood-related data.	Gained experience in conducting field surveys and gathering flood data.	
<b>Day –2 Tuesday 04 June 2024</b>	Documented responses and began analyzing the data collected from the survey.	Learned how to organize and analyze survey data effectively.	
<b>Day –3 Wednesday 05 June 2024</b>	Analyzed the data to identify recurring patterns of flood occurrence and impact.	Gained insight into flood risks and areas needing attention.	
<b>Day –4 Thursday 06 June 2024</b>	Discussed potential solutions to reduce flood risk based on the survey findings.	Developed ideas for app design and flood risk reduction strategies.	
<b>Day –5 Friday 07 June 2024</b>	Finalized the app design plan for "FloodGuard," focusing on user interaction and data display.	Gained practical experience in converting research data into actionable app design.	
<b>Day –6 Saturday 08 June 2024</b>	Designed the basic framework of the "FloodGuard" app and outlined its features.	Started translating survey data into a functional app design.	

## WEEKLYREPORT

### WEEK-3(From Dt. 03-06-2024 to Dt. 08-06-2024)

**Objective of the Activity Done:** To gather flood-related data through a field survey and analyze it to identify patterns and potential solutions. The focus was on understanding flood risks and preparing for the app development.

#### **Detailed Report:**

- Conducted an on-site survey to collect firsthand data on flood-related experiences from local residents.
- Focused on gathering information about flood occurrences, impacts, and the community's current preparedness and response practices.
- Analyzed the documented data to identify common patterns related to flood frequency, severity, and affected areas.
- Discussed ideas for the app design, aiming to address identified risks and support community awareness and preparedness.
- Developed initial concepts for integrating flood prevention, early warning, and emergency response features into the app.
- Outlined the core design and functionality of the "FloodGuard" app, focusing on user-friendly interaction and intuitive data display.
- Decided on key app features, such as real-time flood risk detection, past flood history, and emergency contacts.
- Gained hands-on experience in translating field data into actionable insights for app development.
- Created a preliminary design and basic framework for the app, setting up initial components like the home page, flood risk detection, and information display.
- Outlined the core features to be implemented, including weather updates, flood alerts, and flood prevention tips.
- Began transforming survey findings and field insights into a functional design, marking the start of the app development phase.

### ACTIVITY LOG FOR THE FOURTH WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 10 June 2024</b>	Set up Flutter development environment and installed required packages.	Gained experience in setting up the Flutter environment.	
<b>Day –2 Tuesday 11 June 2024</b>	Configured project paths and directories in Flutter.	Learned the structure and configuration required for a Flutter app.	
<b>Day –3 Wednesday 12 June 2024</b>	Installed and tested the emulator for running the app.	Acquired knowledge on how to run and test apps on an emulator.	
<b>Day –4 Thursday 13 June 2024</b>	Implemented the basic structure of the "FloodGuard" app UI.	Learned how to design the app's interface and layout using Flutter.	
<b>Day –5 Friday 14 June 2024</b>	Worked on adding initial pages like the home page, prevention page, and precaution page.	Gained hands-on experience in Flutter layout and navigation.	
<b>Day –6 Saturday 15 June 2024</b>	Tested the home page and other pages in the emulator and made necessary improvements.	Improved debugging and testing skills with Flutter emulator.	

## WEEKLY REPORT

**WEEK-4(From Dt. 10-06-2024 to Dt. 15-06-2024)**

**Objective of the Activity Done:** This week, the goal was to set up the development environment for Flutter, configure the required paths, and test the emulator for app development.

### **Detailed Report:**

- Successfully set up the Flutter environment by installing the required software and packages.
- Configured project paths and directories, ensuring all required paths are set correctly for smooth app development.
- Acquired skills in project setup and configuration, which is critical for managing assets, dependencies, and ensuring the app runs without path-related issues.
- Installed and configured an Android emulator to simulate a real device for app testing.
- Began building the foundational user interface (UI) of the "FloodGuard" app, focusing on setting up the initial screen structure.
- Created and added basic functionality for the home page, prevention page, and precaution page, focusing on content layout and navigation between pages.
- Improved skills in Flutter layout design and navigation, allowing the creation of a cohesive and user-friendly multi-page app structure.
- Tested the implemented pages in the emulator, identifying and addressing any layout or functionality issues.
- Made improvements to the design and user experience based on testing results, ensuring smooth navigation and responsiveness.
- Enhanced debugging and testing skills, understanding how to evaluate app performance and make necessary adjustments for improved usability.

## ACTIVITY LOG FOR THE FIFTH WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 17 June 2024</b>	Designed the main flood risk detection page (detection page).	Learned how to build interactive pages with user input in Flutter.	
<b>Day –2 Tuesday 18 June 2024</b>	Integrated OpenWeatherMap API for real-time weather and flood risk data.	Gained hands-on experience using external APIs in Flutter.	
<b>Day –3 Wednesday 19 June 2024</b>	Implemented user interaction on the detection page to display weather and flood risk.	Improved skills in integrating APIs and displaying data dynamically.	
<b>Day –4 Thursday 20 June 2024</b>	Continued refining the detection page's design and functionality.	Enhanced design and functionality for user-friendly interface.	
<b>Day –5 Friday 21 June 2024</b>	Conducted tests to ensure correct data is displayed and flood risk is accurately predicted.	Developed troubleshooting and problem-solving skills for app testing.	
<b>Day –6 Saturday 22 June 2024</b>	Completed the final revisions and improvements to the detection page.	Finalized the detection page for better user interaction.	

## WEEKLY REPORT

**WEEK-5(From Dt. 17-06-2024 to Dt. 22-06-2024)**

**Objective of the Activity Done:** The main goal was to design interactive and functional pages while integrating the necessary data.

### **Detailed Report:**

- Developed the primary structure and layout of the detection page, focusing on user-friendly design and interactive elements.
- Connected the app to the OpenWeatherMap API to retrieve real-time weather data based on user input.
- Enabled the detection page to dynamically display weather information and flood risk based on the data received from the API.
- Focused on enhancing the design aesthetics and functionality of the detection page, including layout adjustments and color scheme improvements.
- Incorporated a user-friendly layout that makes the data easily accessible and visually engaging.
- Conducted thorough testing to ensure that the correct weather data and flood risk predictions are displayed based on user location.
- Developed stronger problem-solving skills, understanding how to troubleshoot and refine features to improve the reliability of the app.
- Completed final adjustments to the detection page, addressing any remaining design or functionality issues.
- Enhanced user interaction features, ensuring that the detection page is ready for practical use within the "FloodGuard" app.
- Finalized the detection page to provide a stable, visually appealing, and user-friendly experience, marking a major milestone in the app's development.

### ACTIVITY LOG FOR THE SIXTH WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 24 June 2024</b>	Set up the app on mobile for testing and debugging.	Learned how to deploy Flutter apps on mobile for real-world testing.	
<b>Day –2 Tuesday 25 June 2024</b>	Conducted in-depth tests on the app's functionality on the mobile device.	Gained real-world feedback on app performance.	
<b>Day –3 Wednesday 26 June 2024</b>	Implemented additional app features based on test feedback.	Improved app based on user feedback and test results.	
<b>Day –4 Thursday 27 June 2024</b>	Started documenting the app's development process and features.	Learned how to maintain clear and concise documentation.	
<b>Day –5 Friday 28 June 2024</b>	Continued writing documentation, explaining the app's functionality and features.	Enhanced documentation writing skills.	
<b>Day –6 Saturday 29 June 2024</b>	Finalized testing and completed the first draft of the project documentation.	Prepared for the final submission of the project.	

## WEEKLY REPORT

**WEEK-6(From Dt. 24-06-2024 to Dt. 29-06-2024**

**Objective of the Activity Done:** The primary objective of this week was to deploy and test the app on a mobile device, ensuring it functions as expected. And also the documentation process

### **Detailed Report:**

- Successfully deployed the "FloodGuard" app on a mobile device for real-world testing and user experience evaluation.
- Performed comprehensive tests to evaluate the app's performance, responsiveness, and user experience on the mobile platform.
- Addressed identified issues and made adjustments to improve app performance, stability, and overall user experience.
- Began creating detailed documentation that outlines the app's development journey, technical specifications, and core features.
- Improved skills in organizing and detailing technical information in a clear, structured format for future reference
- Provided comprehensive descriptions of each app component, explaining functionality, purpose, and usage instructions for each feature.
- Focused on making the documentation beginner-friendly, with clear explanations for setting up and using the app.
- Strengthened skills in writing accessible, user-friendly documentation that effectively communicates the app's purpose and usage.
- Conducted a final round of tests on the app to confirm all features and functionalities worked as expected on the mobile platform.
- Finished the initial draft of the project documentation, covering the app's design, development, testing process, and features.
- Prepared the app and documentation for final submission, ensuring everything was in place for the next steps in project evaluation.



### ACTIVITY LOG FOR THE SEVENTH WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 15 July 2024</b>	Finalize the documentation, detailing app features, functionality, and the entire development process.	Learn how to document technical aspects of app development and summarize the project effectively.	
<b>Day –2 Tuesday 16 July 2024</b>	Review the documentation and integrate any feedback or suggestions from the guide.	Understand how to revise and enhance documentation based on feedback for clarity and completeness.	
<b>Day –3 Wednesday 17 July 2024</b>	Perform a final check of the app's functionality and ensure all features are working as expected.	Gain experience in performing thorough testing and validating the functionality of the app.	
<b>Day –4 Thursday 18 July 2024</b>	Implement modifications and improvements suggested by the guide based on app testing.	Learn to apply feedback and improve app features, making adjustments based on practical review.	
<b>Day –5 Friday 19 July 2024</b>	Finalize the app design and UI to ensure consistency and usability across pages.	Understand how to refine the user interface for consistency and user experience improvement.	
<b>Day –6 Saturday 20 July 2024</b>	Final check of both the documentation and the app to ensure everything aligns and is complete.	Develop attention to detail in reviewing both documentation and the app to ensure everything is polished.	

## WEEKLY REPORT

**WEEK-7(From Dt. 15-07-2024 to Dt. 20-07-2024)**

**Objective of the Activity Done:** The focus is on finalizing the app documentation, ensuring that all features and functionalities are well-documented, and the app works as expected. The main goal is to incorporate feedback and refine the app for completeness and consistency.

### **Detailed Report:**

- Completed a comprehensive documentation of the "FloodGuard" app, covering key components such as app features, interface design, functionality, and the overall development process.
- Documented each step of the project in detail, ensuring clarity and accessibility for any future developers or reviewers.
- Conducted extensive testing on the app to validate the functionality of each feature and verify that the app operated as expected.
- Addressed any remaining concerns and made final adjustments to the app's features, implementing improvements based on practical suggestions from the guide.
- Refined the user interface, ensuring consistency in design elements such as color schemes, fonts, button styles, and navigation across all pages.
- Focused on creating a visually cohesive and user-friendly experience that aligned with the app's purpose and branding.
- Improved understanding of UI design principles, ensuring a polished, professional appearance and cohesive design flow throughout the app.
- Conducted a last review of both the documentation and the app to verify that everything was complete, accurate, and aligned with project goals.
- Checked for any inconsistencies or missing details, ensuring both the app and documentation were polished and ready for final presentation.
- Developed attention to detail and thoroughness, ensuring that all aspects of the project were ready for final submission without any gaps.

### ACTIVITY LOG FOR THE EIGHTH WEEK

<b>DAY &amp;DATE</b>	<b>BRIEF DESCRIPTION OF THE DAILY ACTIVITY</b>	<b>LEARNING OUTCOME</b>	<b>PERSON IN-CHARGE SIGNATURE</b>
<b>Day –1 Monday 22 July 2024</b>	Final review of the app implementation. Test all features and ensure no bugs or issues are present.	Gain confidence in conducting a comprehensive final review of the app before submission.	
<b>Day –2 Tuesday 23 July 2024</b>	Finalize and polish the project documentation, ensuring proper formatting and clarity.	Understand the importance of presentation in documentation and how to make it reader-friendly.	
<b>Day –3 Wednesday 24 July 2024</b>	Prepare and complete the PowerPoint presentation, summarizing the project's objectives, process, and results.	Learn how to summarize the entire project into a clear and concise presentation for review.	
<b>Day –4 Thursday 25 July 2024</b>	Review and finalize the PowerPoint presentation, ensuring it highlights the key points effectively.	Learn to refine presentation skills and ensure key points are emphasized for effective communication.	
<b>Day –5 Friday 26 July 2024</b>	Final check of the app, documentation, and PowerPoint presentation. Prepare everything for submission.	Develop the skills to check the completeness of the entire project before submission.	
<b>Day –6 Saturday 27 July 2024</b>	Completion of the final version of the app, documentation, and PowerPoint presentation. Ensure all project elements are complete.	Learn how to finalize and submit a comprehensive project, ensuring all requirements are met.	

## WEEKLY REPORT

**WEEK-8(From Dt. 22-07-2024 to Dt. 27-07-2024)**

Objective of the Activity Done: The goal is to ensure the app is fully functional, the documentation is clear and polished, and the presentation effectively summarizes the entire project process.

### **Detailed Report:**

- Conducted an extensive final check of the "FloodGuard" app to ensure all features were functioning correctly, with no bugs or issues present.
- Refined the project documentation, focusing on clarity, proper formatting, and consistency throughout the document.
- Created a concise and visually appealing PowerPoint presentation summarizing the objectives, process, results, and key features of the "FloodGuard" app.
- Reviewed and polished the PowerPoint presentation, ensuring that it effectively communicated the project's key points, such as objectives, challenges, results, and future prospects.
- Conducted a comprehensive final review of all project components: the app, documentation, and PowerPoint presentation, ensuring consistency and alignment with project objectives.
- Checked for any missing or incomplete elements, ensuring that all requirements were fulfilled and that the app was polished and functional.
- Developed the skills necessary to ensure the completeness of the entire project before submission, checking that no details were overlooked.
- Finalized the app, documentation, and PowerPoint presentation, ensuring that all components were polished, comprehensive, and ready for submission.
- Ensured that the project met all outlined requirements and that it was suitable for review by the guide or any potential evaluators.

## **CHAPTER 5: OUTCOMES DESCRIPTION**

**Details of the Socio-Economic Survey of the Village/Habitation. Attach the questionnaire prepared for the survey.**

1. How often do floods occur in your community?
2. What is the most common cause of floods in your area?
3. How many people lost their jobs due to the flood?
4. How many injuries were reported during the last flood?
5. How many people were displaced due to the flood?
6. What was the impact on local wildlife?
7. Were there any changes in water quality due to the flood?
8. How long did it take for the community to recover from the flood?
9. How many roads were damaged by the flood?
10. How many bridges were affected by the flood?
11. How many buildings were structurally damaged due to the flood?
12. How many people had access to real-time flood updates?
13. How did the flood affect people's daily routines?
14. How many people have plans to move to less flood-prone areas?
15. How have floods affected local agriculture?
16. Did you face any financial losses due to the floods? What kind?
17. Which type of protocols do you follow at your home to save yourself from the floods?
18. How do floods impact local tourism?
19. How much amount did you receive from the government due to any property loss during floods?
20. What are the most common items in emergency flood kits?

## **Describe the problems you have identified in the community**

### **The problems we have identified are**

#### **1. Lack of Awareness About Flood Risks:**

Many residents may not be fully aware of the flood risks they face or how to prepare for potential flooding. Many residents don't know the flood risks they face or how to prepare, leading to poor decisions during floods.

#### **2. Inadequate Flood Warning Systems:**

The absence of timely and accurate flood warnings can put communities at great risk. Without reliable early warnings, residents may not have time to prepare or evacuate before a flood.

#### **3. Environmental Factors Contributing to Flooding**

Deforestation, poor waste management, and urbanization increase runoff, worsening flooding.

#### **4. Climate Change Impact:**

Climate change is leading to increased frequency and intensity of extreme weather events like heavy rainfall and storms, which exacerbate the flood risk. Climate change causes more extreme weather, intensifying flood risks.

#### **5. Lack of Personalized Flood Risk Prediction:**

People in rural or remote areas may not have access to accurate, localized flood predictions based on their specific geographic location. Rural areas often lack accurate, localized flood predictions, leaving communities unprepared.

#### **6. Fragmented Communication Systems:**

Poor communication systems during floods delay warnings and updates, hindering evacuation and safety measures.

**Short-term and long term action plan for possible solutions for the problem identified and that could be recommended to the concerned authorities for implementation.**

### **Short-term Action Plan**

- Hold workshops and programs to educate people about flood risks and prevention steps, such as identifying flood signs and clearing drainage systems.
- Add live weather data like rainfall, temperature, and water levels to the **FloodGuard** app to give real-time updates and flood warnings.
- Continue to build and test the **FloodGuard** app, ensuring it is easy to use and provides flood risk assessments and safety tips.
- Use the app to send notifications with safety tips and evacuation routes to people in flood-prone areas.

### **Long-term Action Plan**

- Improve the app's prediction system by using weather data and AI to give earlier flood warnings.
- Recommend to authorities that they invest in better flood defenses, like drainage systems and flood barriers, and improve stormwater management.
- Develop a disaster plan with regular flood drills, evacuation routes, and community-led response teams.
- Partner with weather stations and organizations to collect more detailed data for the app, improving its accuracy in predicting floods.

**Description of the Community awareness programme's conducted w.r.t the problems and their outcomes.**

### **Community Awareness Programs**

- **Increase Understanding of Flood Risks:**

Educate participants about the causes of floods, weather patterns that indicate flooding, and the impact floods can have on communities.

- **Promote Flood Prevention Practices:**

Share best practices for flood prevention, including maintaining clear drainage systems, building flood barriers, and ensuring proper waste disposal.

- **Encourage Community Participation in Flood Preparedness:**

Encourage residents to actively participate in flood preparedness activities, such as creating evacuation plans, assembling emergency kits, and staying informed through flood alerts.

### **Outcomes**

- **Increased Awareness of Flood Risks:**

Participants gained a better understanding of flood risks, the signs of impending floods, and the importance of timely action.

- **Improved Flood Prevention Practices:**

Communities began adopting flood prevention measures like clearing drainage systems and securing flood barriers. Many households created evacuation plans and prepared emergency kits.

- **Enhanced Community Preparedness:**

Residents became more involved in flood preparedness, sharing safety tips, and using the FloodGuard app for real-time flood updates, which helped reduce the potential damage during flood events.



**Report of the community service project work done in the related subject w.r.t the habitation/village.**

## **Project Title : Flood Guard: Safeguarding Communities Against Flooding**

### **1. Introduction and Background**

**Flood Risk Management:** Flooding is a natural disaster that poses significant risks to communities, especially in rural and low-lying areas. Floods can cause severe damage to homes, infrastructure, and agricultural lands, and often lead to health risks and economic losses. Recognizing these challenges, the **FloodGuard** app project was developed to improve flood preparedness and response through real-time data, flood risk assessment, and safety information spread.

**Overview of Gopuwanipalem Village:** Gopuwanipalem is a rural community in Machilipatnam, frequently affected by seasonal rains and occasional floods. The village relies on farming and local businesses, making it vulnerable to the economic and social impacts of flooding. Local residents have limited access to early flood warnings, making timely evacuation and damage prevention challenging.

**Project Rationale:** The FloodGuard project aims to provide flood predictions and preparedness guidance to residents. By implementing the app in flood-prone areas like Gopuwanipalem, this project seeks to empower residents with tools for flood risk awareness, real-time monitoring, and safety practices.

## **2. Objectives of the Project**

### **Primary Goals:**

#### **➤ Real-Time Flood Risk Monitoring:**

- Integrate real-time weather data sources to provide accurate and timely flood risk assessments for the community.
- Use data points such as rainfall, water levels, and temperature to predict potential flooding.

#### **➤ Community Education and Awareness:**

- Raise awareness on flood risks, preventive measures, and safety protocols to ensure the community is prepared for flood events.

### **Secondary Goals:**

- Empower local residents with knowledge on preventive measures.
- Encourage best practices in flood-prone areas, such as clearing drainage systems and preparing emergency kits.

## **3. Methodology**

### **Data Collection and Assessment:**

- **Literature Review:** Gather information on flood management practices, flood prediction models, and case studies relevant to flood-prone regions.
- **Community Survey:** Conduct surveys to understand local flood experiences and collect insights on existing flood preparedness measures.
- **Weather Data Integration:** Utilize OpenWeatherMap and other sources for real-time weather information, focusing on key flood indicators like rainfall and temperature.

## **4. Project Activities and Execution**

### **Phase 1: Initial Project Planning and Design**

- Discussed project goals and strategies with community members and local authorities.
- Outlined app features, including flood risk alerts, safety guidelines, and user-friendly navigation.

### **Phase 2: App Development and Testing**

- Developed and tested the FloodGuard app, focusing on usability and accuracy of flood predictions based on real-time data from OpenWeatherMap.

### **Phase 3: Community Education Programs**

- Conducted awareness sessions in Gopuwanipalem, educating residents on recognizing flood signs, evacuation protocols, and using the app for alerts.
- Provided training on assembling emergency kits and ensuring household preparedness.

## **5. Implementation Process**

### **Overview:**

This implementation process details the steps taken to develop and deploy the **FloodGuard** app, starting from setting up the Flutter environment to the final installation of the app on an Android mobile device. The objective is to create a functional, user-friendly app that can provide real-time flood alerts and help users understand flood risks, enhancing community preparedness.

The following steps are used to implement the flood app:

## Step 1: Setting Up the Development Environment

### 1. Install Flutter SDK

- Download the latest version of the Flutter SDK from the [Flutter website](#).
- Extract the downloaded ZIP file to a preferred location on your system (e.g., C:\flutter on Windows).
- Add the Flutter SDK's bin folder to the system PATH variable:

**Windows:** Go to "System Properties > Environment Variables" and add C:\flutter\bin to the PATH variable.

### 2. Install Command-Line Tools for Android

- Download and install [Android Studio](#), which provides the Android SDK, essential for running the app on Android devices.
- Download the Android Command-Line Tools from the [Android Developers website](#) under the "Command-line tools only" section.
- Extract the ZIP file to a folder, such as C:\Android\cmdline-tools (Windows) .
- Inside the cmdline-tools folder, create a subfolder named latest and move the extracted files into it (cmdline-tools/latest/...).
- Install the required SDK components: Open a terminal and navigate to cmdline-tools/latest/bin. Run the following command to install essential Android SDK components:

```
./sdkmanager --install "platform-tools" "platforms;android-33" "build-tools;33.0.0"
```

### 3. Configuring Android Emulator

- Install the tools required to set up an emulator by running:  

```
./sdkmanager --install "emulator" "system-images;android-33;google_apis;x86_64"
```
- Create a new Android Virtual Device (AVD):  

```
./avdmanager create avd -n myEmulator -k "system-images;android-33;google_apis;x86_64"
```
- Start the emulator using:  

```
./emulator -avd myEmulator
```

## 4. Verify Flutter Setup

- Run flutter doctor in the terminal. This command checks the Flutter installation and lists any additional requirements. Follow any suggestions to fix issues (e.g., installing missing SDKs or accepting licenses).

## Step 2: Creating the Flutter Project

### 1. Initialize a New Flutter Project

- Open the terminal and navigate to the desired folder. Run flutter create floodguard to generate a new Flutter project named **FloodGuard**.

### 2. Configure Dependencies

- Open the project in a code editor like Visual Studio Code or Android Studio.
- In pubspec.yaml, add dependencies for packages needed in the app, such as:
  - http: For handling API requests (e.g., OpenWeatherMap API for real-time weather data).
  - geolocator: For accessing device location.
  - provider: For managing state across the app.
- Run flutter pub get to install the dependencies.

### 3. Set Up API Access

- Register with OpenWeatherMap and get an API key.
- Store the API key securely in the app's environment configuration for making requests to fetch real-time weather and flood data.

## Step 3: Developing the App's User Interface

### 1. Design the UI Structure

- Start by structuring key screens: Welcome Page, Flood Detection Page, Precautions Page, and Prevention Page.
- Create widgets for each screen and design them to be visually appealing and easy to navigate.

## 2. Add Visual Elements

- Add app icons, logos, and background images to enhance the visual appeal.
- Implement styling themes, colors, and fonts to maintain a consistent look and feel across all pages.

## 3. Build Core Features

- **Real-Time Data Display:** Use the OpenWeatherMap API to fetch and display weather data, including temperature, rainfall, and flood alerts.
- **Flood Prediction:** Implement a flood risk model based on weather data and historical flood data to assess the likelihood of floods.
- **Safety Tips:** Provide users with essential tips on flood preparedness and prevention.

## Step 4: Testing the App on the Emulator

### 1. Run the App on the Emulator

- Connect an Android emulator or physical device. Run `flutter run` in the terminal to test the app on the selected device.
- Navigate through each screen, ensuring all UI elements are correctly displayed and functional.

### 2. Fix Bugs and Optimize Performance

- Check for any errors, crashes, or layout issues on different screen sizes.
- Optimize the code to ensure the app runs smoothly and is responsive across devices.

## Step 5: Deploying the App to a Physical Device

### 1. Enable Developer Mode on Android Device

- Go to **Settings > About Phone** and tap the **Build Number** multiple times to enable Developer Mode.
- In **Developer Options**, enable **USB Debugging** to allow the device to connect to the computer for testing.

## 2. Connect the Device and Install the App

- Connect the Android device to the computer via USB. Run flutter devices to confirm the device is recognized.
- Execute flutter install to build and install the app directly onto the device.

## 3. Conduct Final Testing on Device

- Test all features on the physical device, verifying functionality, UI layout, and response times.
- Ensure real-time weather data updates, accurate flood predictions, and smooth navigation.

### **Code :**

```
import 'package:flutter/material.dart';
import 'package:geocoding/geocoding.dart';
import 'package:http/http.dart' as http;
import 'dart:convert';
import 'package:connectivity_plus/connectivity_plus.dart';
import 'package:font_awesome_flutter/font_awesome_flutter.dart';
import 'package:flutter_spinkit/flutter_spinkit.dart'; // Import for loading spinner
void main() {
  runApp(MyApp());
}
class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flood Detection App',
      home: HomeScreen(),
    );
  }
}
class DetectionPage extends StatefulWidget {
  @override
```

```

    _DetectionPageState createState() => _DetectionPageState();
}

class _DetectionPageState extends State<DetectionPage> {
    final TextEditingController _villageController = TextEditingController();
    final TextEditingController _pincodeController = TextEditingController();
    String _weatherMessage = "";
    String _floodRiskMessage = "";
    bool _isLoading = false;
    final String weatherApiKey = 'a23105f5f07ed8894973f46e3bbdce39'; // Replace
with your OpenWeatherMap API key
    final String weatherApiUrl = 'https://api.openweathermap.org/data/2.5/';
    Future<void> checkFloodRisk() async {
        String villageName = _villageController.text;
        String pincode = _pincodeController.text;
        // Validate inputs
        if (villageName.isEmpty || pincode.isEmpty) {
            setState(() {
                _weatherMessage = "Please enter both village name and pincode.";
                _floodRiskMessage = "";
            });
            return;
        }
        if (!_isValidPincode(pincode)) {
            setState(() {
                _weatherMessage = "Pincode does not match. Please enter a valid 6-digit pincode.";
                _floodRiskMessage = "";
            });
            return;
        }
        // Check internet connectivity
        var connectivityResult = await Connectivity().checkConnectivity();
    }
}

```



```

if (connectivityResult == ConnectivityResult.none) {
    setState(() {
        _weatherMessage = "No internet connection. Please check your network
settings.";
        _floodRiskMessage = "";
    });
    return;
}
setState(() {
    _isLoading = true;
    _weatherMessage = 'Fetching weather data...';
    _floodRiskMessage = "";
});
try {
    List<Location> locations = await locationFromAddress(pinode);
    double latitude = locations[0].latitude;
    double longitude = locations[0].longitude;
    final currentWeatherUrl =
        '${weatherApiUrl}weather?lat=$latitude&lon=$longitude&appid=$weatherA
piKey&units=metric';
    final currentWeatherResponse = await http.get(Uri.parse(currentWeatherUrl));
    if (currentWeatherResponse.statusCode == 200) {
        var weatherData = jsonDecode(currentWeatherResponse.body);
        double temperature = weatherData['main']['temp'].toDouble();
        double humidity = weatherData['main']['humidity'].toDouble();
        double windSpeed = weatherData['wind']['speed'].toDouble();
        String weatherDescription = weatherData['weather'][0]['description'];
        String icon = weatherData['weather'][0]['icon'];
        // Calculate sunset condition
        int sunsetTime = weatherData['sys']['sunset'];
        DateTime sunset = DateTime.fromMillisecondsSinceEpoch(sunsetTime * 1000);

```

```

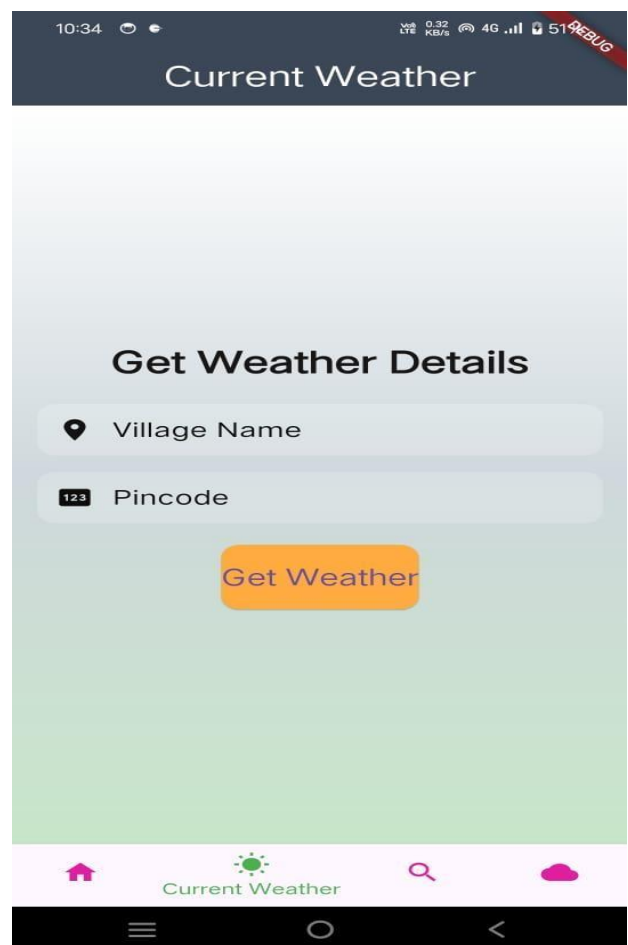
DateTime now = DateTime.now();
// Check if it's day or night, based on sunset
bool isDayTime = now.isBefore(sunset);
String backgroundImage;
// Determine background image based on weather conditions and time of day
if (isDayTime) {
    backgroundImage = _getBackgroundImageForDay(icon);
} else {
    backgroundImage = _getBackgroundImageForNight(icon);
}

```

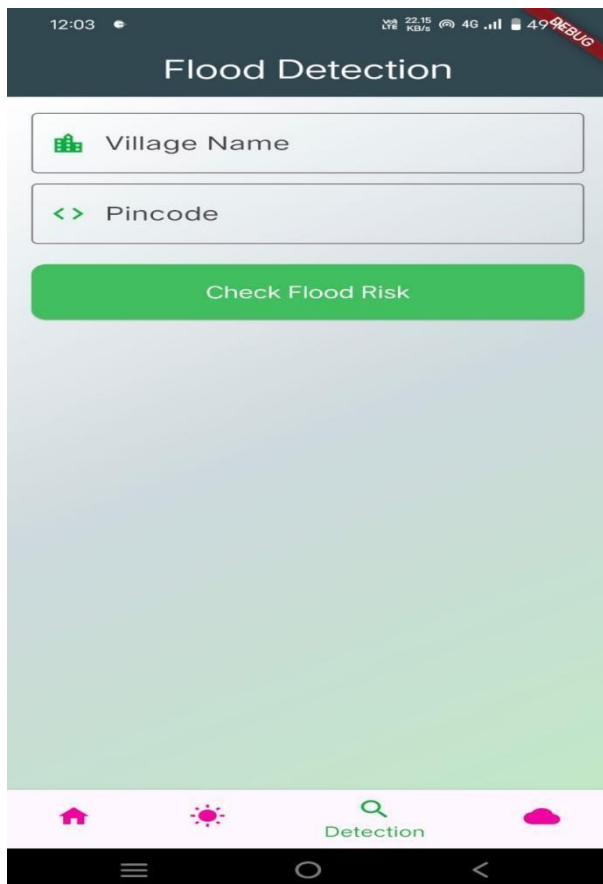
### Application Images



**Home page in app**



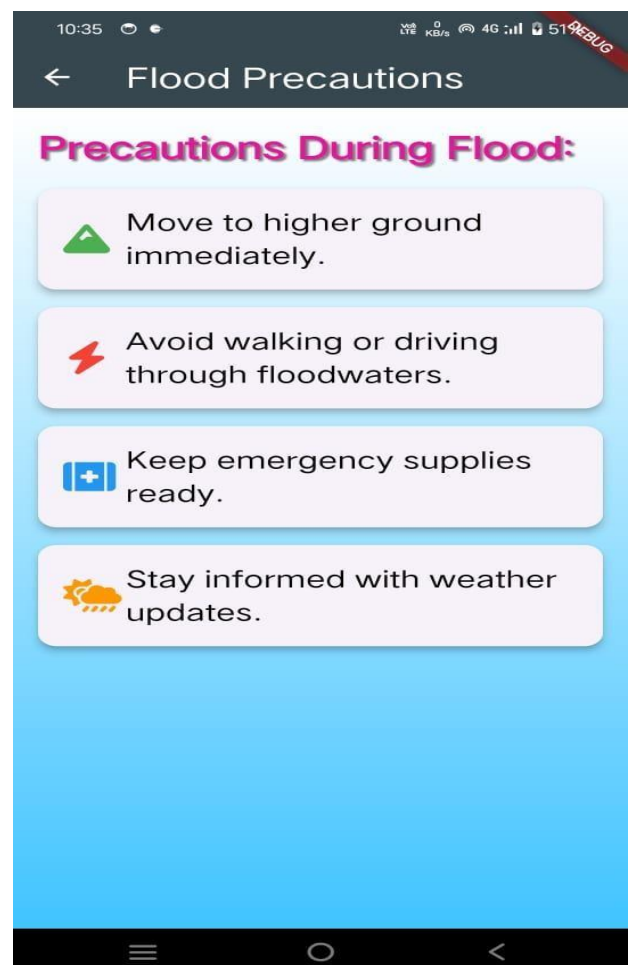
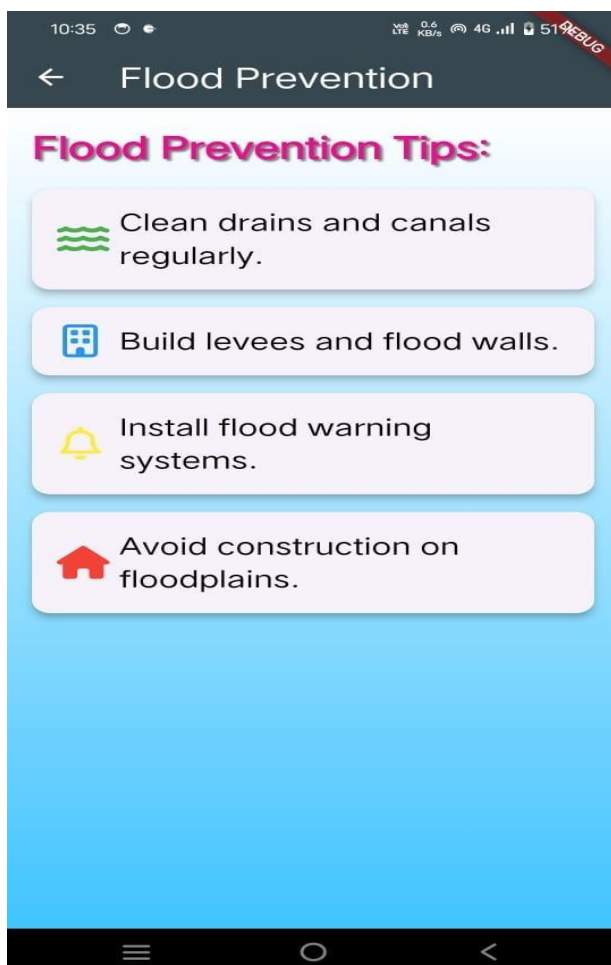
**Current Weather Page**



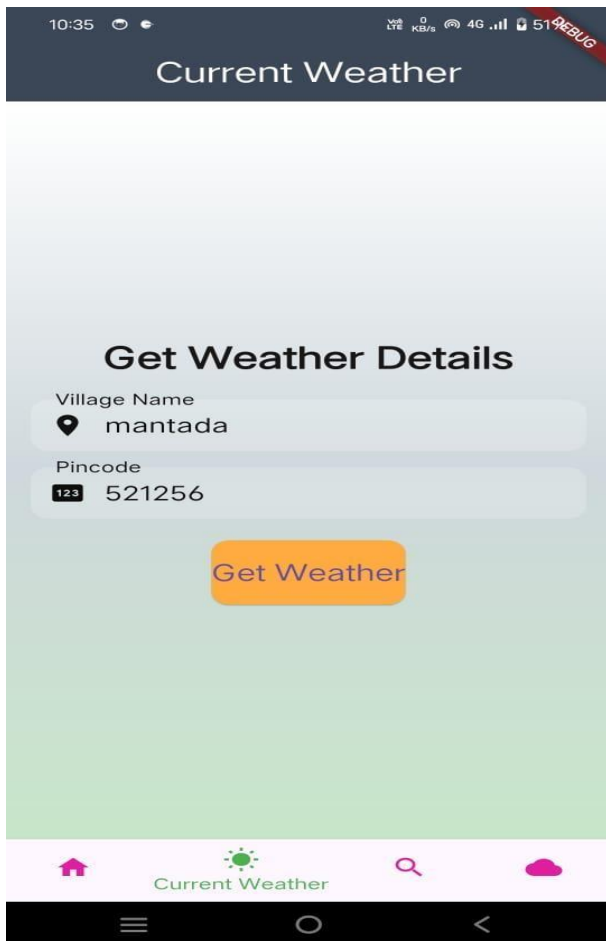
**Detection Page in app**



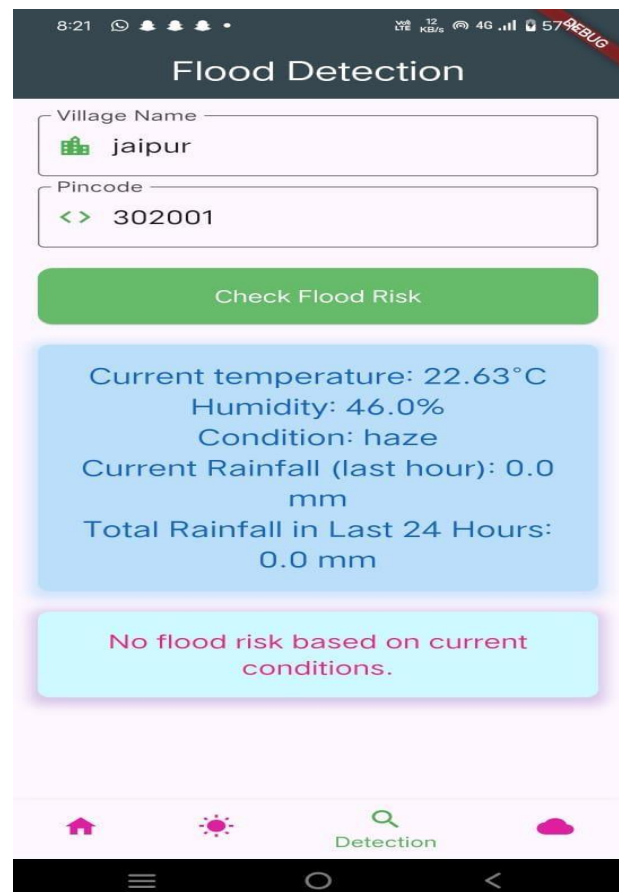
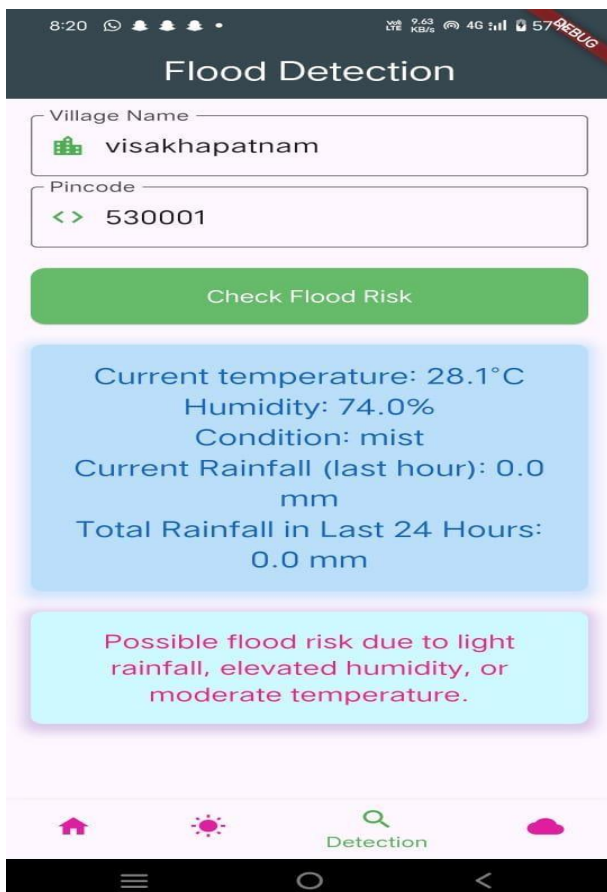
**Weather Forecast Page**



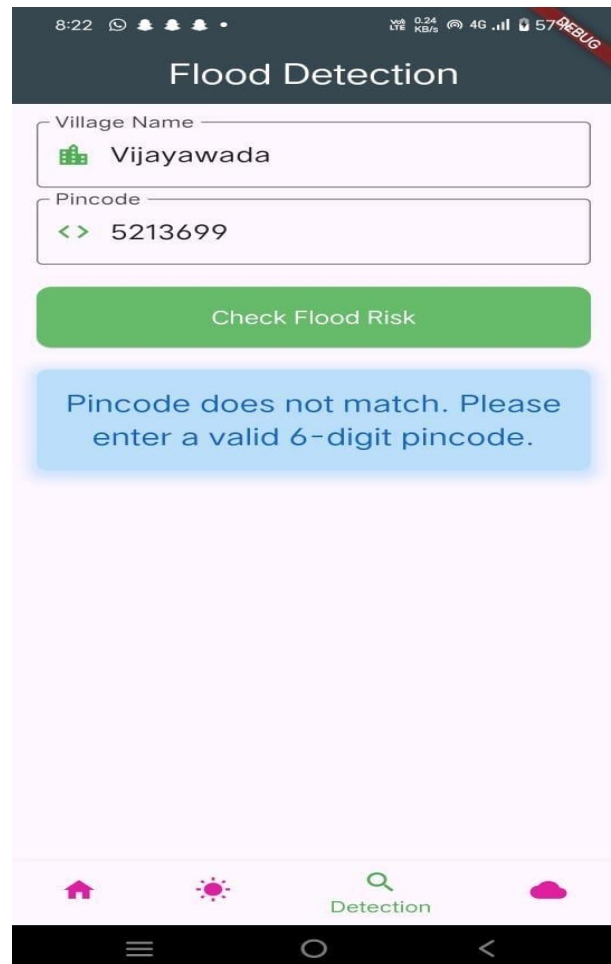
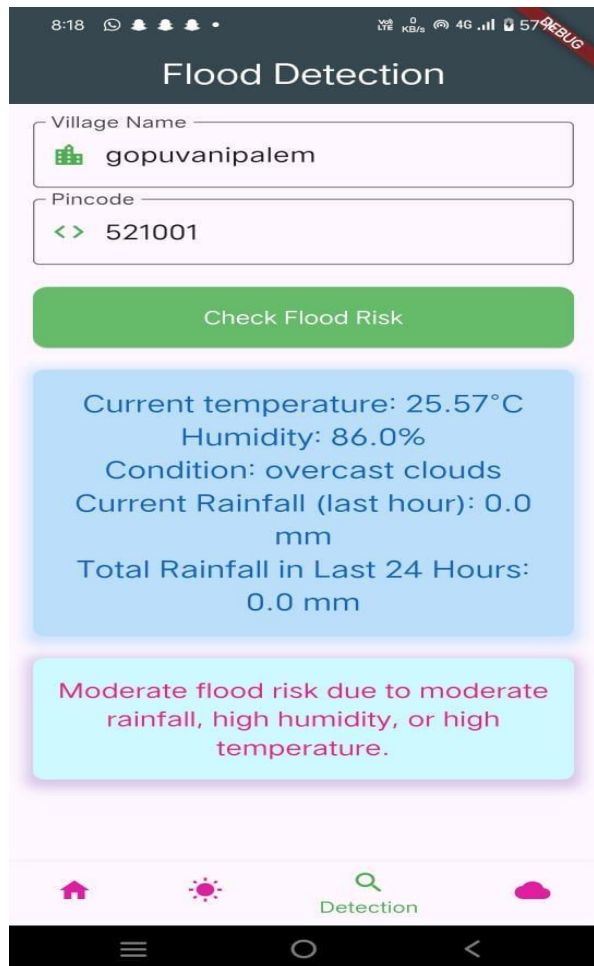
**Prevention page and Precautions page access from home page**



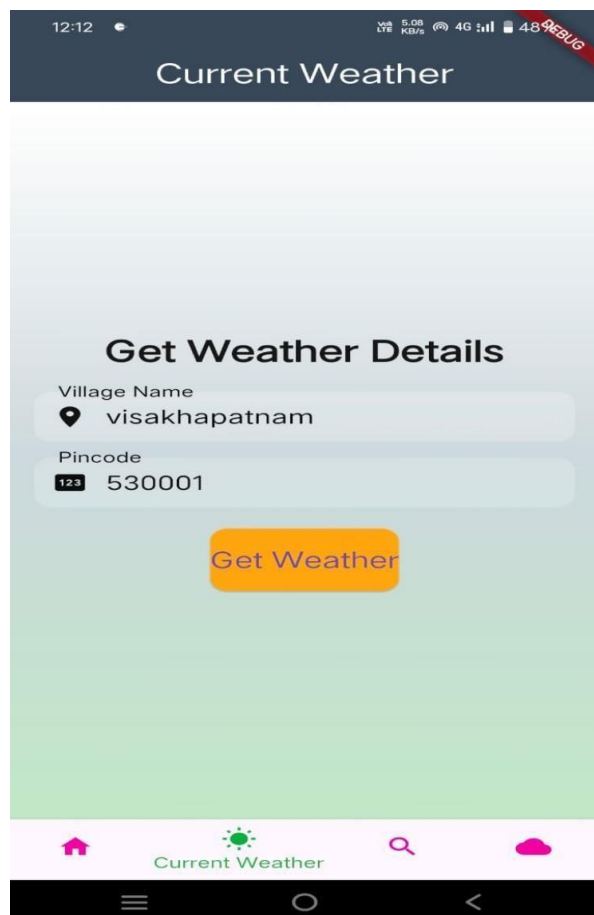
Getting current conditions of mantada in night and the result with night background



Visakhapatnam and Jaipur flood risk possibility check in detection page



**Gopuwanipalem flood risk possibility check      message display when pincode is wrong**



**Getting current conditions of mantada in night and the result with night background**

## CHAPTER 6: RECOMMENDATIONS AND CONCLUSIONS OF THE COMMUNITY SERVICE PROJECT

### **Recommendations**

1. **Enhance Data Collection:** Implement automated weather monitoring systems and collaborate with government agencies for real-time, accurate data.
2. **Improve Geo-Location Alerts:** Use GPS to send personalized flood warnings based on users' exact locations.
3. **Increase Community Engagement:** Organize workshops to educate communities on flood preparedness and the app's features.
4. **Integrate Satellite Imagery:** Collaborate with satellite data providers to add real-time flood maps for better tracking of flood extents.

### **Conclusion**

The "FloodGuard" app has proven to be a valuable tool in enhancing flood preparedness and response. By integrating real-time weather data, providing personalized alerts, and empowering communities with knowledge, the app helps mitigate flood risks and improve safety. However, challenges such as data accuracy, access in remote areas, and the need for continuous feature enhancements remain. With further development, including data integration from government agencies, the use of geo-location for alerts, and the inclusion of satellite imagery, the app can become an even more reliable and impactful resource for flood management. Ultimately, "FloodGuard" has the potential to contribute significantly to disaster resilience, aligning with global efforts toward climate action and sustainable community development.

Finally, the "FloodGuard" app helps people stay safe by providing useful tools for preparing for and responding to floods. It encourages users to share feedback and work together to reduce flood risks. By combining technology with disaster management, the app aims to protect lives and make communities stronger and safer.

## Student Self-Evaluation for the Community Service Project

Student Name: Kolli Mounika

Registration No: 22481A1288

Period of CSP: **From** 20-05-2024 **To** 29-06-2024 And **From** 15-07-2024 **To** 27-07-2024.

Date of Evaluation:

Name of the Person in-charge:

Address with mobile number:

**Please rate the student's performance in the following areas:**

**Rating Scale:** 1 is lowest and 5 is highest rank

1) Oral communication	1	2	3	4	5
2) Written communication	1	2	3	4	5
3) Proactiveness	1	2	3	4	5
4) Interaction ability with community	1	2	3	4	5
5) Positive Attitude	1	2	3	4	5
6) Self-confidence	1	2	3	4	5
7) Ability to learn	1	2	3	4	5
8) Work Plan and organization	1	2	3	4	5
9) Professionalism	1	2	3	4	5
10) Creativity	1	2	3	4	5
11) Quality of work done	1	2	3	4	5
12) Time Management	1	2	3	4	5
13) Understanding the Community	1	2	3	4	5
14) Achievement of Desired Outcomes	1	2	3	4	5
15) OVERALL PERFORMANCE	1	2	3	4	5

Date:

Signature of the Student

## Evaluation by the Person in-charge in the Community/Habitation

Student Name: Kolli Mounika

Registration No: 22481A1288

Period of CSP: **From** 20-05-2024 **To** 29-06-2024 And **From** 15-07-2024 **To** 27-07-2024.

Date of Evaluation:

Name of the Person in-charge:

Address with mobile number:

**Please rate the student's performance in the following areas:**

**Rating Scale:** 1 is lowest and 5 is highest rank

1) Oral communication	1	2	3	4	5
2) Written communication	1	2	3	4	5
3) Proactiveness	1	2	3	4	5
4) Interaction ability with community	1	2	3	4	5
5) Positive Attitude	1	2	3	4	5
6) Self-confidence	1	2	3	4	5
7) Ability to learn	1	2	3	4	5
8) Work Plan and organization	1	2	3	4	5
9) Professionalism	1	2	3	4	5
10) Creativity	1	2	3	4	5
11) Quality of work done	1	2	3	4	5
12) Time Management	1	2	3	4	5
13) Understanding the Community	1	2	3	4	5
14) Achievement of Desired Outcomes	1	2	3	4	5
15) OVERALL PERFORMANCE	1	2	3	4	5

Date:

Signature of the Student



## PHOTOS AND VIDEO LINKS

