SAFESTEPS

A PROJECT REPORT

On

AGB1211 – DESIGN THINKING

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING
(COMPUTER SCIENCE AND ENGINEERING)

In

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

M. KUMARASAMY COLLEGE OF ENGINEERING
(Autonomous), KARUR

ANNA UNIVERSITY :: CHENNAI 600 025

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M. KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution affiliated to Anna University, Chennai)

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BONAFIDE CERTIFICATE

This is to certify that this project report **"SAFESTEPS"** is the bonafide work done by **ASHWANTH R (927624BAM004), BHARATHI R (927624BAM005), BHUVANASRI T (927624BAM006)** during the academic year 2025-2026 under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER   **EXTERNAL EXAMINER**

Programme: B.E. CSE(Artificial Intelligence and Machine Learning)

Vision of the Department:

To become a renowned hub for AIML technologies to producing highly talented globally recognizable technocrats to meet industrial needs and expectation.

Mission of the Department:

M1: To impart advanced education in AI and Machine Learning built upon a foundation in Computer Science and Engineering
M2: To foster Experiential Learning quips students with engineering skills to tackle real world problems.
M3: To promote collaborative innovation in AI and Machine Learning and related research and development with industries.
M4: To provide an enjoyable environment for pursuing excellence while upholding strong personal and professional values and ethics.

Programme Educational Objectives (PEOs):

Graduates will be able to:

PEO1: Excel in technical abilities to build intelligent systems in the fields of AI&ML in order to find new opportunities.
PEO2: Embrace new technology to solve real-world problems, whether alone or as a team while prioritizing ethics and social benefits,
PEO3: Accept lifelong learning to expand future opportunities in research and product development.

Mapping of Programme Educational Objectives with Mission of the Department:

PEOs / Department Mission Statements	M1	M2	M3	M4
PEO1	3	3	2	3
PEO2	3	3	2	2
PEO3	3	2	3	2

1: Slight (Low)   2: Moderate (Medium)   3: Substantial (High)

Programme Outcomes (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs):

PSO1: Expertise in tailoring ML Algorithms and models to excel in designated applications and fields.

PSO2: Ability to conduct research, contributing to machine learning advancements and innovations that tackle emerging social challenges.

Mapping of Programme Educational Objectives with Programme Outcomes and Programme Specific Outcomes:

PEOs / POs & PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PEO1	3	2	2	2	3	2	3	3	1	2	3	1	3	1
PEO2	2	2	3	2	3	3	3	2	2	3	2	3	3	2
PEO3	3	3	2	3	3	2	3	3	3	2	3	3	2	3

1: Slight (Low)   2: Moderate (Medium)   3: Substantial (High)

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2	31.07.2025	Create a Clear and Actionable problem Statement with require root cause analysis and problem framing techniques	
3	07.08.025	Visualize a solution using imagery to envision possibilities and bring them into real time	
4	14.08.2025	Perform a Brainstorming technique to generate new ideas and possibilities with divergent and convergent thinking	
5	28.08.2025	Perform a Mind mapping to generate insights from exploration activities and using those to create design criteria.	
6	13.09.2025	Implement a concept development to assemble innovative elements into a coherent alternative solution using rapid prototyping techniques.	
7	09.10.2025	Perform an assumption testing through gathering feedback from users and iterating them	
8	16.10.2025	Identify the market opportunities for Commercialization through PEST (Political , Economic, Social and Technological) analysis	
9	30.10.2025	Prepare documentation (including detailed descriptions, drawing, Prototypes, or samples of Invention or creation) to file for patent / Intellectual Property Right.	
10	20.11.2025	Prepare a business model canvas chart and pitching.	

ABSTRACT

Women's safety continues to be a critical concern in today's world, with rising incidents of harassment, unsafe travel conditions, and emergency situations where immediate help is often inaccessible. Traditional safety applications require manual interaction, which becomes difficult during panic or high-risk situations. To address this challenge, SafeSteps is designed as an AI-powered mobile companion that provides real-time protection, instant emergency support, and consent awareness education.SafeSteps integrates innovative features such as whisper-activated SOS triggers, AI-based safe-route navigation, auto-generated emergency alerts, live location sharing, background audio recording, and screen-off activation, ensuring rapid response even when a user cannot physically interact with the phone. The application also includes a Consent Awareness Module that educates users through interactive scenarios, promoting safe relationships and informed decision-making.

Exp No: 1 Date: 24.07.2025	**Perform a journey mapping to understand and assess the user needs by developing user personas and empathy maps**

Aim

To study and apply Journey Mapping, User Personas, and Empathy Maps to understand user needs, emotions, and behaviors for the SafeSteps AI Companion, and complete one assessment based on these design-thinking tools.

Module Overview

This module helps in understanding the experiences and needs of users who interact with the SafeSteps AI Companion, an emergency safety platform designed for women. Using Journey Mapping, User Personas, and Empathy Maps, we explore users' pain points, behaviors, emotions, and expectations to create a more reliable and user-centered safety solution.

1. Introduction to Journey Mapping

Definition and Importance

What is Journey Mapping?

Journey Mapping is a visual representation of the user's complete experience with the SafeSteps AI Companion — from the moment they feel unsafe, to triggering the SOS, to receiving help.

Importance of Journey Mapping for SafeSteps

Journey Mapping helps to:

- Understand real-world emergency behavior of women.

- Identify emotional states from fear → action → relief.

- Spot vulnerabilities, delays, or confusion in the safety process.

- Improve the speed, clarity, and reliability of the SOS system.

- Ensure the solution supports the user in high-stress situations.

Steps to Create a Journey Map

1. Define the Scope

We map the journey of a woman who:

"Feels unsafe → Opens SafeSteps → Presses SOS → Shares location → Receives help."

2. Research

Data was collected through:

- Interviews with college students
- Observations of how quickly users interact with emergency buttons
- Small usability tests of the current prototype

3. Identify Touchpoints

- User opens the SafeSteps website
- Presses the SOS button
- Live location is fetched
- WhatsApp / SMS alert is sent
- Emergency contact responds and helps

4. Create the Map

The journey map includes:

- Stages: Fear → Action → Alert → Tracking → Help
- User Actions: Finding the SOS button, clicking it, sharing GPS
- Emotions: Panic, urgency, relief
- Pain Points: Delay in GPS, fear during emergency
- Opportunities: Add voice activation, vibration feedback, clearer UI

5. Analyze Opportunities

Journey mapping showed improvement needs:

- Faster location update
- More visible SOS button
- Auto-alert system if user is unable to click

Tools & Techniques Used

- Flowcharts and digital diagrams
- User interviews and surveys
- Observation during prototype testing
- Mapping software like Miro (simple flow diagrams)

2. Developing User Personas

Definition and Importance

What are User Personas?

User Personas are fictional characters created to represent real users of the SafeSteps system, based on research.

Importance for SafeSteps

User Personas help to:

- Understand different safety needs of women
- Predict emergencies and user behavior
- Design a simple and intuitive user interface
- Prioritize life-saving features

Steps to Create User Personas

1. Conduct Research

Interviews and surveys focused on:

- Age groups using SafeSteps
- Common safety concerns
- Emergency behaviors
- Technology usage habits

2. Identify Patterns

Two major user types emerged:

- College students travelling at late hours
- Working women who commute alone

3. Create Detailed Profiles

Persona 1 – College Student

Name: Aisha, 20

Location: Urban

Goals: Stay safe while traveling between hostel and college

Frustrations:

- Fear of harassment

- Parents worry constantly
  Behaviors:
- Uses mobile a lot
- Prefers simple one-click solutions
  Quote: *"In an emergency, I need the fastest way to alert someone."*

Persona 2 – Working Professional

Name: Divya, 28

Location: City outskirts

Goals: Safety during late-night shifts

Frustrations:
- Poor lighting, unsafe areas
- Slow response from family
  Behavior:
- Uses WhatsApp frequently
- Prefers automated alerts
  Quote: *"My safety depends on how quickly someone knows I'm in danger."*

4. Validate Personas

Personas were shared with classmates and real users for confirmation. Updated pain points and motivations were added based on feedback.

3. Creating Empathy Maps

Definition and Importance

What is an Empathy Map?

An Empathy Map represents what the user Says, Thinks, Does, and Feels, especially in an emergency.

Importance for SafeSteps

Empathy Maps help to:
- Understand fear and stress during danger
- Design a UI that works under panic
- Build emotional connection with users
- Improve the safety experience

Steps to Create Empathy Map

1. Collect Data

Collected from:

- Interviews
- Observation of emergency behavior
- Prototype usage feedback

2. Divide into 4 Quadrants

- Says: "I need help fast!"
- Thinks: "Will someone reach me in time?"
- Does: Opens phone, searches SOS, clicks button
- Feels: Panic, fear, urgency

3. Populate Map with Insights

Added actual quotes, emotional cues, and observed actions.

4. Analyze Insights

Identified needs:

- Big, visible SOS button
- Auto-send alerts
- Vibration confirmation

Practical Example – Empathy Map for SafeSteps User

Says:

"I need an emergency button that works instantly."

"Someone must know my exact location."

Thinks:

"What if my phone hangs?"

"Is location accurate?"

Does:

- Unlocks phone quickly
- Clicks SOS
- Looks for confirmation

Feels:

- Panic
- Fear

- Relieved once alert is sent

4. Practical Activities & Assignments

Activity 1 – Journey Mapping

Objective:

To map the journey of a woman using SafeSteps during an unsafe situation.

Steps:

1. Select a scenario (e.g., walking alone at night)
2. Observe user actions
3. Identify emotional states
4. Prepare journey map
5. Present findings

Expected Outcome:

A detailed journey map showing emotions, pain points, and improvement areas.

Activity 2 – User Persona Creation

Objective:

To create accurate personas for SafeSteps users.

Steps:

1. Collect data
2. Cluster user types
3. Create personas
4. Validate
5. Present

Expected Outcome:

Well-defined personas guiding feature development.

Activity 3 – Empathy Map Creation

Objective:

To understand emotional and psychological states of women in emergencies.
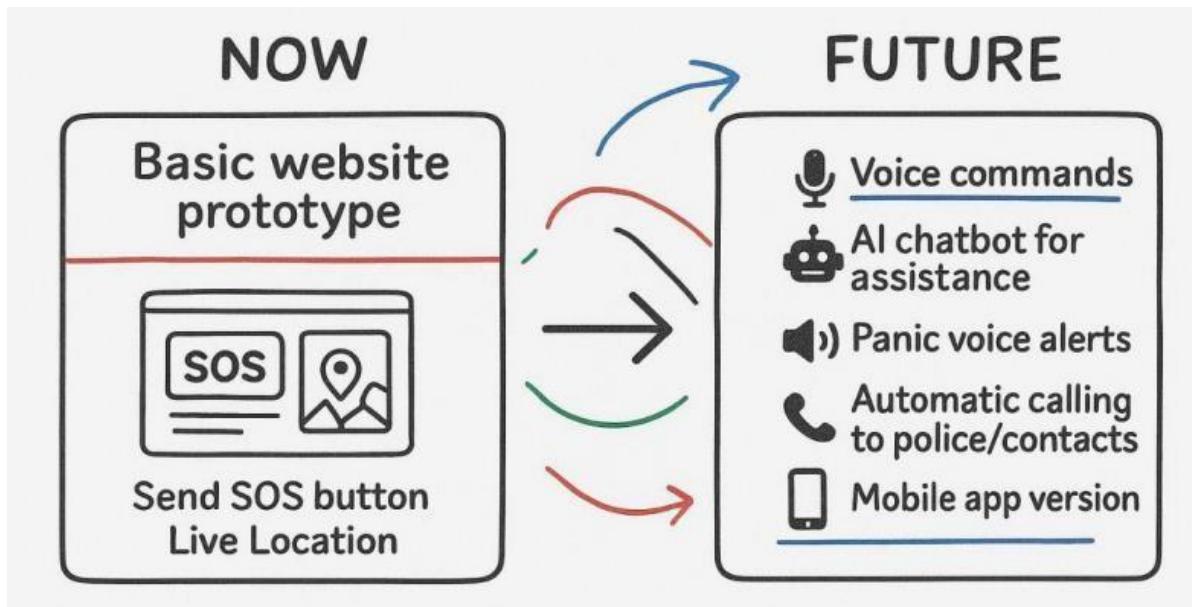
Steps:

1. Conduct interviews
2. Create quadrants
3. Add insights
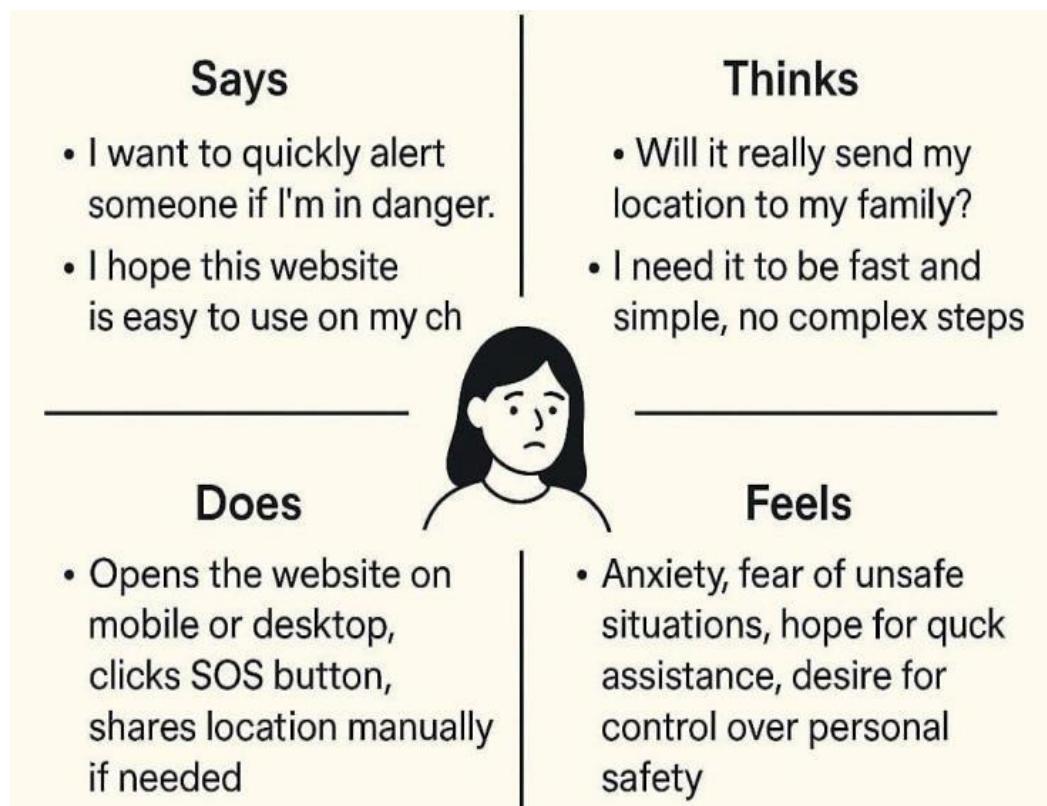
Expected Outcome:

A clear empathy map showing real user fears and needs.

Journey Mapping :

Empathy Mapping :

Result :

The experiment on Journey Mapping, User Personas, and Empathy Maps was successfully completed. A detailed user persona was created to represent the target user group, capturing their goals, motivations, and challenges. An empathy map was developed to understand the user's thoughts, feelings, behaviors, and pain points, which helped build a deeper emotional understanding of user needs. A complete user journey map was also prepared, illustrating the step-by-step experience of users while interacting with the proposed system.

Aim

To study and discuss the creation of clear and actionable problem statements using root cause analysis and problem framing techniques, and apply them to identify and define the core safety issues addressed by the SafeSteps AI Companion project.

Module Overview

This module helps students learn how to create meaningful, concise, and actionable problem statements.

Using Root Cause Analysis and Problem Framing Techniques, we ensure that the SafeSteps project addresses real, underlying safety challenges faced by women, instead of merely treating surface-level symptoms.

1. Creating Actionable Problem Statements

Definition and Importance

What is a Problem Statement?

A problem statement is a clear and concise description of the safety issue faced by users. It defines:

- What the problem is
- Why it matters
- Who is affected
- What impact it has

Importance of Problem Statements for SafeSteps

- Provides clarity on the real safety issue
- Keeps the team focused on solving the right problem

- Helps prioritize features (SOS, location sharing, alerts)
- Ensures all members share a common understanding
- Supports the development of practical, impactful solutions

Characteristics of a Good Problem Statement

1. Clear and Concise

- Avoids technical jargon
- Describes the problem simply (e.g., "Women cannot quickly alert help in emergencies.")

2. Specific

- Focuses on a single safety problem (e.g., delay in sending location)

3. Relevant

- Aligned with the goal of improving women's safety

4. Evidence-Based

- Supported by real observations, user interviews, and safety concerns

5. Actionable

- Leads directly to possible solutions (SOS button, auto-alert system)

Steps to Formulate a Problem Statement

1. Define the Problem

Describe the specific safety challenge women face.

2. Provide Context

Explain the environment, situations, and factors that make this problem serious.

3. Specify Desired Outcome

Define what improvement or change is expected.

Example Problem Statement for SafeSteps

Problem:

Women often struggle to send quick emergency alerts during threatening situations, leading to delayed help and increased vulnerability.

Context:

Many women face unsafe environments while traveling alone, especially at night. The lack of a simple one-click emergency system causes panic, confusion.

Desired Outcome:

To create an instant, reliable SOS system that automatically shares live location with emergency contacts, ensuring faster assistance and improved personal safety.

2. Root Cause Analysis

What is Root Cause Analysis (RCA)?

RCA is the process of identifying the true underlying reasons behind a problem. Instead of treating symptoms, it focuses on fixing the root issue.

Importance of RCA for SafeSteps

- Helps understand why women cannot access help quickly
- Ensures features address real causes, not assumptions
- Leads to stronger, long-term safety solutions
- Avoids repeating the same mistakes in design

Tools for Root Cause Analysis

1. The 5 Whys

Example (Based on SafeSteps Project):

Problem: Women cannot send quick emergency alerts.

Why 1: Because they struggle to find or access the SOS option in time.

Why 2: Because the existing apps are complicated or have multiple steps.

Why 3: Because the design does not consider high-panic situations.

Why 4: Because developers focused more on features than usability. Why

5: Because no user-centered safety design or testing was done.

2. Fishbone Diagram (Ishikawa Diagram)

Problem: Delay in receiving help during emergencies

Categories & Potential Causes:

1. People

- Panic → can't operate phone properly
- Lack of awareness of safety apps

2. Process

- Too many steps to send an SOS

- No auto-trigger mechanism

3. Technology
- Poor GPS accuracy
- Weak network connection

4. Environment
- Dark/unsafe areas
- Isolated locations

5. Device Factors
- Low battery
- Phone locked during emergency

3. Problem Framing Techniques

1. Reframing Technique

Original Problem:

"Women cannot send an SOS quickly."

Reframed Problems:
- "How can we reduce the time to alert emergency contacts?"
- "How can we support women when they panic and cannot operate their phone?"
- "How can we automatically share location without manual input?"

2. SCAMPER Technique for SafeSteps

Problem: Improve emergency alert effectiveness
- Substitute: Replace manual steps with a one-click button
- Combine: SOS + live GPS + auto WhatsApp message
- Adapt: Use browser-based technology (no app needed)
- Modify: Make SOS button larger and more visible
- Put to another use: Use location tracking for post-emergency monitoring
- Eliminate: Remove login steps to speed up alert
- Reverse: Instead of user selecting contacts, pre-save them automatically

3. "How Might We" Questions
- How might we make women feel safer when traveling alone?
- How might we create an alert system that works in just one second?
- How might we reduce panic confusion during emergencies?
- How might we ensure help reaches the user faster?

4. Practical Activities and

Assignments Activity 1: Root Cause

Analysis

Objective:

Identify the real causes behind delayed emergency help for women.

Steps:

1. Choose the problem: "Slow response during emergencies."
2. Apply the 5 Whys analysis.
3. Draw a Fishbone Diagram.
4. Present findings.

Expected Outcome:

A clear understanding of the core safety issues and what must be fixed in the SafeSteps system.

Activity 2: Creating Problem Statements

Objective:

Form clear, impactful problem statements for women's safety issues. Steps:

1. Research the challenges women face.
2. Write a problem statement with problem, context, and desired outcome.
3. Share and refine with team.

Expected Outcome:

Strong, actionable problem statements that guide system design.

Result :

In this experiment, the use of Root Cause Analysis and Problem Framing Techniques proved essential for transforming vague issues into well-defined and actionable problem statements. By systematically examining the underlying causes of the problem and organizing insights, we were able to clearly understand what needs to be solved and why it matters.

Exp No: 3	Visualize a solution using imagery to envision possibilities and bring them into real time
Date: 07.08.2025	

Aim :

To study and visualize solutions using imagery in order to explore possibilities, understand problems deeply, and bring ideas into real-time implementation.

Module Overview

The study and visualization of solutions using imagery involves converting abstract ideas into meaningful visual formats. This process helps in exploring concepts, identifying problems, generating solutions, and implementing them effectively. By using visuals such as diagrams, simulations, prototypes, and dashboards, ideas become easier to understand, more creative, and ready for real-time application.

Introduction

Visualizing solutions using imagery is a powerful method that transforms ideas into visuals like diagrams, charts, prototypes, and simulations. These visual tools improve creativity, understanding, and decision-making. This process helps individuals or organizations clearly imagine possibilities and bring concepts to real life using real-time visual monitoring and feedback systems.

Importance

1. Enhanced Comprehension

Visual tools convert complex problems into simple, understandable representations.

2. Improved Communication

   Images and diagrams help stakeholders understand ideas clearly with fewer mb isunderstandings.

3. Stimulated Creativity

   Imagery encourages new ideas by showing different perspectives and possibilities.

4. Accelerated Decision-Making

   Visual models allows faster and more accurate analysis, helping in quick informed decisions.

Steps Involved

1. Identify the Problem
   - Define the issue clearly
   - Gather relevant information and data

2. Conceptualization
   - Brainstorm ideas
   - Use mind maps, flowcharts, and conceptual diagrams

3. Visualization
   - Create visual solutions using diagrams, models, prototypes
   - Use simulations and 3D representations

4. Implementation Planning
   - Prepare Gantt charts, timelines, and roadmaps
   - Identify resources, milestones, and deadlines

5. Real-Time Visualization
   - Create interactive dashboards
   - Use real-time monitoring systems
   - Collect feedback continuously

6. Execution & Monitoring
   - Implement the plan
   - Monitor outcomes using real-time data tools
   - Adjust strategy based on feedback

Tools & Techniques

1. Conceptual Diagrams
   - Mind Maps: Organize ideas and relationships
   - Flowcharts: Show processes and workflows

2. Simulation & Modeling
   - Digital Simulations (e.g., AutoCAD, AnyLogic)
   - Physical Prototypes (3D models, product samples)

3. Data Visualization
   - Infographics for complex information
   - Charts & Graphs for trends, patterns, and predictions

4. Virtual & Augmented Reality

- VR: Simulated environments
- AR: Overlaying digital data on real objects

5. Interactive Dashboards

- Tools: Tableau, Power BI
- Real-time data monitoring and analytics

6. Collaborative Platforms

- Miro for brainstorming
- Trello for visual project management

7. Feedback Loops

- Tools:Google Forms, SurveyMonkey
- Continuous improvement using visualized feedback

Practical Examples

1. Urban Planning & Development

Scenario

Revitalizing a downtown area to increase livability and economic growth.

Steps & Tools

- Mind maps for oncepts
- 3D models using SketchUp
- VR walkthroughs for stakeholder feedback
- Gantt charts for planning
- Power BI dashboards for real-time progress
- Feedback surveys for citizen input

2. Healthcare Improvement

Scenario

Reducing wait times and improving patient experience in hospitals.

Steps & Tools

- Flowcharts for patient journey
- Simulations for staff optimization
- Visual plans for implementation
- Dashboards to monitor wait times
- Feedback analysis for service improvements

3. Product Design & Development

Scenario

Designing a new consumer electronics product.

Steps & Tools

- Mind maps for idea organization
- Prototypes (digital + physical)
- VR/AR testing environments
- Trello boards for development steps
- Real-time dashboards for project tracking
- User feedback loops for improvements

4. Business Strategy & Planning

Scenario

A company planning to enter a new market.

Steps & Tools

- SWOT diagrams
- Infographics for market data
- Gantt charts for plan execution
- Dashboards for real-time KPIs
- Customer feedback for strategy revision

5. Educational Program Development

Scenario

Creating a new program in Data Science & AI.

Steps & Tools

- Flowcharts for curriculum mapping
- Simulations for student progression
- Visual roadmaps for implementation
- Dashboards for monitoring enrollments
- Feedback loops for continuous improvement

Imaginary Solution :

Result :

The experiment on Creating Clear and Actionable Problem Statements using Root Cause Analysis and Problem Framing Techniques was successfully completed. Through this exercise, a focused and well-defined problem statement was developed by analyzing the issue deeply rather than relying on surface-level symptoms. Root Cause Analysis tools—such as the 5 Whys and Fishbone Diagram—were applied to identify the underlying reasons contributing to the problem.

Exp No: 4 **Date: 14.08.2025**	**Perform a Brainstorming technique to generate new ideas and possibilities with divergent and convergent thinking**

Aim

To perform a brainstorming technique to generate innovative ideas and possibilities for the SafeSteps – AI-Powered Companion App for Women's Safety & Consent Awareness using divergent and convergent thinking.

Module Overview

This module focuses on generating a wide range of creative ideas to enhance and expand SafeSteps features using structured brainstorming. Through divergent thinking, participants explore unlimited possibilities such as new safety features, AI-driven enhancements, and emergency response improvements. Through convergent thinking, the most feasible and impactful ideas are selected and refined into practical solutions.

This process ensures SafeSteps evolves into a highly effective, user-friendly, and technologically advanced safety application for women.

Introduction

Brainstorming is a creativity technique used to generate a large number of ideas for solving a problem or improving a product. It encourages open-minded thinking without criticism, enabling participants to contribute freely.

In the SafeSteps project, brainstorming is used to design new AI safety features, emergency mechanisms, user experience improvements, and consent awareness tools. The session is divided into two phases:

- Divergent Thinking: Generate as many ideas as possible
- Convergent Thinking: Evaluate, refine, and select the best ideas

This structured approach helps produce innovative, practical solutions for improving user safety.

Importance of Brainstorming for SafeSteps

1. Encourages Creativity

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Participants freely generate imaginative safety features—voice triggers, auto alerts, safe-route AI, etc.

2. Enhances Collaboration

Team members combine technical, social, and user-centered perspectives.

3. Generates Multiple Possibilities

A wide variety of solutions for real-life safety problems are explored.

4. Identifies Innovative Solutions

Ideas such as smartwatch integration, geofencing, and AI danger prediction emerge through brainstorming.

5. Boosts Team Confidence

Involvement in idea generation increases ownership, enthusiasm, and motivation.

Steps Involved in Brainstorming for SafeSteps

1. Define the Problem

"How can we improve women's safety using a mobile app with real-time emergency and AI-powered assistance?"

2. Set Ground Rules

- No criticism
- Encourage wild/creative ideas
- Build on others' ideas
- Aim for maximum quantity
- Respect every participant's contribution

3. Select a Facilitator

- The project leader or design-thinking facilitator directs the session.
- Ensures rules are followed, ideas are recorded, and time is managed.

4. Generate Ideas (Divergent Thinking)

- Participants list as many ideas as possible.
- All ideas are written on charts, sticky notes, or digital tools.

5. Categorize & Evaluate Ideas (Convergent Thinking)

- Similar ideas are grouped.
- Each idea is evaluated for feasibility, impact, cost, required technology, and user need alignment.

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6. Select the Best Ideas

- Top ideas with the highest impact and practicality are chosen for development.

7. Develop an Action Plan

- Assign tasks

- Set timelines

- Create implementation roadmap

Tools and Techniques Used

1. Mind Mapping

To visualize connected safety features such as SOS button, tracking, alerts, and consent modules.

2. SWOT Analysis

To analyze strengths, weaknesses, opportunities, and threats of each proposed feature.

3. Six Thinking Hats

To analyze ideas from emotional, logical, creative, and practical viewpoints.

4. SCAMPER Technique

To refine features by:

Substitute – Replace manual alerts with whisper detection

Combine – Merge safe route + live tracking

Adapt – Use AI predictions based on past data

Modify – Enhance UI for 1-click SOS

Put to Use – Use phone sensors for shake detection

Eliminate – Remove slow/manual steps

Reverse – Activate SOS on screen-off

5. Affinity Diagrams

Group ideas into emergency features, safety monitoring, consent awareness, and communication.

6. Brainwriting

Participants silently write ideas before sharing to avoid influence.

7. Nominal Group Technique

Ideas are generated individually, then discussed collectively.

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Application of Divergent and Convergent Thinking for SafeSteps

Divergent Thinking Phase

Objective:

Generate a large number of ideas to enhance user safety, accessibility, and emergency response.

Session Setup:

- Brainstorming room with whiteboard
- Sticky notes / Miro board
- Project team members: developers, designers, users, safety experts

Generated Ideas (Examples): Emergency

Features

- Whisper "Help me" activation
- Shake phone 3 times for SOS
- Auto WhatsApp & SMS alerts
- Hidden emergency mode disguised as calculator
- One-tap floating SOS widget
- Screen-off triple tap panic button

AI & Smart Features

- AI danger prediction based on location history
- Smart safe-route suggestions
- Object detection to sense threats
- Smartwatch and smart earbud integration
- Auto audio recording when threat detected

Tracking & Communication

- 24×7 Live location sharing
- Geo-fenced danger alerts
- Safe circle community alerts
- Nearby users detection for emergency support

Consent Awareness Module

- Interactive scenarios on consent
- Gamified quizzes
- Video-based awareness stories
- "Consent Meter" for relationship education

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User Experience & Accessibility

- Offline mode
- Minimal UI with large SOS button
- Multilingual support
- Dark/light theme toggle

Convergent Thinking Phase

Objective:

Evaluate, refine, and select the most impactful features.

Categorization of Ideas:

Emergency Safety:

- Whisper activation
- Shake-to-alert
- Auto messages

AI Features:

- Danger prediction
- Safe-route AI

Tracking:

- Live location sharing
- Geo-fence alerts

Consent Education:

- Quizzes
- AR scenarios

Evaluation Criteria:

- Feasibility
- Cost
- Technology availability
- User impact
- Implementation time

Selected Ideas for Development:

1. Whisper "help me" activation

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2. Real-time live location tracking

3. Auto WhatsApp/SMS alerts

4. AI safe-route navigation

5. Panic button (1-click + widget)

6. Consent awareness module

7. Smartwatch connection

8. Screen-off activation

Action Plan

1. Whisper Activation

- Task: Build speech recognition module

- Responsible: AI/ML team

- Timeline: 3 weeks

2. Live Location Tracking

- Task: Integrate Google Maps API + Firebase

- Responsible: Mobile dev team

- Timeline: 2 weeks

3. Auto Alerts

- Task: Connect SMS/WhatsApp API

- Responsible: Backend team

- Timeline: 1 week

4. Safe Route AI

- Task: Analyze routes, assign safety score

- Responsible: Data science team

- Timeline: 4 weeks

5. Consent Module

- Task: Create interactive lessons, quizzes

- Responsible: Content + UI team

- Timeline: 2 weeks

6. UI/UX Improvements

- Task: Create wireframes for SOS, dashboard

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- Responsible: Design team
- Timeline: 1 week

Result :

Brainstorming with divergent and convergent thinking helped generate innovative and practical ideas for the SafeSteps application. By using creative tools and structured evaluation, the project identified high-impact safety features such as whisper activation, AI safe-route analysis, live tracking, and consent education. This process ensures SafeSteps becomes an effective, user-centered solution for women's safe

Perform a Mind Mapping to generate insights from exploration activities and using those to create design

Aim

To perform mind mapping in order to generate insights from exploration activities and use those insights to create design criteria for the SafeSteps – AI-Powered Companion App for Women's Safety & Consent Awareness

Overview

Mind mapping is a visual method used to organize insights gathered from exploration activities such as user interviews, field observations, research, competitor analysis, and problem analysis.

For the SafeSteps project, mind mapping helps convert collected information into meaningful clusters such as safety needs, user expectations, pain points, and technological possibilities. These insights are later transformed into clear and actionable design criteria that guide the creation of a user-centered safety application.

1. Understanding the Purpose

Exploration activities for SafeSteps included:

- Interviews with women users about safety concerns
- Analysis of emergency response apps
- Research on safety trends and women's safety statistics
- Study of smartphone sensors, AI capabilities, and location technologies
- Observing real-life safety scenarios (night travel, unsafe zones, panic moments)

The goal is to understand user needs and safety challenges to develop strong, reliable, and quick-response design criteria for SafeSteps

2. Setting Up the Mind Map

Central Node → "SafeSteps – Women's Safety App"

From this central idea, branches are created for the major insight categories.

a) User Needs

- Instant help
- Easy one-tap emergency support
- Privacy and confidentiality
- Multilingual access
- 24×7 tracking support

b) Pain Points

- Slow police/helpline response
- Difficulty calling for help in panic situations
- Fear of being alone while traveling
- Lack of accurate location tracking
- Apps with too many steps during emergencies

c) Market Trends

- AI-based prediction models
- Voice assistants
- Wearable technology (smartwatches, earbuds)
- Increased awareness of consent education
- Rise in personal safety apps

d) Technological Opportunities

- Whisper detection using speech recognition
- GPS + live location tracking
- WhatsApp/SMS emergency APIs
- Cloud storage for audio evidence
- AI danger prediction
- Secure geofencing

3. Adding Detail(Sub-Branches)

User Needs → Sub-Branches

- Convenience: One-tap SOS, floating button
- Accessibility: Offline mode, voice activation
- Trust: Secure data handling
- Awareness: Consent education modules

Pain Points → Sub-Branches

- Slow communication: Manual dialing takes time

- Visibility issues: At night or unsafe routes

- App complexity: Too many steps during panic

- Fear of misuse: Privacy concerns

Market Trends → Sub-Branches

- Smart safety wearables

- AI-enabled route suggestions

- Crowd-sourced safety ratings

- Real-time monitoring dashboards

Technological Opportunities → Sub-Branches

- Shake sensors

- Screen-off activation

- Auto audio recording

- Virtual escort mode

Each detail contributes insights for design refinement.

4. Analyzing and Synthesizing Insights

Patterns and themes identified:

Pattern 1: Need for fast emergency response

Users want instant help → leads to SOS button, whisper activation, shake-to-alert.

Pattern 2: Need for real-time protection

Live tracking + safe-route AI + geofencing.

Pattern 3: Need for awareness and education

Consent learning modules and behavioral scenarios.

Pattern 4: Need for low-effort interaction

Simple UI, minimal steps, and intuitive interface.

Pattern 5: Technological possibilities align with needs

Speech recognition + location AI + cloud alerts = supports core safety goals.

5. Deriving Design Criteria for SafeSteps

Based on insights, the following design criteria are created:

Emergency Safety Criteria

- The app must support 1-tap SOS activation.

- SOS must trigger auto location sharing and auto WhatsApp/SMS alerts.

- Whisper command "Help me" must trigger emergency mode instantly.

- App must start background audio recording when SOS is triggered.

AI & Smart Features Criteria

- Provide AI-generated safe-route uggestions.

- Show danger prediction alerts based on past incidents/location history.

- Implement geofencing to notify trusted contacts if the user leaves a safe zone.

User Interface Criteria

- Emergency button must be visible, large, and accessible on all screens.

- App must be operable with one hand and low-light mode.

- Enable offline usability for rural areas.

Consent Awareness Criteria

- Provide interactive modules such as videos, quizzes, and role-play scenarios.

- Use simple, youth-friendly language.

Security & Privacy Criteria

- Secure encryption for location, audio, and contact data.

- Allow user control over who receives alerts.

6. Prioritizing Criteria

High Priority (Critical):

- 1-tap SOS

- Whisper activation

- Auto alerts

- Live tracking

- Safe-route AI

Medium Priority:

- Consent education module

- Smartwatch integration

- Audio evidence.

7. Iterating and Refining

As the SafeSteps app progresses, the mind map and design criteria are revisited. New insights from testing, user feedback, and safety research are added.

Mind mapping evolves throughout the project to keep the design aligned with:
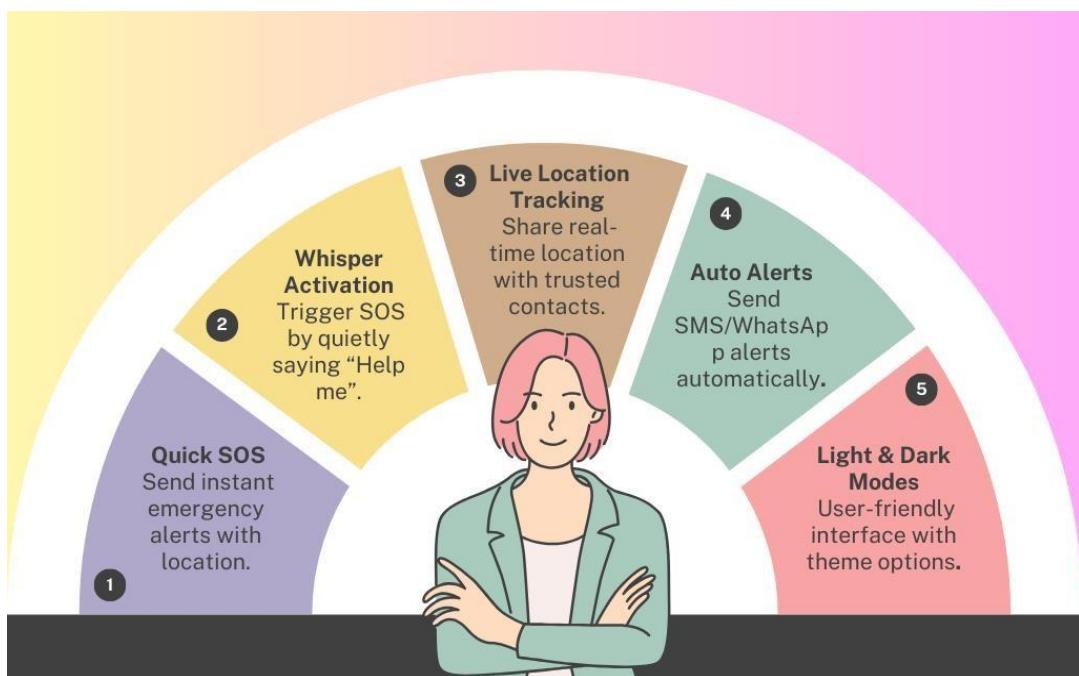
- User expectations
- Technological updates
- Safety standards
- Real-time performance

Tools for Mind Mapping Used in SafeSteps

- Miro → Online collaborative mind map
- XMind → Detailed branching
- Figma/Adobe ID → UI flow mapping

Mind mapping helped visualize safety problems clearly and convert insights into strong design criteria for SafeSteps.

Mindmap :

Result :

The experiment on Mind Mapping to generate insights and develop design criteria was successfully completed.Through the mind-mapping activity, ideas from exploration and research were visually organized into meaningful themes. The connections between user needs, challenges, motivations, and contextual factors became clearer.

Exp No: 6	**Implement a concept development to assemble innovative**
Date: 13.09.2025	**elements into a coherent alternative solution using rapid prototyping techniques**

Aim :

To implement a concept development to assemble innovative elements into a coherent alternative solution for the SafeSteps – AI-Powered Companion App for Women's Safety & Consent Awareness using rapid prototyping techniques.

Overview

This experiment focuses on the development of a clear concept by assembling innovative features into a functional and user-friendly safety application.

Using rapid prototyping, various modules of the SafeSteps app are designed and tested to ensure real-time safety assistance, voice-based activation, and awareness support for women in emergency and preventive situations.

Theory

Concept development is an essential phase where ideas are shaped into tangible solutions through design and experimentation.

For the SafeSteps app, this involves combining advanced technologies such as AI voice recognition, location tracking, and automated alerts into a coherent, functional prototype.

Rapid prototyping allows quick creation and iteration of the app interface and core features to test user experience, usability, and performance before full-scale development.

Steps :

1. Define Objectives and Scope

- Set Goals:

  The objective is to design an AI-based safety companion app that instantly responds to danger through voice or tap activation, while also promoting awareness about consent and safety.

- Identify Constraints:

  Limited development time, Android-first implementation, and real-time response accuracy.

- Assemble the Team:

  A cross-functional team including UI/UX designers, Flutter developers, AI module developers, and testers.

2. Ideation and Concept Generation

- Research and Inspiration:

  Studied existing safety apps and identified gaps such as delayed response and lack of awareness modules.

- Brainstorming Sessions:

  Ideas like "Whisper detection," "AI chatbot for consent," and "Auto WhatsApp alert" were generated.

- Concept Sketching:

  Initial wireframes of the home screen, panic button, and chatbot interface were drawn using Figma.

3. Concept Selection and Refinement

- Establish Evaluation Criteria:

  Criteria included user-friendliness, fast response time, innovation, and feasibility.

  Screen and Prioritize Concepts:

  The top features selected were: Panic Button, AI Voice Activation, Real- Time Tracking, and Auto Alerts.

- Detailed Concept Development:

  Finalized app flow connecting SOS activation, Firebase alert, and tracking system.

4. Rapid Prototyping

- Select Prototyping Method:

  - Low-Fidelity Prototypes: Hand-drawn screen sketches and layout designs.
  - High-Fidelity Prototypes: Interactive digital UI using Figma and Flutter.
  - Digital Prototypes: Working model with sample Firebase backend and simulated alerts.

- Build Prototypes:

  Created using Flutter framework with integrated mock location and message APIs.

- Iterate Quickly:

  Tested early designs and improved based on user feedback for better accessibility and color contrast.

5. Testing and Validation

- Usability Testing:

  Prototype tested by users to check the responsiveness of the SOS button, chatbot clarity, and UI simplicity.

- Technical Testing:

  Firebase message trigger, GPS location accuracy, and whisper activation response were validated.

- Analyze Feedback:

  Users appreciated fast alert speed and intuitive UI but suggested adding a light/dark theme toggle.

6. Refinement and Iteration

- Incorporate Feedback:

  Added a theme switcher, optimized alert timing, and improved chatbot text clarity.

- Further Iteration:

  Repeated testing for better whisper recognition accuracy.

- Final Prototype:

  A functional prototype including all major modules — SOS alert, AI voice trigger, location tracking, and consent chatbot — ready for demonstration.

7. Documentation and Presentation
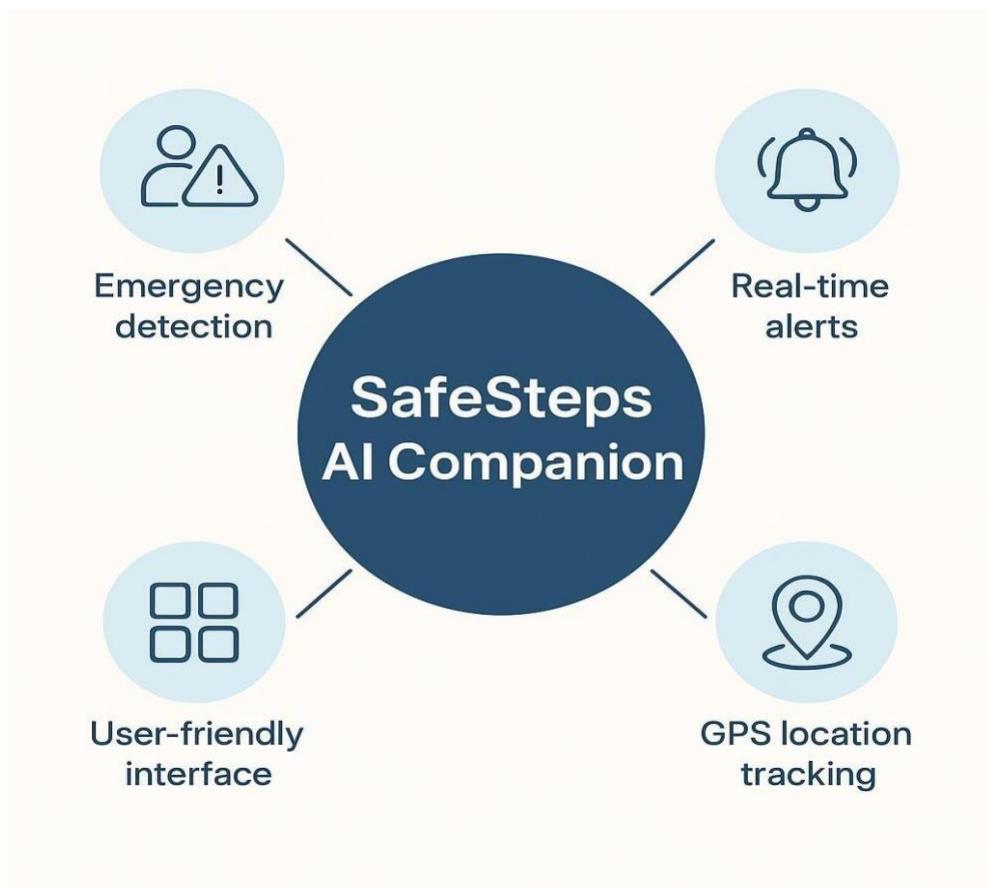
- Document the Concept:

  Created detailed reports, design screens, and module architecture with Firebase connectivity.

- Prepare Presentations:

  Developed PowerPoint slides with app flow, UI screenshots, and working demo video.

- Stakeholder Review:

  Presented to faculty panel for feedback and improvement suggestions.

8. Transition to Development

- Handoff to Development Team:

- Shared finalized Flutter code, Firebase setup details, and prototype UI files.
- Plan for Production:

  Defined user registration, background service, and database management modules.
- Monitor Progress:

  Ensured that the final APK matches the original concept design and performance expectations.

Prototype

Result :

The experiment on Concept Development and Rapid Prototyping was successfully carried. During this activity, multiple innovative elements gathered from research, brainstorming, and exploration were synthesized into a coherent alternative solution. Concept development techniques helped in prioritizing ideas, combining complementary features, and refining the proposed solution to better address user needs and problem requirements.

Perform an assumption testing through gathering feedback from users and iterating them

Aim:

To perform assumption testing by gathering feedback from users for the SafeSteps AI Companion project and iterating the prototype for improvement.

Theory:

The SafeSteps AI Companion project focuses on enhancing women's safety through an emergency SOS system that shares live location and sends alerts via WhatsApp or SMS. Testing user assumptions helps to validate whether the current prototype meets user expectations and identifies areas of improvement.

Assumption testing involves designing a prototype, allowing real users to interact with it, collecting their feedback, and iterating based on the findings. By following the Build–Measure–Learn feedback loop from the Lean Startup methodology, continuous improvements can be made to enhance usability, trust, and reliability.

This testing helps in:

1. Validating whether users find the SOS system quick and reliable.
2. Understanding if the interface is simple and clear during emergencies.
3. Identifying improvements required in alert delivery and location tracking.

Procedure:

STEP 1: User Testing Perspectives

- User-Centric View:

  From the user's side, testing the SOS button and live location helped understand usability and comfort in emergency-like situations. Users provided insights about button responsiveness, message clarity, and alert speed.

- Business Perspective:

Feedback helped validate the assumption that a one-click SOS website increasesuser confidence and trust. It also showed potential for future features like AI chatbot and wearable integration.

- Design & Development Team: The testing helped identify UI improvements, such as larger buttons, clearer messages, and theme options (light/dark).

STEP 2: User Testing Methodology Type of

Testing Used:

- Usability Testing: Users were asked to trigger SOS alerts and observe response time and interface clarity.
- Remote Testing: Conducted through sharing the prototype link and collecting responses through feedback forms.
- Beta Testing: A few early users tested the prototype under simulated emergency conditions.

STEP 3: Best Practices Followed

- Defined clear objectives: to check ease of use, alert delivery, and location accuracy.
- Selected diverse participants including college students and working women.
- Used real-time scenarios such as "Send SOS in an emergency."
- Observed user behavior, noting their comfort level and confidence using the interface.
- Collected both verbal feedback and written survey responses.

STEP 4: Feedback Collection

Feedback was gathered through an online form and personal interactions. The insights were categorized under key features of the prototype.

Feedback from Users:

Feature	User Feedback
SOS Button	Users found the SOS button easy to use but suggested adding vibration or sound feedback for confirmation.
Location Sharing	Users appreciated the live location feature but requested faster and more accurate updates.
Alert Notifications	Most users liked WhatsApp alerts but asked for SMS fallback in case of no internet.

| User Interface | Users praised the clean design and recommended theme options and larger buttons. |
| Registration/Support | Users wanted a quick tutorial for first-time use and appreciated the concept of wearable device integration. |

STEP 5: Iteration and Refinement

Based on feedback, the following improvements were planned:

1. Add sound/vibration confirmation when SOS is triggered.
2. Optimize GPS refresh rate for better accuracy.
3. Include SMS fallback in message delivery.
4. Improve UI with larger SOS button and optional themes.
5. Add tutorial pop-up for new use

Feedback from users :

SOS BUTTON

Users found the SOS button easy to use and reliable during testing. Some suggested adding vibration or sound feedback when the SOS is triggered for better confirmation.

LOCATION SHARING

Most users appreciated the live location sharing feature. They said it gave them a sense of security, but requested more accurate and faster GPS updates.

ALERT NOTIFICATION

Users liked that alerts were sent instantly through WhatsApp. However, they suggested adding SMS fallback in case of poor internet connectivity.

USER INTERFACE

Feedback highlighted that the website layout was simple and clear. Some recommended adding dark/light theme options and larger buttons for quick access.

REGISTRATION AND SUPPORT

Users felt the setup process was smooth but suggested including a quick tutorial for first-time users. They also appreciated the idea of linking the system with wearable devices in the future.

Result:

The user testing and feedback process successfully validated the key assumptions of the SafeSteps AI Companion project. The participants found the platform to be simple, functional, and highly relevant for real-life emergency situations. The one-click SOS feature worked effectively and was appreciated for its speed and ease of use.

Exp No: 8	Identify the Market Opportunities for Commercialization through PEST (Political, Economic, Social, and Technological) Analysis
Date: 16.10.2025	

Aim :

To identify and evaluate the market opportunities and external factors influencing the commercialization of the SafeSteps AI Companion, a women safety web- based application, through PEST (Political, Economic, Social, and Technological) analysis.

Theory:

Every product or service is influenced by external environmental factors that can either support or hinder its success. The PEST Analysis is a strategic framework used to analyze these macro-environmental factors — Political, Economic, Social, and Technological — that shape the market conditions and affect decision- making.

For the SafeSteps AI Companion, which aims to ensure women's safety through a one-click SOS alert and live location-sharing system, understanding these external factors is crucial for identifying its market potential, feasibility, and sustainability.

Introduction to SafeSteps AI Companion:

The SafeSteps AI Companion is a smart safety solution designed to help women and vulnerable individuals during emergency situations. It features:
- A one-click SOS button that immediately shares the user's live location.
- Integration with WhatsApp and SMS to send alerts to pre-configured emergency contacts.
- Real-time GPS tracking and a simple, user-friendly web interface.
- Future scope for AI-driven chat assistance, voice-activated emergency trigger, and wearable device integration.

Procedure:
- Step 1: Identify Political Factors

1. Government Safety Initiatives:
   - India has multiple initiatives like the Nirbhaya Fund, Safe City Project, and Digital India Mission that promote the creation of digital safety and women empowerment solutions.
   - These initiatives encourage innovation and provide a supportive ecosystem for startups developing safety-related applications.

2. Policy and Regulation Support:
   - With government emphasis on women's safety and technology- based solutions, regulatory bodies such as the Ministry of Women and Child Development and Ministry of Electronics and IT actively support such innovations.
   - Grants and funding programs offer additional financial support for social impact projects.

3. Data Privacy and Protection:
   - The introduction of the Digital Personal Data Protection Act (DPDPA), 2023 ensures data privacy, which builds user trust in safety applications.
   - SafeSteps AI Companion ensures compliance with privacy standards to protect user data and location information.

4. Potential Collaboration Opportunities:
   - Collaboration with law enforcement agencies and NGOs can enhance the effectiveness and credibility of the system.
   - Integration with government helplines (like 112) could improve response

Step 2: Identify Economic Factors

Economic factors determine the financial feasibility, accessibility, and scalability of the SafeSteps AI Companion project.

1. Cost Efficiency:
   - The SafeSteps system primarily uses open-source web technologies (HTML, CSS, JavaScript) and APIs like Twilio, keeping the cost low.
   - This makes the solution affordable for both users and institutions like colleges or communities to adopt.

2. Economic Growth and Market Expansion:
   - India's booming digital economy and increasing smartphone usage support the commercialization of web-based safety tools.

- According to *Statista 2025*, India has over 750 million smartphone users, making mobile web apps highly accessible.

3. Funding and Investment Opportunities:
   - The safety and tech-for-good sector attracts funding from CSR programs, startup accelerators, and government innovation schemes.
   - The project can attract social investors due to its public welfare focus.

4. Employment and Skill Development:
   - Projects like SafeSteps AI Companion encourage opportunities in AI, IoT, and software development, fostering digital employment.

 Step 3: Identify Social Factors

Social factors play a vital role in determining how users perceive and adopt safety technologies.

1. Rising Safety Concerns:
   a. Increasing incidents of harassment and unsafe travel situations have led to a growing demand for safety solutions, especially among college students and working women.
   b. Users now seek quick and easy-to-use safety systems rather than complex apps.

2. Changing Social Awareness:
   a. Society is more vocal about personal safety and mental security, making such tools socially relevant.

   b. Campaigns like Beti Bachao Beti Padhao and Women Safety Awareness Drives enhance acceptance of such innovations.

3. User Behavior and Trust:
   a. The success of any safety app depends on the trust it builds. By using privacy-first principles and transparent data handling, SafeSteps ensures credibility.
   b. The system's simplicity (just one click to send alerts) builds user confidence in
      i. emergencies.

4. Target User Demographics:
   a. Primary users: Women aged 15–45 years (students, professionals).
   b. Secondary users: Elderly citizens, late-night travelers, delivery workers, and other vulnerable groups.

5. Cultural Adaptability:
   a. The system avoids gender or age bias and can be customized for different regions and languages in India.

Step 4: Identify Technological Factors

Technological factors determine the potential for innovation, scalability, and integration in future applications.

1. Integration with Emerging Tech:
   - GPS, AI chatbots, and IoT devices can be used to automate help responses and detect danger through voice or motion.
   - Future versions can integrate with wearable devices like smartwatches or pendants for instant SOS triggering.

2. API and Cloud Services:
   - Use of Twilio API for WhatsApp/SMS integration allows global scalability.
   - Cloud deployment ensures reliable performance and minimal downtime during emergencies.

3. AI and Predictive Systems:
   - AI algorithms can analyze user patterns and automatically alert trusted contacts if irregular activity is detected (e.g., sudden stop or phone shake).

4. Accessibility and UI Enhancements:
   - The platform uses responsive design to ensure it works across all devices and screen sizes.
   - Accessibility features like voice trigger and dark/light mode ensure inclusivity.

5. Rapid Technological Growth:
   - The increase in low-cost data and advanced GPS chips makes real- time tracking smoother and more accurate.

Step 5: Market Opportunities Based on PEST Analysis

Factor	Opportunity Identified
Political	Government safety initiatives and policy support can fund and promote SafeSteps.
Economic	Low-cost web deployment ensures affordability and scalability across urban and rural markets.
Social	Growing awareness and need for women's safety increase user acceptance.
Technological	Integration with AI, GPS, and messaging APIs enables rapid innovation and wide adoption.

Step 6: Challenges & Threats

- Possible misuse of location-sharing features if not handled securely.

- Data privacy risks in the absence of end-to-end encryption.

- Competition from existing safety apps like 112 India and bSafe.

- Dependence on stable internet connection for real-time updates

Pest Analysis :

Market Opportunity Commercialization (PEST Analysis)

To analyze the external macro-environmental factors influencing the market opportunity and commercialization of SafeSteps AI Companion.

Political Factors

Government Safety Initiatives
Support from government schemes Ubraia Fund and Digital india promotes enroergency technology

Policy Support
Growing focus on women's security and emergency response systems offers opportunities for public

Economic Factors

Growing Smartphone Market
Increased mobile penetration makes a digital safety apps accessible and affordable.

Startup Funding & Innovation Grants
Government and privata funding for safety tech startups create a supportive business environment

Social Factors

Rising Safety Concerns
Growing awareness about women's safety increases demand for reliable SOS and tracking syst

User Acceptance
Users prefer selar, simple, one-click solutions that can alert family of authorities instantly

Technological Factors

Advancement in GPS & AI
Real-time location tracking. Voice activation, and AI-based alerts improve reliability and response time

Integration with Messaging Platforms
Twillo, WhatsApp and SMS APIs enable fast mmergen communications

Result :

The experiment on Identifying Market Opportunities for Commercialization using PEST (Political, Economic, Social, and Technological) Analysis was successfully completed.By systematically examining the external macro- environmental factors, several potential opportunities and risks influencing commercialization were identified. or restrict market entry.

Exp No: 9	**Prepare Documentation to File for Patent / Intellectual**
Date: 30.10.2025	**Property Rights**

Aim :

To prepare documentation required to file for Patent / Intellectual Property Rights for the innovation developed as part of the project

Overview:

This experiment focuses on preparing patent documentation, including detailed descriptions, drawings, prototypes, and invention samples, required for filing a Patent or an Intellectual Property Right (IPR).

In the context of the SafeSteps – AI-Powered Companion App for Women's Safety & Consent Awareness, proper documentation is essential to prove novelty, functionality, and eligibility for patent protection.

Theory:

A Patent is a legal right granted to inventors for their unique inventions, giving them exclusive rights to make, use, and sell their invention for a limited period of time. Patents ensure innovation is protected and commercially secured.

Types of Patents:

1. Utility Patent

- Protects the functional aspects of an invention: how it works, how it is used.
- Covers algorithms, systems, processes, and technical features.
- Both Provisional and Non-Provisional patents come under this category.
- For SafeSteps, the novel AI safety features (whisper activation, automated alert engine, safe-route AI) fall under *utility patents*.

2. Design Patent

- Protects the visual design, aesthetics, or ornamental appearance of a product.
- Not related to function.

- Example: Shape of the Coca-Cola bottle.
- For SafeSteps, UI layout and icon designs may be eligible.

3. Plant Patent

- For inventing/discovering new asexually reproducible plant varieties.
- Not applicable to software or safety applications.

Procedure:

1. Determining Patent-ability

Before filing, the invention must meet the following criteria:

- Novelty:

  The invention must be new and not previously disclosed.

  (SafeSteps introduces whisper activation + AI alert engine combination not found in existing apps.)

- Non-obviousness:

  A skilled person should not be able to easily guess the invention from existing technologies.

- Usefulness:

  The invention must provide practical benefit to society.

  (SafeSteps improves women's safety in real-world emergencies.)

A preliminary patent search is recommended to confirm no identical prior art exists.

2. Conducting a Patent Search: Prior Art IdentificationPatent search involves exploring:

- Existing patents (Google Patents, USPTO, WIPO database)
- Research papers
- Safety application designs
- Technical publications

Purpose:

- Identify similar inventions
- Confirm uniqueness
- Strengthen patent claims for SafeSteps

3. Preparing the Patent Application

A complete patent application includes:

- Title of the invention

- Abstract
- Background / Problem Statement
- Summary of invention
- Detailed description of components
- Technical drawings, flowcharts, UI diagrams
- Claims (most important section)

For SafeSteps, the documentation must describe:

- Whisper "Help Me" activation mechanism
- Auto-alert system with live tracking
- SafeRoute AI navigation
- Consent awareness engine
- Background safety automation

All parts must follow patent office formatting guidelines.

4. Filing the Patent Application

Once documentation is complete, the application is filed with:

- Indian Patent Office (IPO) or
- USPTO or
- WIPO (for international patents)

Filing includes:

- Submitting forms
- Uploading documentation
- Paying the required government fees

SafeSteps may file a Provisional Patent first to secure early filing date.

5. Patent Examination Process

After filing, the patent office examines the application for:

- Novelty
- Clarity
- Claims validity
- Technical correctness

This process may take months to years depending on jurisdiction.

6. Responding to Patent Office Actions
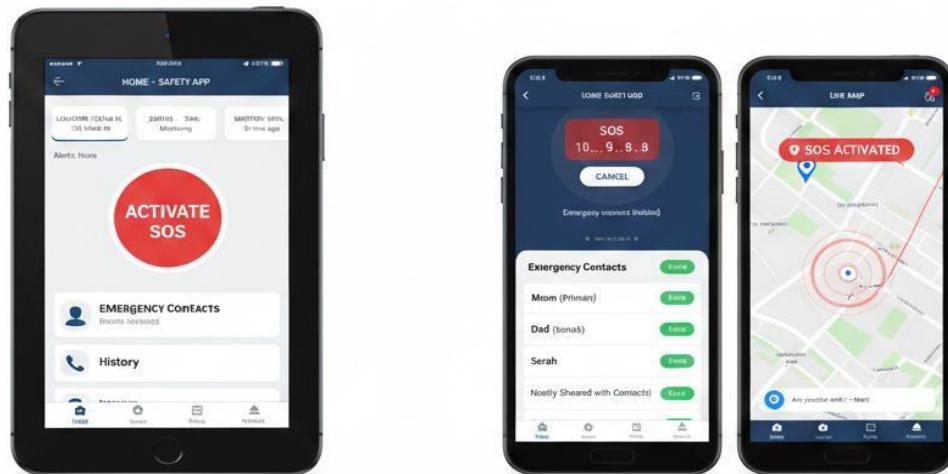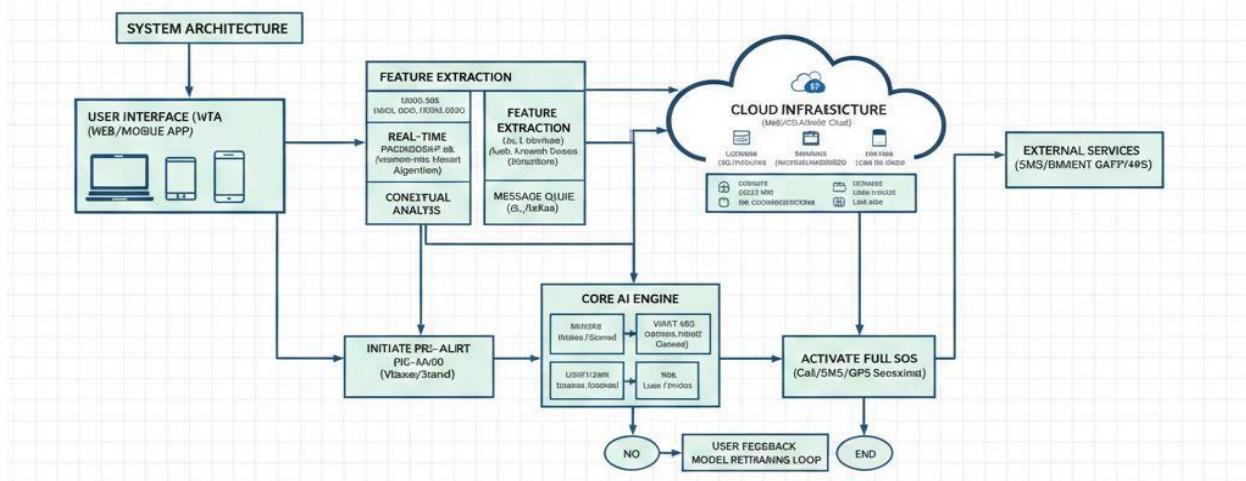
Patent examiners may send:

- Objections

- Requests for clarification
- Requests for modification

A strategic approach ensures the application continues without rejection.

IPR Submission :

Result :

The required documentation for filing a patent/IPR was successfully prepared, including title, abstract, background, description, diagrams, and claims. The documentation clearly explains the invention and meets the criteria necessary for patent application.

Prepare a business model canvas chart and pitching

Aim:

To prepare a business model canvas chart and pitching.

Overview:

This experiment focuses on preparing a Business Model Canvas (BMC) chart and pitching the business. The BMC helps organize business ideas in a structured way, mapping out all the key components of a business model.

Theory:

A Business Model Canvas is a strategic tool that allows entrepreneurs to visualize and analyze all elements of a business. It includes nine blocks: Value Proposition, Customer Segments, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure.

Procedure (SafeSteps – AI-Powered Women's Safety App):

1. Value Proposition:
   - o Provides instant emergency assistance via a panic button.
   - o Real-time location tracking and audio recording during emergencies.
   - o "Whisper activation" for discreet help requests using the keyword "help me."
   - o Awareness about consent and personal safety.
   - o Mobile-friendly interface with light/dark themes for accessibility.

2. Customer Segments:
   - o Women of all age groups concerned about safety.
   - o Parents or guardians monitoring young women.
   - o NGOs and organizations promoting women's safety.
   - o Colleges, workplaces, and public institutions implementing safety measures.

3. Channels:
   - o Mobile app stores (Google Play, Apple App Store).

- o Social media platforms (Instagram, Facebook, Twitter).
- o Partnerships with colleges, workplaces, and NGOs.
- o Online safety blogs, newsletters, and awareness campaigns.
- o Word-of-mouth and referral programs.

4. Customer Relationships:
   - o Personalized experience via user profiles and emergency contact management.
   - o Automated alerts to trusted contacts and authorities.
   - o In-app guidance, tips, and safety resources.
   - o Support through FAQs, chatbots, and customer service.

5. Revenue Streams:
   - o Freemium model: free basic features + premium subscription for advanced features.
   - o Partnerships with NGOs, colleges, and safety organizations.
   - o In-app sponsorships or advertisements for safety products/services.

6. Key Resources:
   - o Mobile application (Flutter-based) and development team.
   - o Firebase backend for authentication, storage, and real-time tracking.
   - o AI algorithms for "Whisper activation" detection.
   - o Cloud infrastructure for storing alerts, recordings, and location data.
   - o Brand and marketing materials for outreach.

7. Key Activities:
   - o Develop and maintain app features (panic button, location tracking, whisper detection).
   - o Conduct user testing and feedback collection.
   - o Implement updates, security patches, and AI model improvements.
   - o Marketing and awareness campaigns to increase adoption.
   - o Collaborate with safety organizations and local authorities.

8. Key Partnerships:
   - o Local law enforcement or emergency services for alert integration.
   - o NGOs promoting women's safety and awareness.
   - o Cloud service providers for backend infrastructure.

Business Model :

Result :

The experiment helped in understanding how to design a complete business model using the Business Model Canvas framework. It also improved pitching skills by guiding how to present an idea in a structured and compelling manner.Thus, the exercise successfully demonstrated the process of converting an idea into a clear, feasible, and presentable business concept.