

2025-2026-2 Human-Machine Interaction

Group Project

Redesign a Real Accident from an HMI Perspective

1. Project Goal

In this project, your team will propose and prototype a human-machine interface for a new intelligent application scenario. The emphasis is not on finding a problem in an existing product, but on designing a suitable interaction solution for a clearly defined user, task, and context.

- Define a meaningful application scenario that involves intelligence, automation, sensing, or decision support.
- Identify target users, user goals, and the operating context.
- Design the interaction flow, interface elements, feedback, and control logic.
- Build a prototype that communicates your design clearly.
- Conduct a small user evaluation and revise the design based on evidence.

2. Project Scope

Your project must involve a system in which humans interact with an intelligent or semi-intelligent system. The scenario can be realistic, speculative, or future-oriented, but it must be concrete enough for task analysis and interface design.

Possible topic directions

- Smart campus assistant for visitors, students, or staff
- AI-supported healthcare or rehabilitation interface
- Intelligent transportation, driving, parking, or navigation support
- Smart home or elder-care interaction system
- Robot, kiosk, wearable, voice, AR, or multimodal interaction system
- Safety-critical monitoring or decision-support interface

Not allowed

- A project that only lists problems without proposing a complete design solution
- A purely technical AI project with no clear HMI component

3. Group Formation

- Group size: **5 students**
- Each group choose one real accident of an intelligent system
- Fill in your group information by 27th March, 2026 (Friday)
<https://docs.qq.com/sheet/DTmVtR1RtTXZEcm1Q>

4. Submission

Compress **GroupXX-Report.pdf**, **GroupXX-Prototype.zip** and **GroupXX-Presentation.pdf** into a final ZIP file named **GroupXX.zip**, where **XX** is your group ID.

4.1 Presentation Requirement

15 mins are assigned for each team. At least two team members must participate in delivering the presentation.

- 10 minutes for presentation (including setup time)
- 2 minutes for Q/A

The presentation slides should be converted to PDF format and named **GroupXX-Prototype.pdf**, where **XX** is your group ID.

4.2 Prototype Requirement

Produce a prototype. This may be a Figma mockup, PowerPoint mockup, paper prototype, clickable demo, or a short prototype video.

- Compress all prototype-related files into a ZIP file named **Prototype.zip**.
- Provide a text file named **readMe.txt** that clearly explains how to open, run, or view the prototype.
- Then compress **Prototype.zip** and **readMe.txt** into a final ZIP file named **GroupXX-Prototype.zip**, where **XX** is your group ID.

4.3 Report Requirements

The report should include the following sections. Keep it concise and visually clear. Use figures, wireframes, storyboards, flow diagrams, and evaluation tables where appropriate, rather than long paragraphs. The maximum length is 20 pages.

The report should be converted to PDF format and named **GroupXX-Report.pdf**, where **XX** is your group ID.

Section Name	Suggested Page Limitation	Detailed Content
Title and team members	1 page	Project title, team members, class, student IDs
Application and motivation	1 page	The problem being addressed, why the scenario matters, why HMI is important in this case
Target users and user needs	1 to 2 pages	Target user group, key user characteristics, main user needs and pain points
Task analysis and context of use	2 to 3 pages	Main tasks, operating environment, constraints, possible risks or difficulties
Design requirements	1 to 2 pages	Functional requirements, usability/safety/feedback requirements, design goals
Proposed HMI solution	2 to 4 pages	Overall design concept, interaction style, key features, explanation of how the design matches the requirements
Prototype description	2 to 3 pages	What was built, fidelity level, tools used, functions demonstrated
Evaluation method and findings	1 to 2 pages	Participants, tasks, evaluation method, major findings only; concise tables or bullet points are preferred
Design revision and reflection	1 page	Suggested changes after evaluation, lessons learned, limitations

Use of LLMs or other tools	1 page	Tools used, how they were used, which parts were human-made, brief honesty statement
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5. Grading

- **Problem Definition (10%)**
Clarity and significance of the scenario definition and motivation
- **User Research (20%)**
Depth and quality of the analysis of users, tasks, and context of use
- **HMI Design (20%)**
Quality, coherence, and originality of the proposed HMI design
- **Prototyping (15%)**
Clarity, completeness, and communicative value of the prototype
- **Usability Evaluation (20%)**
Quality of the evaluation and strength of the evidence-based reflection
- **Presentation (10%)**
Quality of the final presentation and effectiveness of teamwork
- **Adherence to Instructions (5%)**
Compliance with the project requirements and submission instructions

6. Important Dates

Presentation Date: 11th, 12th, 13th May, 2026

Submission Due Date: 14th May, 2026

7. Recommended Tools

1. Diagrams and documentation

- draw.io / diagrams.net
- Lucidchart / Miro
- PowerPoint / Keynote

2. UI and prototyping

- Figma

- Axure

3. Simulation (optional)

- Unity
- Webots / Gazebo
- CARLA (for driving-related cases)

4. Analysis frameworks (lightweight, no heavy math required)

- FMEA-style failure table
- STPA-lite (unsafe control actions)
- NASA-TLX (workload)
- Levels of automation framework
- Situation awareness (Level 1/2/3)