Introduction to Group Project

Intelligent Interactive Systems (1MD032) 2025 - 2026

Project Description

In the final project, you are expected to build a system that

- Automatically analyses human behaviour and affective states and
- Generates in response a socially adaptive behaviour by the Furhat virtual robot.

A scenario/application

e.g., a robotic bartender, a robotic mindfulness coach, etc.

Systems requirements

Sub-system 1 - User Perception

Aim:

To acquire input from a webcam in real time, of a human user or a group of users interacting with Furhat, and to automatically detect their affective states.

Basic requirement:

To train and properly evaluate your own machine learning (ML) system.

Sub-system 2 - Interaction (Furhat)

Aim:

Take two inputs (the affective state produced by the User sub-system 1, and the user's speech) to generate a socially adaptive behaviour by Furhat as response.

Basic requirements:

- ➔ Furhat's behaviour should be a suitable and appropriate response to the users' affective state and the interaction context.
- ➔ You are expected to implement a basic conversation between a human user and Furhat, adhering to a structured dialogue that you have designed.

Grading and Sophistication

The **level of challenge** that you choose in the design and development of these two sub-systems will result in different final grades.

(e.g., the number of modelled facial features and affective states, the number of generated Furhat's behaviours, the complexity of the designed ML and conversation systems, etc.)

Examples of more sophisticated development:

- **Advanced Computer Vision** building on top of foundational models
- **More sophisticated LLM integration** (e.g., multi-modal input-output, dynamic state creation and tracking, thorough evaluation of robustness and fail cases, etc.)
- **Custom Specialisation**

Project Specification

I. Introduction

[One short paragraph about the problem you are trying to solve e.g., "Students are stressed by exams... Meditation exercises can help..."]

II. Elevator Pitch

[One summary sentence about what you want to do e.g., "We want to create a mindfulness robot coach that adapts meditation exercises based on your mood."]

III. Objectives

[Insert a couple of sentences on the overall objective of the project summary here]

1) **Objective 1:** [Description of measurable objective and tool/libraries you plan on using]
2) **Objective 2:** [Description of measurable objective and tool/libraries you plan on using]
3) **Objective 3:** [Description of measurable objective and tool/libraries you plan on using]

IV. Deliverables

[Insert a couple of sentences on the general system you want to deliver at the end of the project]

1) **Deliverable 1:** [Name and brief description of the output]
2) **Deliverable 2:** [Name and brief description of the output]
3) **Deliverable 3:** [Name and brief description of the output]
4) **Presentation/Demo:** [Description of presentation or demonstration requirements]
5) **Final Report:** [Description of report contents and format]

Project Specification

V. Success Metrics

- **Metric 1:** [How will you measure this? What is the target threshold?]
- **Metric 2:** [How will you measure this? What is the target threshold?]
- **Metric 3:** [How will you measure this? What is the target threshold?]
- **Progress Tracking:** [Describe your approach to monitoring project status and milestones]

VI. Potential Issues

- **Issue 1:** [Description of the risk and possible mitigation]
- **Issue 2:** [Description of the risk and possible mitigation]
- **Issue 3:** [Description of the risk and possible mitigation]
- **Time-Intensive Tasks:** [Identify aspects expected to require significant effort]

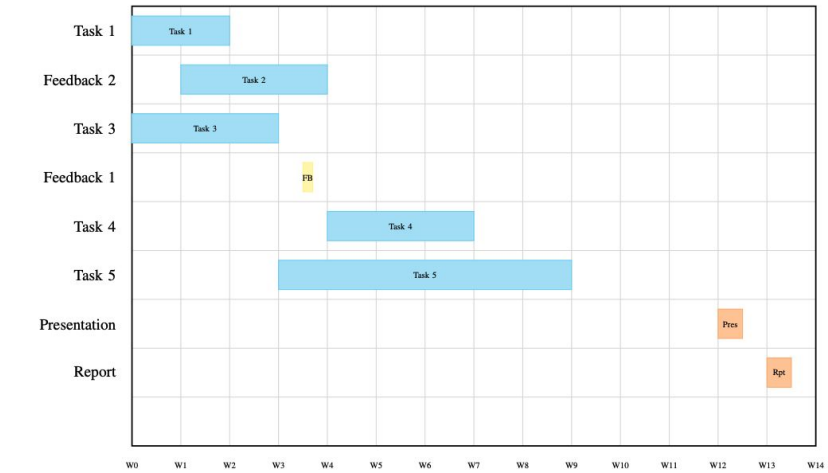
VIII. Aimed Grade

[What grade are you aiming for? Why do you think this project satisfies that goal?]

VII. Project Breakdown

Deadline	Task Description	Assigned To	Notes/Dependencies
[Date]	[Specific task or milestone]	[Team member(s)]	[Related tasks or constraints]
[Date]	[Plenary Feedback Session]	[Team members (all)]	[Required deliverables for feedback]
[Date]	[Specific task or milestone]	[Team member(s)]	[Related tasks or constraints]
[Date]	[Feedback Session / Checkpoint]	[Team members (all)]	[Required deliverables for feedback]
[Date]	[Specific task or milestone]	[Team member(s)]	[Related tasks or constraints]
[Final Deadline]	[Project Presentation]	[Team members (all)]	[Finalise all deliverables]
[Final Deadline]	[Report Submission]	[Team members (all)]	[Integrate all work]

Gantt Chart:



Legend: Task | Feedback/Checkpoint | Milestone

Bad examples of project specifications

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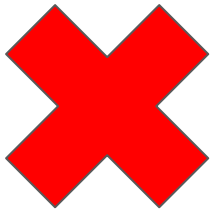

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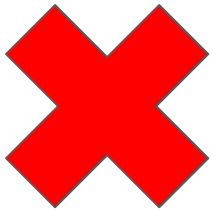

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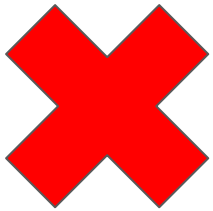

Bad: too generic. Also missing methods and tools.

Objectives

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Objective 2: Create a demo video.

Objective 3: Write a final report.

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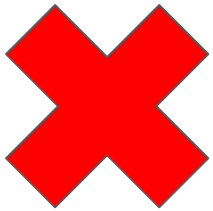

Bad: These are not objectives. 2 and 3 are deliverables.

Objectives

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Objective 2: Create a fully autonomous dialogue system that handles any conversation topic.

Objective 3: Develop custom deep learning architectures for each modality.

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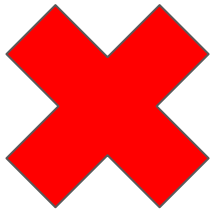

Bad: too ambitious.

Success metrics

Metric 1: The emotion detection should work well

Metric 2: Furhat's responses should be appropriate

Metric 3: The system should run smoothly

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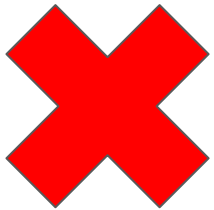

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Potential issues

Issue 1: Technical difficulties

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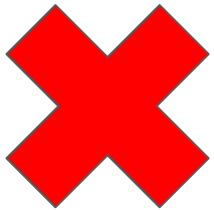

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Project breakdown

Week 1: Complete entire CV subsystem and Furhat integration

Week 2: Testing and evaluation

Week 3: Write report

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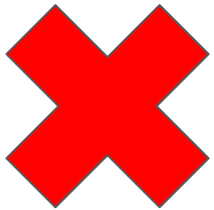

Bad: unrealistic, points too broad

Overall

Building a Furhat therapist that gives mental health advice using GPT-5. No emotion detection needed since users will just tell Furhat how they feel.

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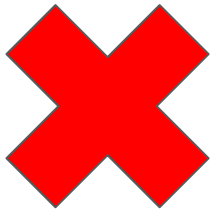
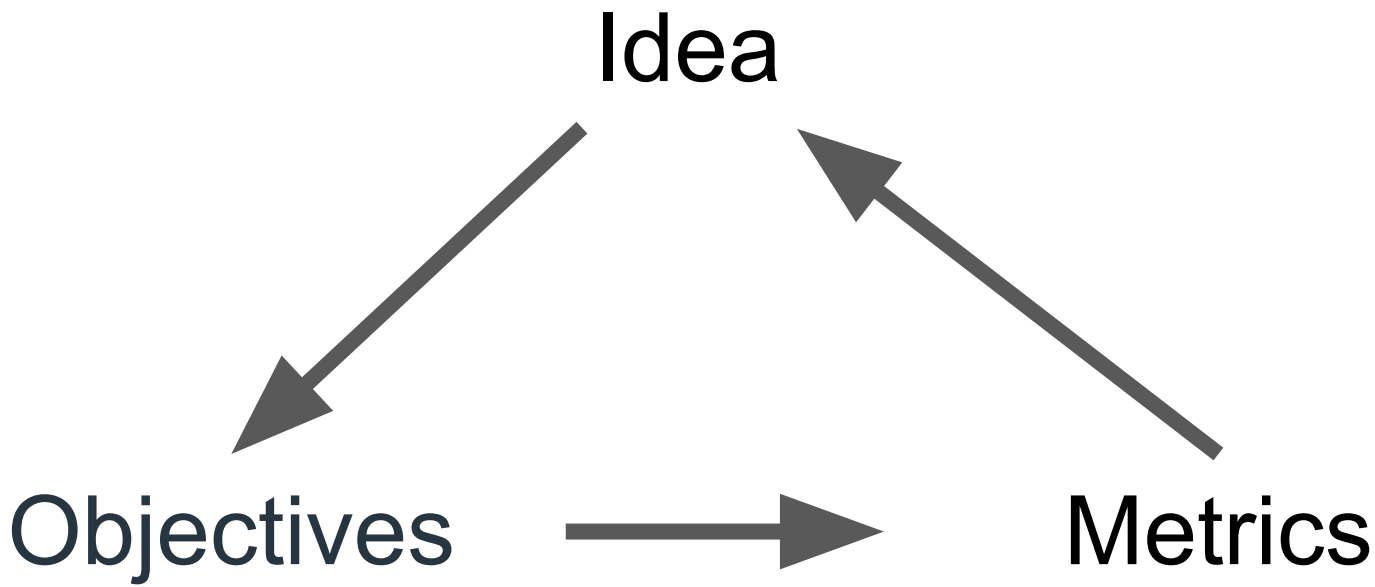


Bad: Missing core requirements

Good project specification


Idea
Objectives
Metrics

S.M.A.R.T. objectives:

- S - Specific
- M - Measurable
- A - Achievable
- R - Relevant
- T - Time-bound

Robot Barmen

Lift pitch?

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Robot barmen that detects user emotions and uses it to propose an appropriate drink, increasing customer mood.

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Metrics:

- Drink recommended according to specs
- Customer emotions improved according to specs

Be Agile

- Iterative and incremental delivery
- Flexibility and adaptability
- Continuous improvement
- …
- many more, but start with these

Be Agile

- Iterative and incremental delivery
  - Split into small tasks. Prioritize to have minimal solution complete first.
- Flexibility and adaptability
- Continuous improvement
- …
- many more, but start with these

Be Agile

- Iterative and incremental delivery
- Flexibility and adaptability
  - Don’t hesitate to adapt and change if something does not fit anymore.

    Do not get stuck. Ask each other for help earlier than later.
- Continuous improvement
- …

Be Agile

- Iterative and incremental delivery
- Flexibility and adaptability
- Continuous improvement
  - Use your time effectively, keep improving.
- …

Few concluding points:

- Simple **Complete** Project > Complex **Incomplete** Project

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Good Luck!