Generative AI
Research Project: Creative Support Tool
Semester 1, 2025–26

Description

Working in groups of 2–3 people, implement a creative support tool (or co-creative system). In particular, you are expected to explore how multiple systems can be brought together to support human creativity. At least one of the systems used should be a generative system, e.g., a machine learning model. The generative systems that you choose to combine may be trained on task-specific datasets, be a fine-tuned model, or use a pre-trained model.

You may work on this project in **groups of 2 or 3 people**.

The submission **deadline is January 7, 2026 at 23:59**.

Instructions

The Generative AI course has been structured to support you to explore different types of Generative AI and the development of your Research Project. This is why the brief for the Research Project is released early in the semester. We will use work groups to brainstorm ideas, form groups, and discuss common interests that you would like to explore in the Research Project. Once you have formed a group, you should register your group on Brightspace for *Research Project*.

Brainstorming

When brainstorming ideas for your Research Project we will explore four fundamental questions:

What type of research are you trying to conduct?

Types of research include, but are not limited to, e.g., exploring the outputs of a generative system to better understand how it can support creativity, exploring the parameters of a generative system to better align it with supporting a creative task, exploring ways of interacting with a generative system to better support creativity, providing ways for user to better understand the generative process (Explainable AI/ML), etc.

What type of creative activity are you trying to support?

Types of creativity activity may be defined by the creative domain of the output, e.g. Visual Art, Graphic Design, Music Composition, Poetry Generation. Types of creative activity may also be defined by the stage of the creative process, e.g., Ideation (a.k.a. Brainstorming), Refinement/Exploration, Detailing/Finalisation, etc. Types of creativity activity may also be defined by the context, e.g., integration with an existing system/application (e.g. a plug-in for an existing tool), integration with an existing workflow (e.g. a web service designed to be used in conjunction with other services)

What type of person are you trying to help?

Are you trying to support someone familiar with the generative system, e.g., someone who is looking for a technical solution? Or, are you trying to support someone who has no experience with the generative system, e.g., someone who is looking for a simple interface?

Background Research

As a group, conduct comprehensive research to inform your project design. This research should encompass three key areas:

Existing Creative Support Tools: Explore systems that have already been developed in your chosen domain. Sources include academic papers, Hugging Face repositories, GitHub projects, and commercial applications. For each relevant system, document:

- what creative activities it supports and how,
- what generative AI techniques it employs,
- who the intended users are, and
- what limitations or gaps you've identified.

Consider the following questions when reviewing the existing Creative Support Tools that you've found:

- How does your proposed approach differ from existing solutions?
- What specific limitations in current systems does your project address?
- Which existing systems could serve as baselines for comparison?

Technical Resources: Identify datasets, pre-trained models, APIs, and implementation frameworks relevant to your domain. Consider both the technical requirements and licensing constraints. For example, by choosing to use pre-trained models you can make use of generative systems that would be beyond the time (and computing resources) available to you.

Research Literature: Engage with academic literature on creativity research, human-computer interaction in creative domains, and the specific generative AI techniques you plan to use. This should inform both your technical choices and your understanding of how creativity can be supported computationally.

Scope

Before beginning implementation, clearly define your project boundaries by addressing these questions:

Project Type Selection: Choose one primary approach, but consider how it aligns with your group's skills, available time, and access to computational resources. The following are some suggestions for possible approaches but you are not limited to choosing from this list:

Proof-of-Concept: Use a small generative system or domain, e.g., a generative system working on a "toy" domain such as MNIST Fashion, to illustrate an idea for an interesting way to support creativity. This may allow you to produce something very novel, but can only be implemented in a limited way with the time and resources available. Ideal for exploring novel interaction paradigms or creative applications. Use simplified datasets (e.g., MNIST, small text corpora) to demonstrate core concepts. Focus on the creative workflow rather than system scalability.

(Re)Implementation of Existing Example: Have you seen an implementation of a system that you really like but would like to try to implement in a different way, either to see if you can improve on it (e.g. use a different training dataset for some part of the system) or achieve some slightly different (e.g. combine different systems together). Build upon some existing work with clear improvements or adaptations. Document your specific contributions and how they advance the original concept. Consider different datasets, user interfaces, or integration approaches.

Ambient Creative Support: Would you like to build a system that operates autonomously to enhance or inspire creativity in a physical or digital space? These "ambient" systems run continuously without direct user interaction, creating environments that support creative work through generative visual displays, evolving soundscapes, or contextual prompts.

Multi-Agent Creative System: Would you like to build a model of interacting creative agents that collaborate or compete to explore creative possibilities? These systems focus on how multiple AI agents with different roles (generator, critic, curator) can work together to produce novel outputs or discover creative directions that individual systems might not achieve. These can be open to human interaction, or closed as a model of how humans might interact with them.

Consider the following questions when trying to decide on your approach:

- What computational resources do you have access to?
- How will you evaluate whether your approach is successful?
- What is the minimum viable version of your system?
- How will you handle technical challenges that exceed your current capabilities?

Creative Support Strategy: Define specifically how your system enhances human creativity. What does your system do to support human creativity? How are users of your system expected to interact with it? Does your system respond to user inputs, or does your system work pro-actively?

Inspiration and Ideation: Does your system generate novel starting points or variations? Systems in this category focus on the early stages of creativity, providing fresh concepts, unexpected combinations, or alternative

perspectives when users face creative blocks. They might generate mood boards, suggest unusual material combinations, produce thematic variations on existing ideas, or offer prompts that challenge conventional approaches. The key is sparking new thinking rather than refining existing concepts.

Skill Augmentation: Does your system help users achieve results beyond their current abilities? These systems act as creative amplifiers, enabling users to produce outputs that would be technically challenging or impossible with their current skills alone. Examples include AI-assisted illustration that enhances rough sketches, music composition tools that help non-musicians create complex arrangements, or writing assistants that help users achieve particular styles or technical formats they haven't mastered.

Workflow Integration: How does your system fit into existing creative processes? Rather than replacing established workflows, these systems seamlessly integrate into how creative individuals already work. They might automate tedious tasks, provide real-time feedback during creation, offer contextual suggestions based on current work, or bridge between different tools and stages of the creative process. The focus is on enhancing productivity and maintaining creative flow rather than disrupting practices.

Exploration Support: Does your system help users discover new creative directions? These systems encourage creative risk-taking and experimentation by suggesting unexplored possibilities, revealing hidden patterns in existing work, or providing safe spaces to test radical departures from familiar approaches. They might analyse a user's creative history to suggest uncharted territories, generate "what if" scenarios, or create interactive spaces for creative experimentation without commitment to final outcomes.

Deliverables

1. Source code for your system, e.g., Jupyter notebook, including instructions for how to run your system, e.g., runtime requirements, package dependencies, etc., and how to use your system, i.e., user instructions.

   a. You are encouraged to use Python to implement your system, unless there is a clear reason not to, e.g., development of a web service that requires the use of Javascript. If you plan on using a language other than Python or Javascript please contact the teaching staff prior to investing significant time on your implementation to check that it can be accommodated.

   b. You may reference an external implementation, e.g., Colab notebook, GitHub repository, website, but a copy of your source code that can be run locally must be submitted.

2. A report on the implementation of your Creative Support Tool, which should include:

   a. **Project Aims**

      i. What type of problem are you trying to solve?

      ii. What type of creative activity are you trying to support?

    iii.   What type of person are you trying to help?

    iv.   How does your system support creativity?

b.   Background Research

    i.   Similar existing systems

    ii.   Useful resources (e.g. domain-specific datasets, reference implementations of generative systems, potentially useful pre-trained models)

    iii.   Research literature (e.g. generative systems, creativity research, domain-specific research)

c.   Implementation

    i.   What type of project are you trying to implement? For example:

- Proof-of-Concept
- (Re)Implementation of Existing Example
- Autonomous Installation/Model

    ii.   What resources did you use in your implementation?

- **Note:** You are allowed (and encouraged) to use pre-existing resources to produce your system, but you must acknowledge the source of the resources you have used and provide a description of how you have modified and extended what you have found to implement your system.

    iii.   What did you implement to build your system?

d.   Example Outputs

    i.   Provide some examples of the output of your system. Outputs can be additional files submitted with your report. Outputs should reflect an exploration of your systems capabilities and/or limitations.

e.   Reflection and Future Work

    i.   Conclude your report with a reflection on what worked and what didn't. Consider how your implementation satisfies (or doesn't) the aims you set out at the beginning of the process.

- What are the significant achievements of your implementation as a creative support tool?
    - For example, if you re-implemented an existing system, how well does your system compare to the original?
- What are the significant limitations of your implementation as a creative support tool?
- What would you do differently if you were to start your project again now?

    ii.   Identify some future directions for your project, should you or someone else want to continue it.

- How might your creative support tool be extended?
    - For example, if you implemented a proof-of-concept, what domain/dataset would you like to see your system be extended to support?
- How might your creative support tool be improved?