

Take-Home Exam

General Instructions

Read these instructions carefully before answering any of the questions.

Rules and Ethics

You will write an official report, comparable to an exam, and regular rules about exams and ethics also hold here. However, unlike in in-class exams, you take this exam in your own time and pace, and you are allowed to use reference materials and literature.

The report is individual. Every student must produce their answers without asking others for help or advice, **excluding the Project Overview which can be written by the whole group**. Any plagiarism will be reported to the Head of Studies for further actions.

Answers

There is a reserved space for your answer for each question. Your answer **must** fit in that space. You can erase the question text (*gray text written in italics*), but you may not erase the section title, change the line spacing, basic font (but you can alter the font style for highlighting purposes with, e.g. `\textbf`, `\textit`, `\verbatim` or `\texttt`), font size, or alter the template in any other way.

References

You can add citations to your answers and a list of references to the end of the exam if you so wish. The reference list is not counted towards the space limitation of any answer.

Deadline

Deadline for the exam is Sun 18.12. 23.55. Return your exam via moodle as a single pdf file. The deadline is strict.

1 Project Overview (max. 1 page)

*What does the system aim to create? Give a brief description of the main points and principles of your solution. Describe individual agents, how they form a society, and how the domain/culture is possibly modeled. For each, describe what were the major design choices you made, and why you made them. Give example results from the system and, if useful, other examples of how the systems function. Examples may use one additional page. **You may write this answer together with the whole project group.** NB: This question is not graded. Furthermore, do not argue about your system's creativity in this part, other questions are for that purpose.*

2 Creativity as Search (max 1.5 pages in total)

a) Single agent (max 0.5 pages)

4 points. Describe the single agents in your project using Wiggins' framework of creativity as search. Provide a brief rationale for each choice of description; also point out obvious alternatives. (If your project has several agent types, pick the one that you think is most interesting to describe here.)

b) The whole system (max 0.5 pages)

4 points. Describe the whole multi-agent system in your project using Wiggins' framework of creativity as search. Provide a brief rationale for each choice of description; also point out obvious alternatives.

c) Transformational creativity (max 0.5 pages)

4 points. Is your single agent implementation transformationally creative/creative in the metalevel? If yes, how? If not, describe one way of extending the system to be transformational. If your project has several agent types, use the same type as in part a).

3 Creative Autonomy of an Agent (max 0.5 pages)

8 points. Based on how Jennings defines and argues about creative autonomy [1, first 4 pages, link to pdf in the course page], consider your single agent implementation in the group project. (If your project has several agent types, pick the one with most creative autonomy.) Does your agent have creative autonomy? Why or why not? If not or not much, how could it be modified to have greater creative autonomy?

4 MAS Beyond Mere Generation (max 1.0 pages)

(Modified on Dec 7th for clarity.) 10 points. Ventura describes several steps for making a single generative agent more creative [3], but does not mention creative societies at all. What could be possible extensions to Ventura's work, to show how interaction between generative agents can also increase creativity? Design two new steps in Ventura's style: give pseudocode, as in the article, and justify why and how they add to the creativity, based on computational social creativity [2]. You can position the steps anywhere between Ventura's current steps; the point is to illustrate the creative potential of agent communities, not to argue where they would fall within Ventura's steps. Hint: Focus on communication between agents and how the individual agent can become more creative based on it.

5 Design Rationale (max 1 page)

a) Rationale/goal of using a society of agents

5 points. In the design of your agents and their society, what is the rationale or goal of using a society of agents? Can your system be categorized as a multi-agent system or as an agent-based model? Why or why not? Ground your arguments on concepts such as communication model, learning, autonomy, local views, emergence, etc.

b) How well does the system actually reach its goals/match the rationale of the design — where and how/why not?

5 points. Given the system's rationale/goal described in part a) above, discuss and argue how well it reaches its goal. How could you improve the system to better reach its design objectives?

References

- [1] Kyle E. Jennings. Developing creativity: Artificial barriers in artificial intelligence. *Minds and Machines*, 20(4):489–501, 2010.
- [2] Rob Saunders and Oliver Bown. Computational social creativity. *Artificial Life*, 21(3):366–378, August 2015.
- [3] Dan Ventura. Mere generation: Essential barometer or dated concept? In *Proceedings of the Seventh International Conference on Computational Creativity (ICCC 2016)*, Paris, France, 2016. Sony CSL, Sony CSL.