PROJ 1:

A strategy video-game for collaborative agents with a personality: action-based dialogues

In this project we aim to develop a multiagent system to play a strategy video game [1]. The basic idea is that a group of agents acting on behalf of the player work collaboratively to achieve a common goal. At each step a decision is to be made for which action the group should take. and it is commonly assumed that agents act rationally to achieve the goal as efficiently as possible [2]. However, for more entertainment here we take a different approach: we intend to model agents with more human-like features. The key idea is that agents will have a ‘personality’ and may at any point disagree with the most rational behaviour driven by other features such as tiredness, boredom, distraction, … [3] As basis for discussion on what actions to take, agents will use a model of argumentation, which can be used to represent pros and cons for a decision as well as to identify an agreeable solution on the basis of their preferences [4] In addition, being an entertainment game requires agents to communicate with each other by means of understandable language such that the player is able to follow the discussion. Such agent dialogues should then be rendered via Natural Language Generation [5][6]. The project will take the following initial steps: 1) Identify a suitable game for agents to play in teams 2) define a model of ‘agent personality’ and associated reasons to justify an action 3) define and develop a logical model of argumentation-based dialogue for agents to discuss and agree on their options 4) define and develop a natural language generation model for rendering these dialogues in understandable English.

Action-based Dialogue: The focus of this project is specifically to develop dialogues about actions options. Justifications and refutations of actions should be on the basis of future plans [7], or future adversary potential plans [8]. Personality is intended as a utility based function that scores various actions on the basis of different “personality” traits or factors.

Supervisors

Christopher Stone, Alice Toniolo

Artefact(s)

1. Design and implementation of the game infrastructure

2. Design and implementation of a decision-making model of agents with personality

3. Design and implementation of human understandable dialogue

Background

[1] https://en.wikipedia.org/wiki/Strategy\_video\_game

[2] M. Tambe and W. Zhang. Towards flexible teamwork in persistent teams: Extended report. Autonomous Agents and Multi-Agent Systems, 3(2):159–183, 2000.

[3] Egges, Arjan, Sumedha Kshirsagar, and Nadia Magnenat-Thalmann. "A model for personality and emotion simulation." International Conference on Knowledge-Based and Intelligent Information and Engineering Systems. Springer, Berlin, Heidelberg, 2003.

[4] E. Black and K. Atkinson. Dialogues that account for different perspectives in collaborative argumentation. In Proceedings of the Eighth International Conference on Autonomous Agents and Multiagent Systems, pages 867–874, 2009.

[5] Perera, Rivindu, and Parma Nand. "Recent advances in natural language generation: A survey and classification of the empirical literature." Computing and Informatics 36.1, 2017: 1-32.

[6] A Gatt and E Reiter. SimpleNLG: A realisation engine for practical applications. Proceedings of ENLG-2009, 2009

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[8] Adversarial Search (Chapter 5) S. J. Russell and P. Norvig. Artificial Intelligence: A Modern Approach. Pearson Education, 3rd Edition, 2010.

PROJ 2:

A strategy video-game for collaborative agents with a personality: humoristic dialogues

In this project we aim to develop a multiagent system to play a strategy video game [1]. The basic idea is that a group of agents acting on behalf of the player work collaboratively to achieve a common goal. At each step a decision is to be made for which action the group should take. and it is commonly assumed that agents act rationally to achieve the goal as efficiently as possible [2]. However, for more entertainment here we take a different approach: we intend to model agents with more human-like features. The key idea is that agents will have a ‘personality’ and may at any point disagree with the most rational behaviour driven by other features such as tiredness, boredom, distraction, … [3] As basis for discussion on what actions to take, agents will use a model of argumentation, which can be used to represent pros and cons for a decision as well as to identify an agreeable solution on the basis of their preferences [4] In addition, being an entertainment game requires agents to communicate with each other by means of understandable language such that the player is able to follow the discussion. Such agent dialogues should then be rendered via Natural Language Generation [5][6]. The project will take the following initial steps: 1) Identify a suitable game for agents to play in teams 2) define a model of ‘agent personality’ and associated reasons to justify an action 3) define and develop a logical model of argumentation-based dialogue for agents to discuss and agree on their options 4) define and develop a natural language generation model for rendering these dialogues in understandable English.

Humoristic Dialogue: The focus of this project is specifically to investigate computational models of humourism, and integrate those in the dialogue. This means that during the course of the game, the various agents should plan strategically what to say in the various dialogue interactions with other agents with the aim of generating humour in the dialogue. To achieve this objective, the project should investigate theories of humour [7]. For example, in incongruity theory, humour may be induced by statements made out of the expected behaviour. In order to adopt this approach, the agents should plan to debate as expected for a while, and decide when to make a dialogue move out of the ordinary.

Supervisors

Alice Toniolo, Christopher Stone

Artefact(s)

1. Design and implementation of the game infrastructure

2. Design and implementation of a decision-making model of agents with personality

3. Design and implementation of human understandable dialogue

Background

[1] https://en.wikipedia.org/wiki/Strategy\_video\_game

[2] M. Tambe and W. Zhang. Towards flexible teamwork in persistent teams: Extended report. Autonomous Agents and Multi-Agent Systems, 3(2):159–183, 2000.

[3] Egges, Arjan, Sumedha Kshirsagar, and Nadia Magnenat-Thalmann. "A model for personality and emotion simulation." International Conference on Knowledge-Based and Intelligent Information and Engineering Systems. Springer, Berlin, Heidelberg, 2003.

[4] E. Black and K. Atkinson. Dialogues that account for different perspectives in collaborative argumentation. In Proceedings of the Eighth International Conference on Autonomous Agents and Multiagent Systems, pages 867–874, 2009.

[5] Perera, Rivindu, and Parma Nand. "Recent advances in natural language generation: A survey and classification of the empirical literature." Computing and Informatics 36.1, 2017: 1-32.

[6] A Gatt and E Reiter. SimpleNLG: A realisation engine for practical applications. Proceedings of ENLG-2009, 2009

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