Analysis of the Game Who am I using Reinforcement Learning and Stochastics

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Abstract

The game “Who Am I” is all about guessing which person a player is representing. Thus, it is a perfect example for the usage of reinforcement learning, due to its trial and error approach. The outcome should be equivalent to that of a stochastic solution because the “RL-Approach” can be seen as a simulation of stochastic calculation. Since using RL for this relatively simple question may be considered overkill, this thesis serves as an overall comparison between stochastic and RL solutions, exploring when it makes sense to use each. Furthermore, this thesis clarifies the number of questions required to identify the represented person.

Exposé

1 Introduction

The Deep Space 8K[1] at the Ars Electronica Center in Linz, with its 16×9 meter projection surface, including position tracking, offers a unique opportunity to create computer games. These games do not use classic control mechanisms such as a keyboard, mouse, or gamepad; instead, the players themselves "control" the content with their movements. Furthermore, these games take place in a semi-public to public space, making it difficult to determine the target group and the number of people playing. This bachelor thesis (master thesis) illuminates this problem and presents concrete solutions based on an example.

2 Theoretical Background and State of the Art

Large public display games (LPD games) are a particular type of computer game displayed on large, publicly visible projection surfaces. Such installations can be found in museums (such as the Ars Electronica Center) or public places. People can usually see these games at any time and actively participate in them. According to [1], this publicity results in three groups of people participating in the game: *Actors* actively participate in the game, *spectators* actively follow it, and *bystanders* are just in the vicinity of the public installation. The goal is for bystanders to become spectators and spectators to become actors, that is, to actively play the game. This process should be as fluid as possible and involve as many people as possible. Such an approach was called *Smooth Transition Gameplay* in [2]. The authors use a concrete application to demonstrate how this transition can be achieved, but it needs to be systematically described which factors are necessary.

The used game mechanics provide a starting point. Following the categorization in [3], mechanics from the areas of space, actions, and rules are particularly suitable. Such mechanics can be used in a corresponding game design so that the requirements mentioned above—easy entry and good scalability with respect to the number of players—can be achieved in an LPD game.

[1] https://ars.electronica.art/center/en/exhibitions/deepspace/

3 Research Question

These approaches lead to the following research question for this bachelor thesis (master thesis):

> In a game design for a large public display game, which game mechanics have to be used in which way to design it for a variable number of players and to enable an easy entry for them?

4 Methodology

To answer this question, the bachelor thesis (master thesis) will be realized as a combination of literature work and practical or prototypical implementation.

First, the existing literature (extending section 2) will show how the topic of smooth transition gameplay is dealt with from a game design perspective. Common factors such as mechanics will be extracted from this and serve as the basis for a theoretical framework. This framework will contain a list of core mechanics and guidelines for their application so that LPD games allow easy entry and a variable number of players.

The applicability of this framework will be tested by an own LPD game developed during the term project. By asking simple qualitative questions to the players and observing the visitors during several test runs, it will be determined whether smooth transition gameplay could be achieved with the mechanics used.

5 Expected Results

As a concrete result, a framework of game mechanics will be created to serve as a basis for the creation of LPD games. It is expected that such concrete mechanics can be found and described.

The tests of the practical implementation of the framework are also expected to be positively evaluated since there are already successful concepts and LPD games that can serve as positive examples.

References

Literature

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