Product Planning Draft

TU Delft

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1 Introduction

When the municipality plans to build a new residential area, it takes them years just to decide to build it. There are many factors they need to take into account when planning to build such an area. There needs to be enough space, enough money, a good reason, no conflicts with the citizens and so on.

To speed up this process the company Tygron made a serious game for urban planning. The game simulates the planning and shows a conflict if one would appear. Since all stakeholders are participating such conflicts can be resolved immediately.

Our product is a virtual human which runs in the urban planning game and can replace a real human in this game. This virtual human tries to reach his goals that are initiated at the beginning by performing goal specific actions. When deciding to take a certain action, it should consider the goals and emotions of the other players.

The game we will be working with is an urban city planning game from Tygron. With multiple players, every player works towards his own goals. These differ for each role a player has, for example a company wants to make profit, while the municipality wants the city to have a high livability and a lot of green.

2 Product

Here we will give more insight about the product itself. The next two sections contain detailed information about the backlog of our product and a roadmap, which shows the progress of the development for every sprint.

2.1 High-Level product backlog

Our product, from now on called 'Virtual Human', has the task to replace one or multiple real human players. Our part of the Virtual Human is writing the agent in GOAL. An agent is a program that makes decisions on its knowledge, believes and precepts and will work towards the goals of the human player it replaces. To reach these goals, it must make certain decisions. These decisions can lead to actions, like building houses or buying new land, or to new knowledge. With new knowledge the agent will make new decisions that fits with the new situation.

It is our goal to make the agent as human as possible. A player should not see any difference when playing against one of our agents or when playing against a human. To make this possible, the agent will use emotions. We will use Gamygdala for this.

The agent will look at the budget the Virtual Human has, if there is room to build, if it is happy about certain actions and so on, to make the right decision.

With all these implementations, the users should be able to replace human players with a Virtual Human. The AI for this Virtual Human should be as human as possible and should replace any possible stakeholder, except the Municipality.

2.2 Roadmap

This section will contain information what we did every sprint. This section will be updated every time we release a new sprint reflection.

Sprint 1

- We analyzed the game and created a TestMap.
- We analyzed and created stakeholders on the TestMap.
- Set up meeting with Tygron.

Sprint 2

- Coming end of this week.

3 Product backlog

This sections contains information about user story's and milestones.

3.1 Functions in MoSCoW-Method

Here we will talk about the functions we want in our part of Virtual Human. We will use the MoSCoW-method for this.

Must haves: Features that are of highest importance for our AI, and without these our product is not complete.
Should haves: Features that are important, but our product still works without these features.
Could haves: Features that are not important, and shall only be implemented when there is sufficient time for this.
Would haves: Features that we will not implement due to lack of time, but can be implemented in future projects.

Must haves

- The agents must use Gamygdala to simulate emotions.
- These emotions must involve the decision making of the agents.
- The agents should get as close to their indicators as possible.
- The agents must take action to reach their goals.

Should haves

- The agents should communicate.
- The agents take other agents emotions into account when making decisions.
- The agents can handle every indicator.

Could haves

- The agents can build every building.
- The agents take the position of buildings into account when deciding to build something.
- The agents take the type of the building into account when deciding to build a building.

Would haves

- The municipality stakeholder can be replaced by a Virtual Human.
- The agents can operate on any map.

3.2 User Stories

In this section we will go into more depth into the features we mentioned before.

Must Haves

The agent has a housing indicator,
It needs to build houses to reach its goal,
The agent builds a house,
The indicator goes up.

The agent has a housing indicator which is full,
The agent builds a house,
The indicator goes down.

The agent built a house on its own ground,
It needs to ask for a permit from the municipality.

The agent just built a house,
The indicator goes up,
Gamygdala sends a happy or proud emotion.

The agent is happy about its previous success,
The agent decides to build another house.

Should Haves

The agent built a house and asked for a permit,
The municipality declined,
The agent must not try the same house on the same place again.

The agent wants to build a house,
An other agent wants to build a parking lot,
The first agent is closer to its goal,
The first agent agrees to build a parking lot.

The agent wants to build a house,
An other agent does not want that to happen,
The first agent gets to know this.

The agent asked for a permit,
The municipality declined,
The agent asks the municipality why through communication.

The agent need a permit from the municipality,
The municipality is in a bad mood,
The agent waits until the municipality is in a better mood to ask for the permit.

3.3 Initial release plan

Here we will describe our initial release plan. This is how we think our product development will go during the Context Project.

Week	Milestone
1	Learn about the Tygron Eninge and find a good TestMap place.
2	Finish the TestMap with good starting values, goals and so on.
3	Create Design for agents and make simple strategy.
4	Start with a complex strategy the agents will use.
5	Finish the complex strategy and implemented it correctly.
6	Start working on using emotions in our strategy.
7	Finish the implementation to use emotions in their strategy.
8	Finish our product and debug.
9	Present our product.

4 Definition of Done

In this section we will give a short explanation of when something is done. We will specify when a feature, sprint and release is done.

A feature is done when it is tested thoroughly and the code is checked by other group members. We will test the code manually by playing ourselves and by using a simple IDE. The code must be documented. When the code passes all tests and there are no errors and the code is approved, then the feature is done and can be merged with the rest of the code.

A sprint is done when the entire code is tested en all features in it are done as explained before. The entire product is done when the entire code is done like with each sprint. After that, the user will test the game to check whether the agent acts as it should. All must haves must be implemented in the code. It should also contain a few should haves though not necessarily all.

5 Glossary

Agent

An agent is an entity that observers through sensors and acts upon an environment. It directs its activity towards achieving goals.

AI

AI stands for Artificial intelligence, and is intelligence created by humans for a program. This intelligence will define what the program does in different situations.

Gamygdala

This is an program that outputs emotions based on goals and events.

Goal

This is a programming language, specialized for making rational agents.

Indicator

The agents in our game use indicators, which tell them what their goal is. Indicators can be 'Green', 'Livability', 'Housing', 'Parking' or 'Budget'. It has an percentage attached to it. An example is Green, 65% and Housing, 35%; this means green objects (parks, trees) determines 65% of the agents score and housing objects (houses, flats) the other 35%. In this example, an agent will find green objects more important, since it determines most of the score.

Stakeholder

A stakeholder is a (non) playable character in the game. A stakeholder has a few indicators which determines what it finds important. Each stakeholder will have different goals. There are three stakeholders we use, 'Municipality', 'Housing corporation', and 'Company'

Virtual Human

A virtual human is the creation or re-creation of a human being that plays