

Architecture Design

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CodeFox

Marco Houtman

Ronald van Driel

Joshua Slik

Matthijs Halvemaan

Lisette Veldkamp

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1. Introduction

This Document provides a sketch of the system that is going to be built during the context project Virtual Humans for Serious gaming. It is used to represent the current state of the design of the system. The systems architecture is described in high-level components.

1.1 Design goals

The following design goals will be maintained throughout the project:

- **Availability**

After each sprint the system should be in a working condition. This is important because it will allow the user to utilise the systems features and provide feedback based on the experience. The final version of the product should always be available and working in the same environment as it has been developed for.

- **Manageability**

The code will be made publicly available for other programmers who are interested in our progress. All code will be well documented and commented for a clear overview of the system and will enable additional developers to extend or modify the agent.

- **Performance**

Our product must be at least runnable on mid end personal computer systems. The agent should be able to act and react on real time environmental changes without delays exceeding more than a minute.

- **Reliability**

The agent can be run with help of SimpleIDE or the GOAL environment in eclipse when the Tygron environment is available to the client and enough hardware resources are available.

- **Scalability**

Our agent should keep working and interacting when additional agents are added to the environment and when the environment changes. It does not guarantee however that additional features in the environment or in additional agents will be utilized.

2. Software architecture views

In this software architecture section we describe a high level overview of different subsections of the system. In the first section we describe the programming aspect of the system, in the second section we provide a high level overview of the full system and the third section gives a high level overview of the most important subsection of the system.

2.1 Programming languages

For this project both Java and GOAL, a high-level programming language for programming decision logic of cognitive agents that derive their choice of action from their beliefs and goals, will be used. Java is primarily used for the interaction between the agent and the environment. GOAL will be used to program the decision making of the agent using Artificial Intelligence.

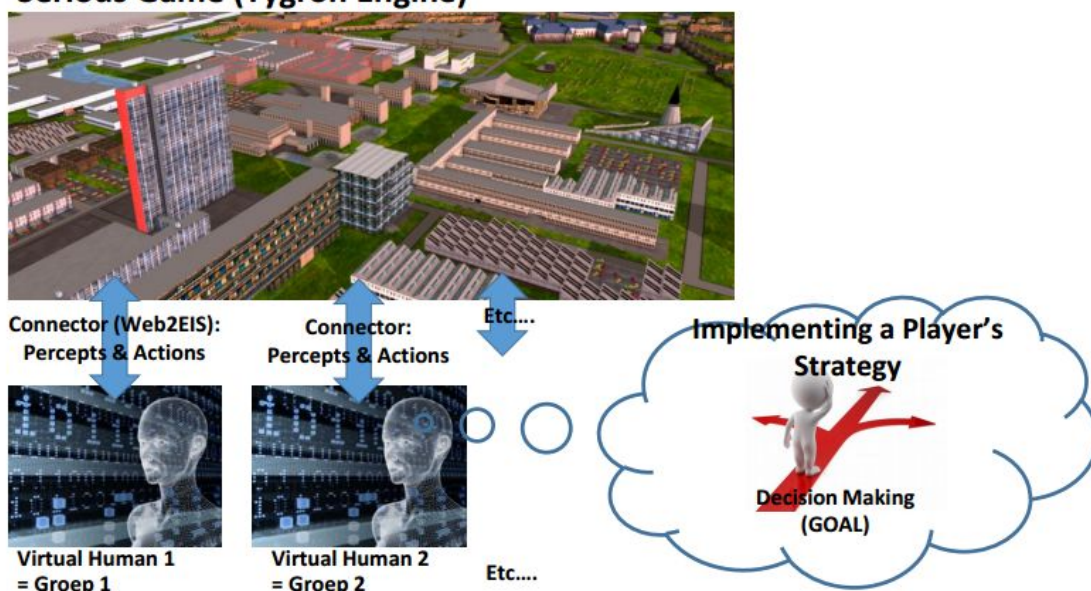
2.2 Full system overview

The Tygron environment allows multiple agents to connect and interact. Each agent requires a connector which acts as an interface between Tygron engine and the agent. This interface is required for all agent interactions with the environment.

All agents have separate logic but are able to interact with each other through the Tygron Environment.

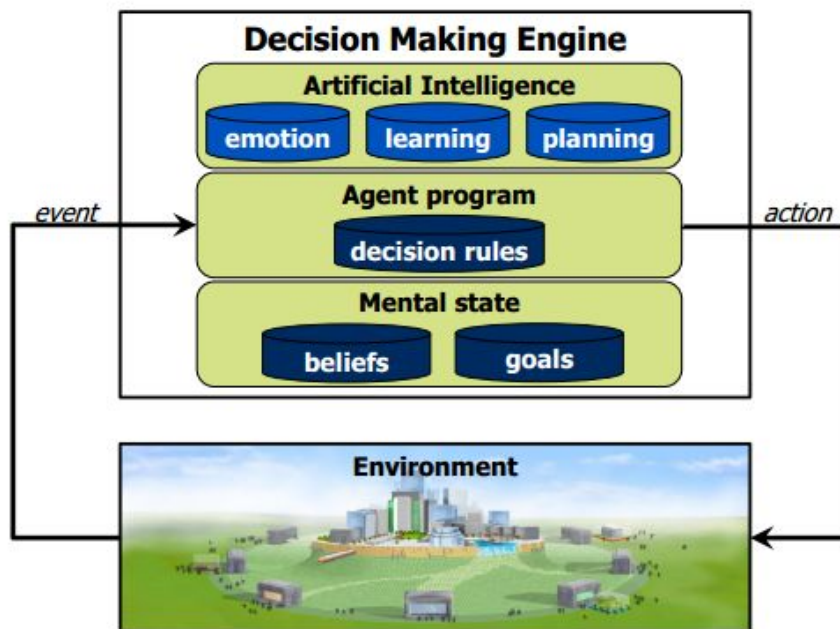
Our product will consist of the implementation of a single virtual human. For our product a basic connector has been provided but can be extended when desired. Most implementational logic will be required for the agent's decision making in GOAL.

Serious Game (Tygron Engine)



2.3 Virtual human overview

Our virtual human will perceive events from the Tygron environment. The useful events will be processed in the agent as beliefs or goals for the mental state. Based on the mental state and the implemented decision rules, the agent will make smart decisions. Then the agent will observe what happens after its decision and will learn from this so that next time when there is a similar situation the agent can handle it better.



Koen Hindriks, "Kickoff Virtual Humans 2016" (Powerpoint Presentatie, Den Haag, April 21, 2016).