Architecture Design

06/05/2016

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

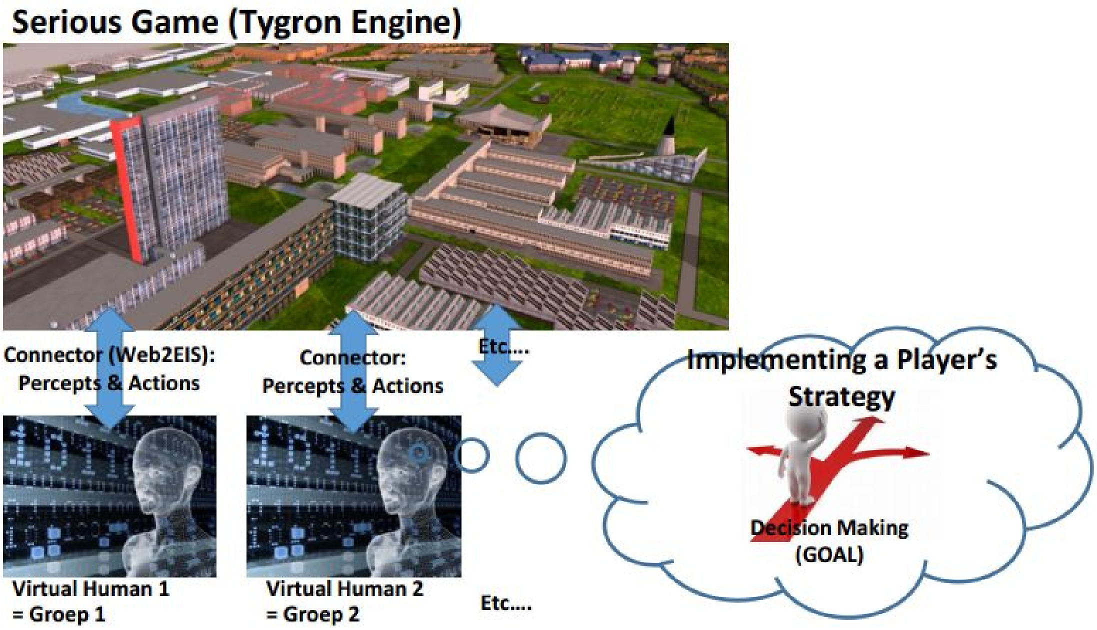
For this project both Java and GOAL, a high-level programming language for programming decision logic of cognitive agents that derive their choice of action from their beliefs and goals, will be used. Java is primarily used for the interaction between the agent and the environment. GOAL will be used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

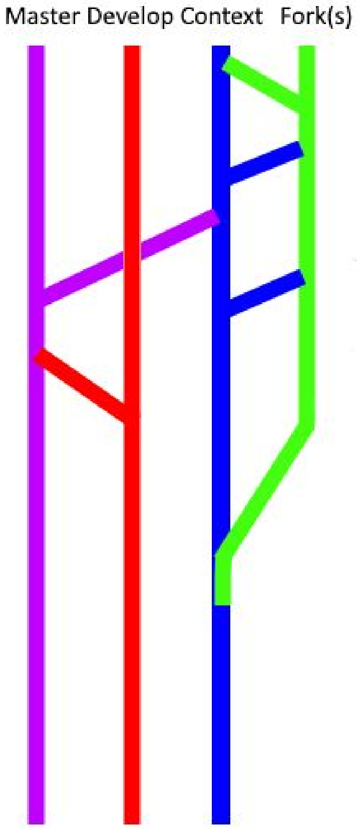
Our product will consist of the implementation of a single virtual human. For our product a basic connector has been provided but can be extended when desired. Most implementational logic will be required for the agent’s decision making in GOAL.


Serious Game (Tygron Engine)
Connector (Web2EIS): Percepts & Actions
Connector: Percepts & Actions
Etc....
Implementing a Player's Strategy
Decision Making (GOAL)
Virtual Human 1 = Groep 1
Virtual Human 2 = Groep 2
Etc....

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

2.3 Web2EIS-Connector overview

The Web2EIS-connector is our base connector currently being expanded by several people involved with the (EIS)hub and by the groups of the Virtual Humans for Serious Gaming project. The groups all have a fork of the Tygron-EIS and are expected to develop their own Percepts and Actions for the virtual human they are developing.

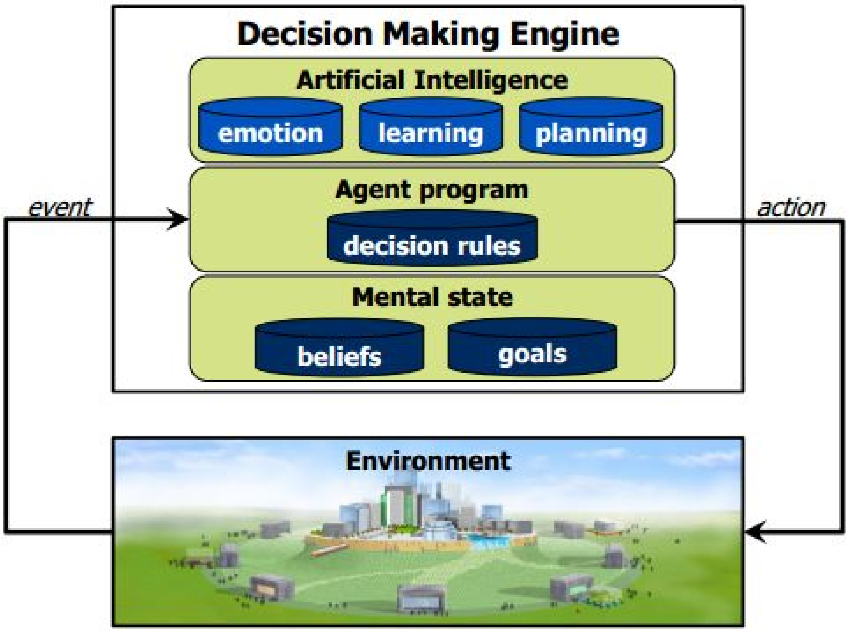


The dev branch is being developed by the (EIS)hub programmers and when they are ready to release their branch is merged into master. After release and a reviewed pull request master will be merged into the context branch. The groups will fork the context branch so they can work on their percepts and actions. When one of the context groups has a working feature for the context branch it will make a pull request and when the request is positively reviewed will merge their changes into the context branch so that it can be used by the other project groups.

Github's issue system is being used by the context groups to keep a clear overview of who is working on which part of the connector. An issue can be created by any team member and can be assigned to team members of all context groups.

2.4 Virtual human overview

Our virtual human will percept 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.



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