Technische Universiteit
Eindhoven
University of Technology

Department of Mathematics and Computer Science
Architecture of Information Systems Research Group

Visualization of multi-agent systems

Prototype user manual

Joris Reijrink
j.reijrink@student.tue.nl

Supervisors
MSc. B. Postma
dr.ir. H.M.M. van de Wetering

March 26, 2016

Contents

Chapter 1

Introduction

This manual describes the new visual analytics prototype tool for TechUnited. The goal of the prototype is to support the analysis after each game to detect anomalies faster. The base of the prototype consists of several configurable charts that are linked with each other. In this way, different parameters can easily be compared with each other at the same time. The prototype also has a visualization of the field.

The prototype is still under development and could therefore be slow and might crash. You can contact me if you don't get the prototype working, have questions or come up with a new feature for the prototype. I would appreciate to receive feedback about the prototype. Thanks for using and evaluating the prototype.

The prototype can be downloaded from https://github.com/jreijrink/MultiAgentVisualization/. A compiled version with all required files can be found in the "release" directory.

Chapter 2

How to use

The prototype supports .MAT files directly, the "replay" matrix of the .MAT file is used. The prototype shows a default layout every time it is opened. The layout can be fully customized, in the future the tool will support saving custom layouts. Elements can be dragged, dropped, minimized, removed, resized and added. New charts can be added from the "Elements" menu. The prototype supports four visual elements that are all linked with each other through selection:

- Scatter chart
- Line chart
- Categorical chart
- Field

Figure 2.1: Overview of the prototype.

2.1 Data

Data-mapping and configuration only has to be done when the "replay" data changes in the .MAT file. The data-mapping describes all parameters in the "replay" matrix. It supports three types of data:

- Numerical
- Positional
- Categorical

Currently the numerical and positional data are handled as regular numbered values. For each data type a range can be configured, values outside this range are deemed invalid and are display red in a chart. Categorical data supports the defining of categories, where each category represents a value.

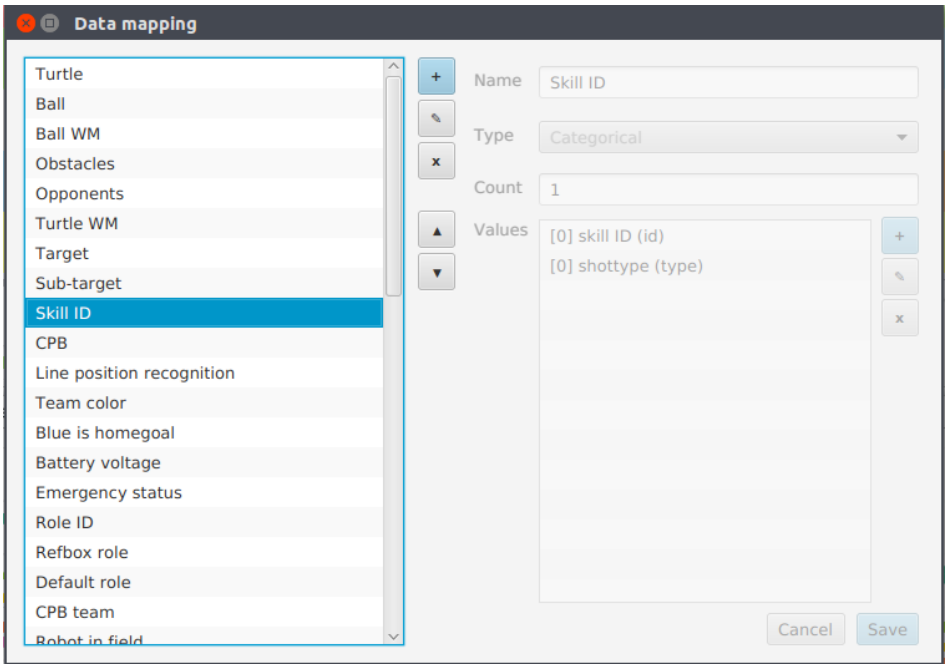

Figure 2.2: Mapping of the MAT file.

Once the data-mapping is complete the configuration must be set. The configuration contains values that must be set in order for the tool to work.

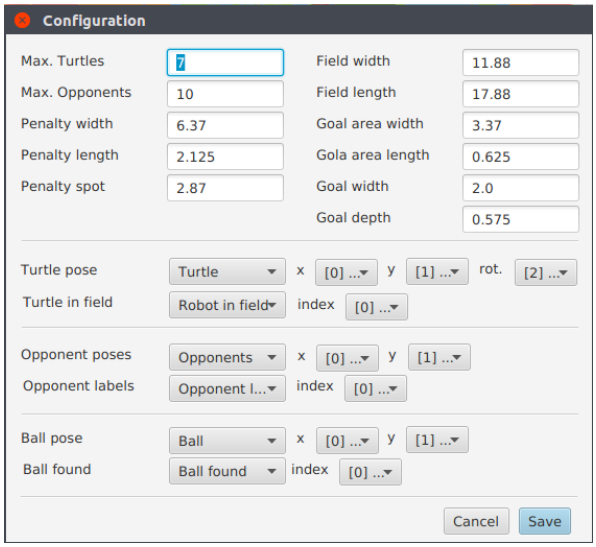

Figure 2.3: Configuration for the required parameters.

2.2 Scatter & line chart

The scatter and line charts show the data of turtles over time with a selected parameter. Each turtle is represented by a fixed color. In the top the selected parameter, index and value are shown. If a selection is made, the selected indices are also shown in the top. In the right top of the element the settings can be opened.

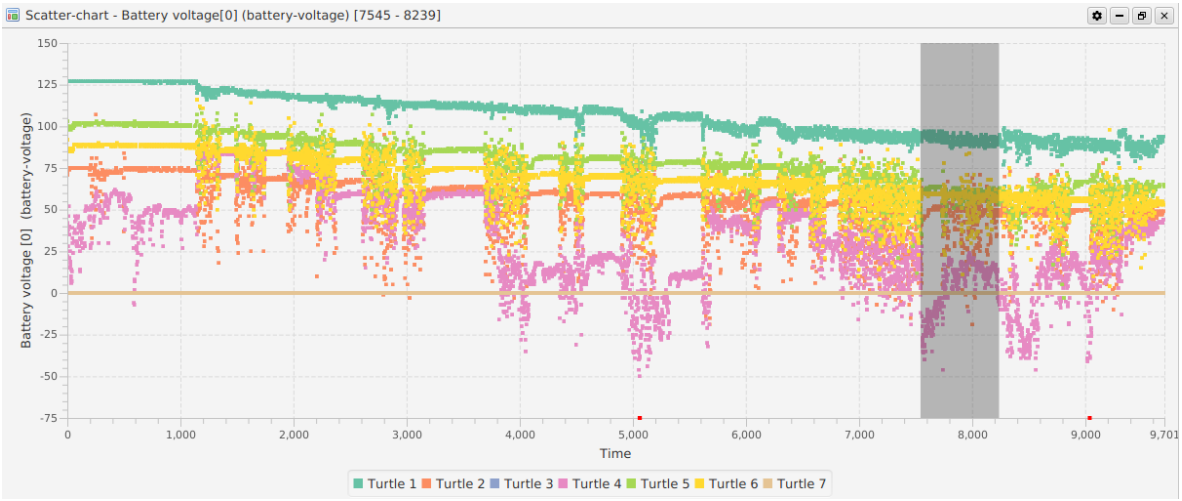

Figure 2.4: Example of a scatter chart.

In the settings the plotted parameter can be changed. A parameter can have multiple indices, for example one for each opponent. A parameter can also have multiple values, for example X, Y and Z. Finally a selection can be made of the turtles to show in the chart.

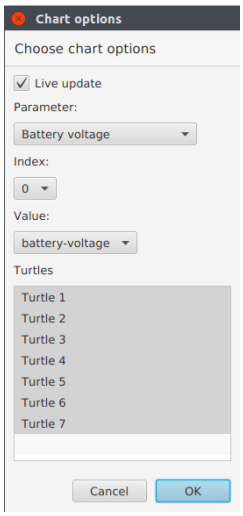

Figure 2.5: Settings of the scatter chart.

2.3 Categorical chart

The categorical chart shows the data of turtles over time with a selected categorical parameter. Instead of a parameter the turtles are shown on the Y-axis. Each category is represented by a fixed color. In the top the selected parameter, index and value are shown. If a selection is made, the selected indices are also shown in the top.

The settings of the categorical are almost the same as the settings of the scatter and line chart. The difference is that only parameters of the categorical type can be selected.

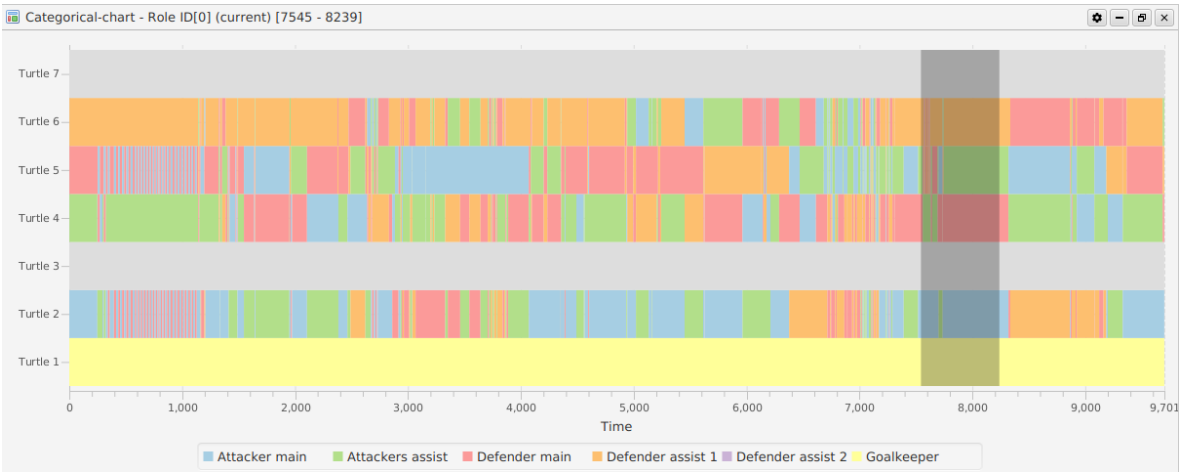

Figure 2.6: Example of a categorical chart.

2.4 Field

The field shows the situation of the last index of the selection. It can show the turtles, opponents and the ball. Each turtle is represented by the same fixed color used for the line and scatter chart.

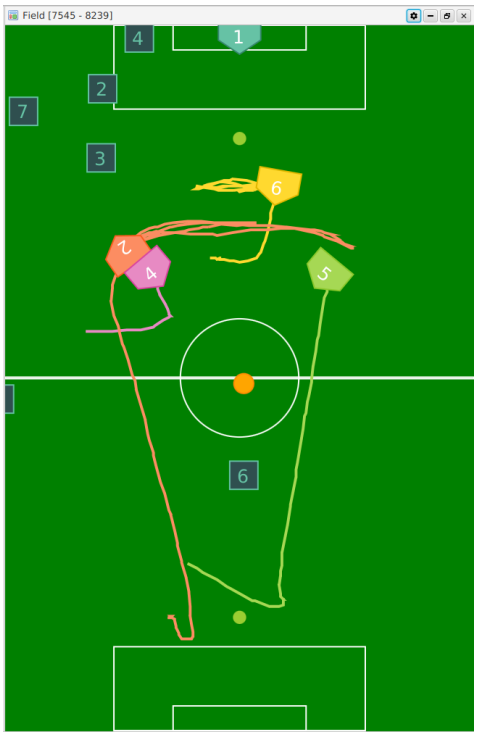

Figure 2.7: Example of the field visualization.

In the settings the history can be selected, this shows the positions in the selection as a historical path. History can be shown for a turtle, ball and/or opponent. The ball and the opponents are seen by each turtle individual, therefore each can be shown in the field. The color of the opponent depends on the turtle that sees it.

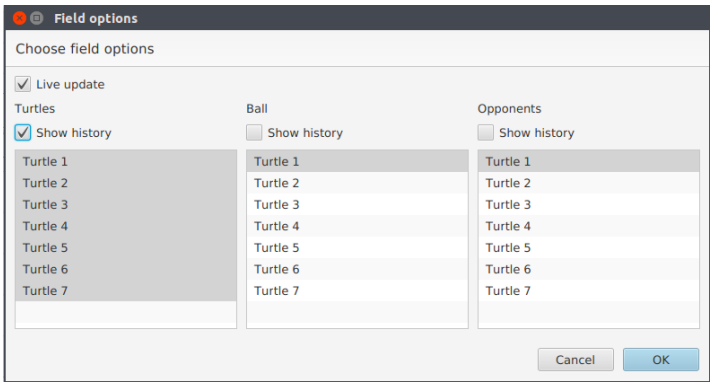

Figure 2.8: Settings of the field visualization.