

Tool for Data Collection and Analysis

Treball Final de Grau

Grau en …...............[[1]](#footnote-1)

Surname: Name:

Pla:[[2]](#footnote-2)

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# Summary

El resum (de 250 a 500 paraules) ha de reflectir el que és present en el text i no inclou referències bibliogràfiques. De manera resumida ha de descriure el problema, plantejar els objectius i l’abast de la investigació, així com la metodologia que s'ha emprat; resumint el resultat i sintetitzant les conclusions.

This document elaborates on the analysis of data collection and visualization tools for videogames, and follows the development of a tool for the GameEngine Unity that allows the users to collect, and then visualize said data.

EXPAND

# Keywords

Entre 5 i 10 paraules que defineixin conceptes clau del treball. Han d’anar separades per comes.

Data, Collection, Visualization, Unity, Tool,

# Links

URL on està la maqueta, web, APP, videojoc, vídeo, etc.

https://github.com/Witiza/-Tool-for-Data-Collection-Analysis-and-Visualization-in-Unity

# Índex de taules

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# Glossari

**Exemple:**

**SQL:** Language to access and manipulate databases.

**DataVis:** Short for Data visualization

UML

CSV

GameObject

Component

# 1. Introduction

## 1.1 Motivation

I have been working with Unity for the past four years, both at university and with personal projects, and I love how the engine manages to merge accessibility and immedianteness with complexity, allowing to do from quick prototypes to fully fledged videogames. This last semester, I got introduced to data analysis and visualization, and its practical use in videogame development.

I did a bit of research and realized that, despite how practical a data collection tool for a big game engine like Unity, would be, there were not many options outside of Unity’s own Game Analytics.

## 1.2 Problem Formulation

Quin és el problema que cal resoldre? Està el problema ja resolt i cal utilitzar/adaptar una solució existent o cal dissenyar-ne una nova?

Few data collection tools are available to the public, and many developers end up producing their own tools for their company/games. This can be an issue for Indie studios who have a more limited budget, and creating a data collection and visualization tool can be too time consuming.

## 1.3 General Objectives of the TFG

Create a Unity asset package that encapsulates a Tool that allows for data collection and visualization.

* Develop the tool
* Allow for Data Collection
* Allow for Data Visualization

## 1.4 Specific Objectives of the TFG

* Develop a tool in Unity that uses its editor UI
* Discover how to render over a unity Scene (MAKE MORE CLEAR)
* Put it in the Unity Asset Store.
* Setup server functionality

## 1.5 Reach of the Project

Limita l'abast del projecte, determinar a qui va dirigit el producte, qui ho farà servir, i qui es beneficiarà del resultat del treball.

The project is intended to be put in the Unity Asset store for free and to be used primary by indie or hobby developers.

There could be a donation button somewhere in the webpage, but the intention is for the tool to be completely free.

# 2. State of the Art

L'Estat de l'Art és el coneixement més actualitzat que existeix per resoldre el problema plantejat o per resoldre problemes similars i es compon dels coneixements i investigacions més recents que s'han formulat per donar solució al problema o aquells que han contribuït substancialment amb algun aspecte de la solució d'aquest.

És revisar la literatura i tecnologia associada al tema d'interès, de manera que es pugui determinar qui, com, quan, on i per què han tractat de resoldre el problema plantejat.

* Data Collection Tools
* Data Visualization Tools

## 2.1 Market Study

Productes que es troben ja en el mercat, semblants al que es proposa en el TFG.

# 3. Project Management

## 3.1 Procedure and tools for the tracking of the[[3]](#footnote-3)

### 3.1.1 GANTT

Documentation

The first phase of the project is to research and write down how the project is going to get done. To do this, the necessary workspaces have been created, like the Trello Board, the Clockify project, the Unity Project, and most important, both, the GitHub repository that is going to store the Unity Project, and the repository that is going to store and keep track of this document and additional resources that are made, like excel sheets.

The practical part of the project has been divided in three main sections, as they are independent from each other, and by doing this, the progress for each section is independent, despite being ordered in the GANTT chart. What this means is that, in order for a section to be worked on, the previous section in the chart does not need to be completed, and testing can be done for each section independently.

Data Collection

The first functionality that is going to be done, is the collection of data from the game the tool is being used on. The specific objectives for this section follow the procedure to develop a software. First, and **UML** will be done to have a scheme of how will the scrip be structured. The objective is to have a **GameObject Component** in order to collect the data from the game, so the next step is to create the base class and structure of the component. After that, both the UI of the component and its functionality will be programmed. The UI is important, as it is the element that the tool users will interact with. Finally, the component will need to save the data generated as **CSV** files.

Data visualization

The next section in the development will be Data Visualization. The steps will be the same as in Data Collection, starting with an **UML** to define the structure, and then base structure that evolves into both functionality and UI, with the difference that, instead of a Component, a C# class will be used. In this case, functionality refers to the ability to receive **CSV** files and visualize them. To modify how data is visualized, the user will be able to modify settings and choose options in a UI. Additional sections in the GANTT like Visualization GUI and Rendering have been added, as both are tasks that can prove to be difficult. GUI refers to the creation of a complex UI Window resembling the ones used in visualization software, using Unity’s GUI system. And Rendering is the process of displaying the data over the Unity Scene, via HeatMaps and event timelines that are rendered directly into the scene.

Database

The third main section of the project will be the one that ties the previous two together. It is also the one that is most subject to change, as the project progresses, either due to a lack of time, or an adjustment in the previous sections or the project itself. The first goal is to have a local database we can write data and read data from. Then, the objective is to move the local database to a remote one, so in a practical use of the tool, the users would be able to gather data from various instances of the tool. This can prove challenging, as the knowledge of this section is inferior to the previous ones.

QA

After finishing the tool, and testing of each individual section, an overall QA is required. To do so, a dummy project will be created, and the Tool implemented. For further testing, external users can be recruited as QA testers of the tool.

Publishing to Unity

Finally, once the project is completed, it needs to be uploaded to Unity’s Asset Store, and assets like screenshots, readmes and instructions will also be created.

### 3.1.2 Trello

For keeping track of more immediate tasks, Trello will be used. For the practical parts of the project, the plan is to first do the UML for each section, and then divide the resulting scheme in tasks to be done in the Trello board, also following the sections and tasks in the GANTT chart.

### 3.1.3 Clockify

An online clock that allows the user to keep track of the time spent working, and in which tasks is the time being spent. Additionally, there is a section to analyse the hours logged and see the total hours spent, order them by tasks or projects, and more.

### 3.1.4 GitHub Repository

For this project, two GitHub repositories have been created. One will hold the Unity Project witch the scripts for the tool and the QA, and the other will keep track of the project document. The reason behind this is that having the Unity Project in a separate repository draws the line between the TFG and the actual tool, in order to facilitate forking of the repository and having the commits more ordered.

## 3.2 Validation Tools

Entrevistes, test, etc.

## 3.3. DAFO

Els punts forts i dèbils del tema i del seu desenvolupament

|  |  |  |
| --- | --- | --- |
|  | **Positius** | **Negatius** |
| **Origen**  **Intern** | **Fortaleses** | **Debilitats** |
| **Origen**  **Extern** | **Oportunitats** | **Amenaces** |

## 3.4 Risks and contingency plan

Es de vital importància detectar els riscos que poden posar en perill la feina i buscar solucions per en cas de ser necessari poder reconduir el projecte.

Els possibles riscos identificats d’aquest projecte, i les seves corresponents solucions son les següents, ordenades de menor a major importància:

|  |  |
| --- | --- |
| **Risk** | **Solution** |
|  |  |
|  |  |
| Unity Rendering being to difficult | More dataviz tools should be added. |
| Unity GUI not being flexible enough | The dataviz aspect of the tool will suffer, so other aspects like data collection should be reinforced. |
| Databases being too complicated | Albeit being a key component, the complexity of the database section of the tool can be reduced, and even removed |
| Not having enough time | The tool is modular so sections can be cut off |

## 3.5. Initial costs analysis

A human life.

# 4. Methodology

**Descripció pas a pas**, les diferents fases i sub-fases del projecte.

Exemple de metodologies:

Interactiu i incremental

Preproducció, producció i postproducció.

Disseny Centrat en l'Usuari

Un cop triada la metodologia explicar cadascun dels processos

# 5. Development of the Project

Aparts propis de aquest tema como pot ser usabilitat, maquetació, disseny, programació, proves, etc.

# 6. Conclusions i treballs futurs

# 7. Bibliografia

**Exemples**

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* Rhyne, Theresa-Marie. 2000. *The impact of computer games on scientific & information visualization (panel session): if you can't beat them, join them*. IEEE Visualization 2000. IEEE Computer Society. pp. 519–521. ISBN 1-58113-309-X.
* Siobhan O’Donovan, J. G. 2013. *A Case Study in the Gamification of a University-level.* New York: Association for Computing Machinery

# 8. Annexos

**Exemples**

Guió Literari

Guió Tècnic

1. Fotografia i Creació Digital o Multimèdia o Disseny i Desenvolupament de Videojocs o Disseny, Animació i Art Digital [↑](#footnote-ref-1)
2. Grau en Fotografia i Creació Digital i Grau en Multimèdia, pla d’estudis es **2009**, Grau en Disseny i Desenvolupament de Videojocs, pla d’estudis es **2014,** Grau en Disseny, Animació i Art Digital **2017** [↑](#footnote-ref-2)
3. Per a la comunicació (drive), per a la planificació (inicial gantt i seguiment Trello), i si porten repositoris com el github o git, dropbox [↑](#footnote-ref-3)