UNIVERSIDAD
REY JUAN CARLOS

INGENIERÍA SUPERIOR DE TELECOMUNICACIONES +

INGENIERÍA TÉCNICA EN INFORMÁTICA DE SISTEMAS

Curso Académico 2016/2017

Trabajo Fin de Carrera

TÍTULO DEL TRABAJO EN MAYÚSCULAS!!

Autor : Viorel Rusu Tutor : Dr. Jesús M. González Barahona

Proyecto Fin de Carrera

FIXME: Título

Autor : FIXME

Tutor : Dr. Gregorio Robles Martínez

La defensa del presente Proyecto Fin de Carrera se realizó el día de de 20XX, siendo calificada por el siguiente tribunal:

Presidente:

Secretario:

Vocal:

y habiendo obtenido la siguiente calificación:

Calificación:

Fuenlabrada, a de de 20XX

Dedicado a

mi familia / mi abuelo / mi abuela

Agradecimientos

Aquí vienen los agradecimientos… Aunque está bien acordarse de la pareja, no hay que olvidarse de dar las gracias a tu madre, que aunque a veces no lo parezca disfrutará tanto de tus logros como tú… Además, la pareja quizás no sea para siempre, pero tu madre sí.

Resumen

Aquí viene un resumen del proyecto. Ha de constar de tres o cuatro párrafos, donde se presente de manera clara y concisa de qué va el proyecto. Han de quedar respondidas las siguientes preguntas:

- ¿De qué va este proyecto? ¿Cuál es su objetivo principal?
- ¿Cómo se ha realizado? ¿Qué tecnologías están involucradas?
- ¿En qué contexto se ha realizado el proyecto? ¿Es un proyecto dentro de un marco general?

Lo mejor es escribir el resumen al final.

Summary

Here comes a translation of the "Resumen" into English. Please, double check it for correct grammar and spelling. As it is the translation of the "Resumen", which is supposed to be written at the end, this as well should be filled out just before submitting.

Contents

List of Figures

Chapter 1

Introduction

We live in a world of data. Data of all sorts: sensors, logs, statistics, different company data. Specifically, in the world of software projects, we also start to have thousands and thousands of data Terabytes. We should not be surprized, a single software project may have millions of lines of code, written by thousands different programmers, having contributions from houndreds of different companies, with thousands of different versions... ok, you get the idea. The problem is we, humans, lose perspective if we only observe that raw data, and it becomes completely useless. We just can't see the forest for the trees.

1.1 The problem

From the previous paragraph, it seems obvious that what is needed is to get simpler data from that huge amount of data. What is needed is to analyze that data in some way, organize and show it so we, humans, could have an eagle view just by a glance. That way, we could draw conclusions about that information and make better decisions, improving our world.

In the last years, many different projects have arisen with this goal in mind: provide tools that help us analyze huge amounts of data and represent it somehow. We are talking about projects such as business intelligence projects, data mining, real-time analytics and visualizations. Some of them are real Big Data projects, some of them don't have in scope such a big amount of data so we can't call them that way.

Specifically, what we want is to build different visualizations, or dashboards, of our software development data. We are applying our data analysis and visualizations to software projects in particular, but really we could apply it to any other kind of data. Out there we can find many tools to achieve our goals. There are many different solutions to the mentioned problem of respresenting data. What we want is a solution that lives in the browser. Somehow, we want the final user to interact with his browser and seeing easily different visualizations of his own data, in a new way it hasn't been shown before. We want to make our contribution to this world and make it available for everyone, we want it to be open source.

1.2 The solution

We decided to use Kibana[1]: an open source analytics and visualization platform designed to work with Elasticsearch[2]. Elasticsearch is a highly scalable open-source full-text search and analytics engine. It allows us to store, search, and analyze big volumes of data quickly and in near real time.

Kibana is a very new technology, fully under development by the time this project was realized. It provides single visualizations of different types, like pie or bar charts. Then, it is possible to save and load this visualizations in a dynamic dashboard. This is an interactive dashboard, allowing us to move each separate visualization around, and applying different filters to all data just by interacting with a single visualization for example. This makes it really easy to understand large volumes of data. We can quickly create dynamic dashboards that display changes to Elasticsearch queries in real time. All this features made Kibana a very good choice.

The problem with Kibana is that it has a very limited number of visualizations. Kibana team is aware of this problem and they encourage independent developers to develop their own visualizations and make it public to the community. And this is achieved developing a plugin for Kibana. Official documentation on how to create a custom plugin is poor, but luckily independent developers have succeeded and published the process. With this information, and the information we can obtain of standard plugins by reverse-engineering, reading source code, we are able to create a new plugin.

We saw that basic 2D charts are already available in Kibana, and other developers were already working in adding more variety to it. So a good idea would be to represent the data in

[1] https://www.elastic.co/products/kibana

[2] https://www.elastic.co/products/elasticsearch

a whole new way for Kibana, under the form of 3D charts. There are not many 3D libraries out there written in Javascript that allow us to represent 3D functional data, and we wanted to promote the use of a new library a student at Universidad Rey Juan Carlos developed as his thesis, being in touch with the developer in order to add new functionality and report bugs.

In order to sum it up, we can express our solution with the following words: it is going to take the form of an easy-install plugin fully-integrated in Kibana, containing different 3D visualizations.

1.3 Objectives

- Store open source projects data in the elasticsearch database engine. - Use Kibana integrated tools to retrieve the data we need from elasticsearch. - Build this new 3D visualizations: pie chart, - Integrate threedc.js 3D scenes in Kibana visualization - Integrate threedc.js visualization in Kibana dashboard - Add custom events to threedc charts in order to filter data on click - Help to improve threedc.js library by reporting bugs, adding an interface for custom data and for custom events.

1.4 Structure of this paper

En esta sección se debería introducir la esctura de la memoria. Así:

- En el primer capítulo se hace una intro al proyecto.

- En el capítulo **??** se muestran los objetivos del proyecto.

- A continuación se presenta el estado del arte.

- ...

Chapter 2

State of art and context

Descripción de las tecnologías que utilizas en tu trabajo. Con dos o tres párrafos por cada tecnología, vale.

Puedes citar libros, como el de Bonabeau et al. sobre procesos estigmérgicos [1].

También existe la posibilidad de poner notas al pie de página, por ejemplo, una para indicarte que visite la página de LibreSoft[1].

2.1 Sección 1

[1] `http://www.libresoft.es`

Chapter 3

Used technologies

3.1 HTML5

3.2 Javascript

3.3 ThreeDC

3.4 ElasticSearch

3.5 Kibana

3.6 AngularJS

Chapter 4

Diseño e implementación

4.1 Arquitectura general

figura 4.1.

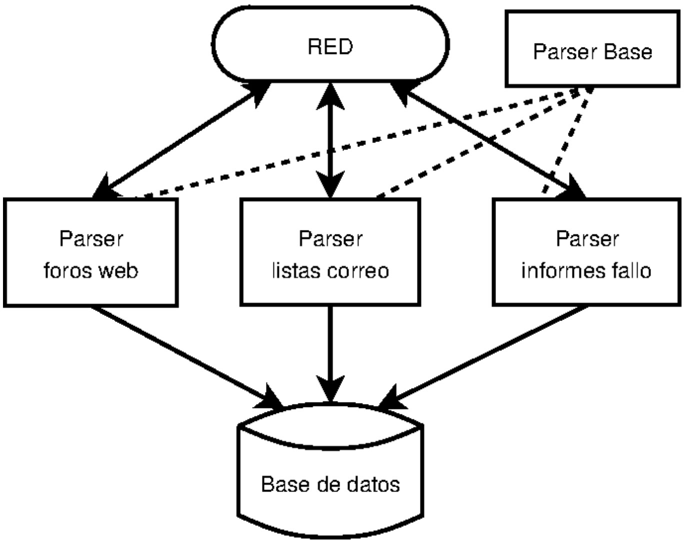

Figure 4.1: Estructura del parser básico

Chapter 5

Resultados

Chapter 6

Conclusiones

6.1 Consecución de objetivos

Esta sección es la sección espejo de las dos primeras del capítulo de objetivos, donde se planteaba el objetivo general y se elaboraban los específicos.

Es aquí donde hay que debatir qué se ha conseguido y qué no. Cuando algo no se ha conseguido, se ha de justificar, en términos de qué problemas se han encontrado y qué medidas se han tomado para mitigar esos problemas.

6.2 Aplicación de lo aprendido

Aquí viene lo que has aprendido durante el Grado/Máster y que has aplicado en el TFG/TFM. Una buena idea es poner las asignaturas más relacionadas y comentar en un párrafo los conocimientos y habilidades puestos en práctica.

1. a
2. b

6.3 Lecciones aprendidas

Aquí viene lo que has aprendido en el Trabajo Fin de Grado/Máster.

1. a

2. b

6.4 Trabajos futuros

Ningún software se termina, así que aquí vienen ideas y funcionalidades que estaría bien tener implementadas en el futuro.

Es un apartado que sirve para dar ideas de cara a futuros TFGs/TFMs.

6.5 Valoración personal

Finalmente (y de manera opcional), hay gente que se anima a dar su punto de vista sobre el proyecto, lo que ha aprendido, lo que le gustaría haber aprendido, las tecnologías utilizadas y demás.

Apéndice A

Manual de usuario

Bibliography

[1] E. Bonabeau, M. Dorigo, and G. Theraulaz. *Swarm Intelligence: From Natural to Articial Systems*. Oxford University Press, Inc., 1999.