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Bachelor in Computer Science

Accelerating SQL with Complex Visual Querying

Dissertation plan submitted in partial fulfillment
of the requirements for the degree of

Master of Science in
Computer Science and Informatics Engineering

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Abstract

The dissertation must contain two versions of the abstract, one in the same language as the main text, another in a different language. The package assumes that the two languages under consideration are always Portuguese and English.

The package will sort the abstracts in the appropriate order. This means that the first abstract will be in the same language as the main text, followed by the abstract in the other language, and then followed by the main text. For example, if the dissertation is written in Portuguese, first will come the summary in Portuguese and then in English, followed by the main text in Portuguese. If the dissertation is written in English, first will come the summary in English and then in Portuguese, followed by the main text in English.

The abstract shoul not exceed one page and should answer the following questions:

- What's the problem?
- Why is it interesting?
- What's the solution?
- What follows from the solution?

Keywords: Keywords (in English) ...

Resumo

Independentemente da língua em que está escrita a dissertação, é necessário um resumo na língua do texto principal e um resumo noutra língua. Assume-se que as duas línguas em questão serão sempre o Português e o Inglês.

O *template* colocará automaticamente em primeiro lugar o resumo na língua do texto principal e depois o resumo na outra língua. Por exemplo, se a dissertação está escrita em Português, primeiro aparecerá o resumo em Português, depois em Inglês, seguido do texto principal em Português. Se a dissertação está escrita em Inglês, primeiro aparecerá o resumo em Inglês, depois em Português, seguido do texto principal em Inglês.

O resumo não deve exceder uma página e deve responder às seguintes questões:

- Qual é o problema?
- Porque é que ele é interessante?
- Qual é a solução?
- O que resulta (implicações) da solução?

E agora vamos fazer um teste com uma quebra de linha no hífen a ver se a LaTeX duplica o hífen na linha seguinte...

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Sim! Funciona! :)

Palavras-chave: Palavras-chave (em Português) ...

Contents

Chapter 1

Introduction

This project was developed on a particular environment, and, as such as, this chapter will introduce this thesis, starting by all the contextualization about the company, the product, and its section which will be the nuclear focus of this thesis, followed by the description the motivation behind it. In addition, will be presented an overview of the problem, such as expected contributions and the structure of the document.

1.1 Context

Once this project was proposed to improve the visual way that the users of the OutSystems Platform can query data, in this section, will be first provided some context about the OutSystems, in order to obtain an overview of the product. After this, also a description of Aggregates, which is the current OutSystems feature to build queries through visual interaction will be provided.

The main idea in this section, is to present a short description, with three or four paragraphs, which contains some executive summaries of the problem and of the topics of this work.

1.2 Motivation

It will be presented the motivation behind this project. So, it will be explained what are the user possibilities to build queries, including visual and not visual ways, and what are the problems related with both of them. Also, will be presented what is the company's motivation to do this project, since users can do the queries that they want in different ways.

1.3 Problem Description

In this section, will be presented generally the problem of this thesis. The goal of this section is to provide a global view of the problem without many details.

1.4 Research Questions

Following, will be enumerated the most important question which guides the workflow (e.g. Can we enable OutSystems developers to easily do most kinds of database queries without ever using SQL?). The goal is to do all the research and development in order to obtain answers to all of these questions.

1.5 Main Expected Contributions

In the Main Expected Contributions, will be enumerated what are the thesis contributions to this work and to the proposed final solution.

1.6 Structure

The remaining chapters of this thesis are organized as follows:

- Chapter 2 - Related Work: presents a short description of the OutSystems Platform, as well as a description of the existing techniques that already exist on the context of the main topic of this thesis - data visualization and visual querying. Besides, other commercial applications will be enumerated which can have relevant content for this study;
- Chapter 3 - Proposed Solution: describes the proposed solution, starting with a requirement analysis, followed by a more detailed explanation about the problem, and finally with a definition of the development scope to understand what problem will be tackled on detail;
- Chapter 4 - Work Plan: includes a planning of the inherent total work. Thus, will be presented an overview of the tasks that were done on this dissertation plan, together with the preview of the work which will be the focus of the second phase of the thesis, the elaboration.

Chapter 2

Related Work

On this thesis, it is pretended to apply Human-computer interaction (HCI), Data Visualization and Visual Querying concepts, techniques and technologies to improve a Visual Querying Feature of the OutSystems Low-code Development Platform. Thus, in this chapter, will be presented the results of a study that analysed what is the Low-code development platform background and its actual situation, as well as what are the techniques and technologies which already exist, including some comparison between them. Finally, will be enumerated what products, technologies and tools exist on other commercial applications which can be related with the topics of this thesis.

It is necessary to add more sections to describe some key concepts about user experience testing and analysis.

2.1 OutSystems Background

The entirety of this thesis has the aim of improving the OutSystems Platform, so it is very important to understand what is that product and what can be developed with it. This section provides an overview of this Low-code Development Platform, describing its value proposal, and its technological goals and approaches. In addition, it will be used some images to illustrate some relevant aspects of the platform.

The next sections depend on the research done.

2.2 Data Visualization

2.3 Visual Queries

2.4 Data User Exprerience and Expressiveness

2.5 Technologies and Commercial Applications

Such as the techniques research, it is also very important to search what are the technologies related with the subjects of this thesis that already exist, as this knowledge can be very important to the concept of a solution proposal.

Furthermore, in any research, the academic content should not be the only taken into account, because sometimes the knowledge does not evolve only in the research centres but also in the companies. Since this thesis is made to improve a company product, the latter assertion has additional strength, so also, will be introduced commercial applications which can be useful to all the entirety of this process.

Chapter 3

Proposed Solution

This chapter presents the solution proposed to the problems presented, that includes a description of the process realized to understand why the people use SQL to made queries instead of Aggregates, such as Personal Interviews and a Quantitative Analysis of the queries which customers ran on the cloud. Furthermore, this chapter presents what is the scope of the project, so it will be explained what problems will be tacked in detail.

3.1 Requirements Analysis

As referred above, this section presents the results of the analysis made to understand why developers use SQL to make queries instead of Aggregates through its Visual Querying Features.

3.2 Proposed Implementation

Following, will be detailed the pretended project, indicating all the problems identified and all the approached that will be adopted.

3.3 Scope Definition

In this section, will be presented what were the decisions made of which problems will be addressed in this thesis, once the initial problem presentation had a wide scope and it was concluded that it's not possible to resolve all the Aggregates expressiveness and experience problems in this project.

Chapter 4

Work Plan

This chapter includes a planning of the total work from beginning to end. Thus, will be presented in a chronological way all the work realized in the preparation phase. Furthermore, after all the analysis realized on this dissertation plan, will be presented an expected plan to the remaining time until the final of this thesis.