



**Universidade do Minho**

Escola de Engenharia

Departamento de Informática

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## **Analysis and Visualisation of Dynamic Social Networks**

September 2016



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## **Analysis and Visualisation of Dynamic Social Networks**

Master dissertation

Master Degree in Computer Science

Dissertation supervised by

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September 2016

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## ACKNOWLEDGEMENTS

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Write acknowledgements here

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## ABSTRACT

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Write abstract here (en) or import corresponding file

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## RESUMO

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Escrever aqui resumo (pt) ou importar respectivo ficheiro

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## CONTENTS

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1	INTRODUCTION	1
1.1	Context and Problem	1
1.2	Motivation	1
1.3	Goals	1
2	SOCIAL NETWORKS IN SOCIOLOGY	2
2.1	Origins of Social Networks	3
3	ONLINE SOCIAL NETWORKS	4
3.1	Portuguese and Online Social Networks	4
3.2	SN A	4
3.2.1	Domain Modeling	4
3.2.2	API	4
3.3	SN B	4
3.4	SN C	4
4	SOCIAL NETWORK ANALYSIS	5
4.1	Network Analysis	5
4.1.1	Scientific Background	5
4.1.2	Power Law	5
4.1.3	Centrality Measures	5
4.1.4	Link Analysis	5
4.1.5	...	5
4.2	Six Degrees of Separation	5
4.3	Network Visualisation	5
4.4	Real World Applications	5
5	STATE OF THE ART	6
5.1	Basics/Background/Related work	6
6	THE PROBLEM AND ITS CHALLENGES??	7
7	PROPOSED SOLUTION	8
7.1	Solution Requirements	8
7.1.1	Requirements Analysis	8
7.1.2	Requirements Specification	8
7.1.3	Requirements Prioritisation	8
7.2	System Modeling	8
7.3	System Architecture	8

7.4	Technology Selection	8
7.4.1	Technology A	8
7.4.2	Technology B	8
7.4.3	Technology C	8
7.4.4	Technology Comparison	8
7.4.5	Decision	8
8	IMPLEMENTATION	9
8.1	Data Extraction	9
8.1.1	Data Sources	9
8.2	Data Mining	9
8.3	Back end	9
8.4	Front end	9
8.5	Outcomes	9
9	CASE STUDIES	10
9.1	Results	10
9.2	Discussion	10
9.3	Summary	10
10	CONCLUSION	11
10.1	Conclusions	11
10.2	Prospect for future work	11
A	SUPPORT MATERIAL	12

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## LIST OF ABBREVIATIONS

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<b>SN</b>	Social Network
<b>SNA</b>	Social Network Analysis
<b>ONS</b>	Online Social Network



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## LIST OF FIGURES

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## LIST OF TABLES

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## INTRODUCTION

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### 1.1 CONTEXT AND PROBLEM

SNs, SNAs, OSNs, Unstructured Data Analysis

### 1.2 MOTIVATION

### 1.3 GOALS

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## SOCIAL NETWORKS IN SOCIOLOGY

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Nowadays is hard to find something that is not organized as a network, if one tries to understand something about the world around us, then definitely one needs to know something about networks.

Curiously if you look up the term "*Social Network*" in the Cambridge Dictionary, we may face the following:

a website or computer program that allows people to communicate and share information on the Internet using a computer or mobile phone

But, even if today we automatically think in SNs as websites (or web applications), deep down we know when talking about SNs, we refer to a much more broader term, that said, we may consider a SN as the following:

A social structure made of nodes that are generally individuals or organizations. A social network represents relationships and flows between people, groups, organizations, animals, computers or other information/knowledge processing entities. The term itself was coined in 1954 by J. A. Barnes.

One may say that networks work like pipes, and through them things flow, from individual to individual inside the network. It's through networks that big institutions can organise themselves, and actually add value to society despite the large number of individuals.

## 2.1 ORIGINS OF SOCIAL NETWORKS

(...) many people attribute the first use of the term "social network " to Barnes (1954). The notion of a network of relations linking social entities, or of webs or ties among social units emanating through society, has found wide expression throughout the social sciences. (...)

The Social Network concept has been around for many years now, maybe not in the exact format that nowadays, we are familiarized with ("*web way*", in a manner of speaking), but in a more abstract sense, applied in real life within real connections. In "*Social Network Analysis - Methods and Applications Stanley Wasserman and Katherine Faust*", the authors refer that this term has first came into discussion in 1954, introduced by Barnes, J.A.

Social relations in Bremnes, Norway, fall into three categories: relatively stable formal organizations serving many different purposes, unstable associations engaged in fishing, and interpersonal links that combine to form a social network and on which perceptions of class are based. In fishing situations, orders are given and obeyed; in the other social settings, consensus decisions are reached obliquely and tentatively.

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## ONLINE SOCIAL NETWORKS

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Present table and comment. A, B and C are studied more deeply in the following sections.

### 3.1 PORTUGUESE AND ONLINE SOCIAL NETWORKS

Mentioning relevant facts from marktest study "Os Portugueses e as Redes Sociais 2016"

### 3.2 SN A

#### 3.2.1 *Domain Modeling*

#### 3.2.2 *API*

### 3.3 SN B

### 3.4 SN C

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## SOCIAL NETWORK ANALYSIS

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### 4.1 NETWORK ANALYSIS

#### 4.1.1 *Scientific Background*

*Graphs*

*Statistics*

...

#### 4.1.2 *Power Law*

#### 4.1.3 *Centrality Measures*

#### 4.1.4 *Link Analysis*

#### 4.1.5 ...

### 4.2 SIX DEGREES OF SEPARATION

Small World Problem, Stanley Milgram's Experiment

### 4.3 NETWORK VISUALISATION

It's a science by itself.

### 4.4 REAL WORLD APPLICATIONS

What SNAs are used for.

---

## STATE OF THE ART

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State of the art review; related work

### 5.1 BASICS/BACKGROUND/RELATED WORK

Example of a citation where the author should be cited directly on the text like, the work of ?, on producing L<sup>A</sup>T<sub>E</sub>Xfiles with BibT<sub>E</sub>X references.

Another way of citing without a direct mention to the author can be used like the work done on C language (?).



# 6

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THE PROBLEM AND ITS CHALLENGES??

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## PROPOSED SOLUTION

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### 7.1 SOLUTION REQUIREMENTS

#### 7.1.1 *Requirements Analysis*

#### 7.1.2 *Requirements Specification*

#### 7.1.3 *Requirements Prioritisation*

### 7.2 SYSTEM MODELING

### 7.3 SYSTEM ARCHITECTURE

### 7.4 TECHNOLOGY SELECTION

#### 7.4.1 *Technology A*

#### 7.4.2 *Technology B*

#### 7.4.3 *Technology C*

#### 7.4.4 *Technology Comparison*

#### 7.4.5 *Decision*

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## IMPLEMENTATION

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### 8.1 DATA EXTRACTION

#### 8.1.1 *Data Sources*

### 8.2 DATA MINING

### 8.3 BACK END

### 8.4 FRONT END

### 8.5 OUTCOMES

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## CASE STUDIES

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Application of main result (examples and case studies)

9.1 RESULTS

9.2 DISCUSSION

9.3 SUMMARY

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## CONCLUSION

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Conclusions and future work.

### 10.1 CONCLUSIONS

### 10.2 PROSPECT FOR FUTURE WORK



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## SUPPORT MATERIAL

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Auxiliary results which are not main-stream; or

Details of results whose length would compromise readability of main text; or

Specifications and Code Listings: should this be the case; or

Tooling: Should this be the case.