NOVA SCHOOL OF SCIENCE & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

JOANA FALCÃO DE MOURA

BsC in Computer Science

IOC: INTERNET OF COWS

TOO BE ADDED

Dissertation Plan
MASTER IN COMPUTER SCIENCE AND ENGINEERING

NOVA University Lisbon
Draft: *January 11, 2023*

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BsC in Computer Science

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Abstract

Regardless of the language in which the dissertation is written, usually there are at least two abstracts: one abstract in the same language as the main text, and another abstract in some other language.

The abstracts' order varies with the school. The default behaviour for the NOVAthesis LaTeX (novathesis) template is to have in first place the abstract in *the same language as main text*, and then the abstract in *the other language*. For example, if the dissertation is written in Portuguese, the abstract order will be first Portuguese and then English, followed by the main text in Portuguese. If the dissertation is written in English, the abstract order will be first English and then Portuguese, followed by the main text in English. The novathesis (LaTeX) template will automatically order the abstracts by considering this rule. However, this order can be customized by adding

```
\abstractorder(<MAIN_LANG>):={<LANG_1>,...,<LANG_N>}
```

to the file `5_packages.tex`. For example, for a main document written in German with abstracts written in German, English and Italian (by this order) use:

```
\abstractorder(de):={de,en,it}
```

Concerning its contents, the abstracts should not exceed one page and may answer the following questions (it is essential to adapt to the usual practices of your scientific area):

1. What is the problem?
2. Why is this problem interesting/challenging?
3. What is the proposed approach/solution/contribution?
4. What results (implications/consequences) from the solution?

Keywords: One keyword, Another keyword, Yet another keyword, One keyword more, The last keyword

Resumo

Independentemente da língua em que a dissertação está escrita, geralmente esta contém pelo menos dois resumos: um resumo na mesma língua do texto principal e outro resumo numa outra língua.

A ordem dos resumos varia de acordo com a escola. O comportamento padrão para o template novathesis é ter em primeiro lugar o resumo *na mesma língua do texto principal* e depois o resumo *na outra língua*. Por exemplo, se a dissertação for escrita em português, a ordem dos resumos será primeiro em português e depois em inglês, seguido do texto principal em português. Se a dissertação for escrita em inglês, a ordem dos resumos será primeiro em inglês e depois em português, seguido do texto principal em inglês. O template novathesis (LaTeX) irá ordenar automaticamente os resumos por uma ordem apropriada. No entanto, esta ordem pode ser personalizada adicionando

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\abstractorder(<MAIN_LANG>):={<LANG_1>,...,<LANG_N>}
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ao ficheiro `5_packages.tex`. Por exemplo, para um documento escrito em Alemão com resumos em Alemão, Inglês e Italiano (por esta ordem), pode usar-se:

```
\abstractorder(de):={de,en,it}
```

Relativamente ao seu conteúdo, os resumos não devem ultrapassar uma página e frequentemente tentam responder às seguintes questões (é imprescindível a adaptação às práticas habituais da sua área científica):

1. Qual é o problema?
2. Porque é que é um problema interessante/desafiante?
3. Qual é a proposta de abordagem/solução?
4. Quais são as consequências/resultados da solução proposta?

Palavras-chave: Primeira palavra-chave, Outra palavra-chave, Mais uma palavra-chave, A última palavra-chave

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Acronyms

novathesis NOVAthesis LaTeX *(pp. ii, iii)*

1

Introduction

This chapter will explore the motivations for this thesis development, the underlying problem that provoced the need for this dissertation, the objectives expected to achive during its development and the current document structure.

1.1 Motivations

In the Bla Bla Bla Farm, located in Bla Bla Bla, they have over xxx cows, alongside many other animals, spread throughout xxxkms. Controling that many animals in such a vaste terrain is quite a difficult task. Futhermore, the region lacks network connection, which complicates this mission even more.

The cows are kept seperated in herds depending on their ages, this means that the younger cows are not in the same herd as the older ones. This kind of seperation is quite important for them to coexist. Inside each herd they follow a hierarchical structure, having a leader that all the other cows follow.

The BLA BLA BLA Farm currently has physical fences in place to mantain the multiple herds seperated from each other and protected. However, this fences usually are not very persistent, which lead to an often replacement and potencial danger for the cows. In addition, since the farm has an immensive amount of land, it is reasonably strenuous to locate all cows and make sure all are healthy and safe.

Having already available some great options of collars that create virtual fences for all kinds of animals, there are still no alternative that would work for the BLA BLA BLA Farm. Mainly because of the lack of network connection available, but also do to the immensely amount of cattle at this location.

1.2 Problem Statement

1.3 Objectives

During this dissertation it is expected to be developed a fully functional animal collar, adaptable to any cow, that connects to gps and creates a virtual fence for each herd. This fence should be adjustable accordingly to the user's wish and the collar should send a vibration to the cows, when this fence area is changed, in order to get the herd to the new location created by the new virtual fence position.

The collars should provide accurate information about the cows locations as well as be highly scalable to handle all the cows informations.

1.4 Structure

The remainder of this dissertation is organized as follows:

- Chapter 2 - Related Work: includes research on existing protocols for broadcasting, focusing on Gossip Protocol, options for wireless sensor networks, available sensors and Arduino alternatives, how cows behave in a herd and lastly some possible existing collars.
- Chapter 3 - Work Plan: a description of the future work organization and explication of each work phase.

2

Related Work

2.1 Gossip Protocol

2.1.1 History

The Gossip Protocol, as the name indicates, was created based on how gossips are propagated in social groups. In a Gossip Protocol, nodes in a network send the information, randomly, to other nodes in the same network, similar to how a gossip is spread between members in a social group.[1]

2.1.2 What is the Gossip Protocol

The gossip protocol is based on every participant propagating their messages collaboratively with all the members of their group.

This process starts when a node desires to propagate some piece of information. He will send his message to t nodes, chosen randomly. When the receiving nodes obtain the message for the first time, they will do the same as the previous node had done and resend the message to t randomly chosen nodes. If a node receives the same message twice, it will discard her. However, since neither node knows who has received each message and who has sent a message to whom, each node will have to keep a log of all messages that he has already received.

It can be effective in distributing information quickly, but it can also be inefficient because nodes may end up sending the same information to each other multiple times.

3

Following Work

Bibliography

[1] J. Carlos and A. Leitão. *Gossip-based broadcast protocols*. 2007. (Visited on 2023-01-09) (cit. on p. 3).

A

NOVAthesis covers showcase

This Appendix shows examples of covers for some of the supported Schools. When the Schools have very similar covers (e.g., all the schools from Universidade do Minho), just one cover is shown. If the covers for MSc dissertations and PhD thesis are considerable different (e.g., for FCT-NOVA and UMinho), then both are shown.

B

Appendix 2 Lorem Ipsum

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Annex 1 Lorem Ipsum

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