FIRST NAME
LAST NAME

TÍTULO DA TESE (MÁXIMO 70 CARACTERES)

THESIS TITLE (MAX 70 CHARACTERS)

PROPOSTA
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"*The greatest challenge to any thinker is stating the problem in a way that will allow a solution*"

— Bertrand Russell

Universidade de Aveiro
2024

FIRST NAME
LAST NAME

TÍTULO DA TESE (MÁXIMO 70 CARACTERES)

THESIS TITLE (MAX 70 CHARACTERS)

Proposta de Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à conclusão da unidade curricular Proposta de Tese, condição necessária para obtenção do grau de Mestre em Engenharia de Computadores e Telemática , realizada sob a orientação científica do Doutor (nome do orientador), Professor associado do Departamento de Eletrónica, Telecomunicações e Informática da Universidade de Aveiro, e do Doutor (co-orientador), Professor auxiliar convidado do Departamento de Matemática da Universidade de Aveiro.

Dedico este trabalho à minha esposa e filho pelo incansável apoio.

o júri / the jury

presidente / president   Prof. Doutor João Antunes da Silva
professor associado da Faculdade de Engenharia da Universidade do Porto

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agradecimentos / acknowledgements

Palavras Chave   texto livro, arquitetura, história, construção, materiais de construção, saber tradicional.

Resumo   Um resumo é um pequeno apanhado de um trabalho mais longo (como uma tese, dissertação ou trabalho de pesquisa). O resumo relata de forma concisa os objetivos e resultados da sua pesquisa, para que os leitores saibam exatamente o que se aborda no seu documento.

Embora a estrutura possa variar um pouco dependendo da sua área de estudo, o seu resumo deve descrever o propósito do seu trabalho, os métodos que você usou e as conclusões a que chegou.

Uma maneira comum de estruturar um resumo é usar a estrutura IMRaD. Isso significa:

- Introdução

- Métodos

- Resultados

- Discussão

Veja mais pormenores aqui:
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Abstract

An abstract is a short summary of a longer work (such as a thesis, dissertation or research paper).

The abstract concisely reports the aims and outcomes of your research, so that readers know exactly what your paper is about.

Although the structure may vary slightly depending on your discipline, your abstract should describe the purpose of your work, the methods you've used, and the conclusions you've drawn.

One common way to structure your abstract is to use the IMRaD structure. This stands for:

- Introduction

- Methods

- Results

- Discussion

Check for more details here:
https://www.scribbr.com/dissertation/abstract/

Conteúdo

Lista de Figuras

Lista de Tabelas

Lista de Excertos de Código

Glossário

CAPÍTULO 1

Introduction

1.1 Dissertation Framework

The current systematic literary review is involved within the scope of the Dissertation/Internship Preparation (PDE) and Dissertation/Internship course of the Master's in Computer Engineering (MEI), of the Department of Electronics, Telecommunications and Information Technology (DETI), of the University of Aveiro.

The review aims to be able to develop an intelligent assistant based on voice commands that is capable of interpreting and correctly executing commands related to the area of human resources (HR) knowledge.

To ensure that the development of the creation of this literary review avoided biases, and efficiently obtained the answers determined for the context, systematic methodologies were used, accepted by the majority of the current scientific community.

1.2 Contextualization of the Problem

Voice-user interfaces (VUIs) have emerged as integral components of modern technology, transforming the way users interact with devices. The increasing prevalence of VUIs, facilitated by Automatic Speech Recognition (ASR) and Natural Language Processing (NLP), has paved the way for innovative applications in various domains. This research seeks to explore the untapped potential of developing domain-specific VUI personal assistants, with a focus on enhancing functionalities within the human resources sector.

1.3 Project Contributions and Objectives

While general-purpose VUIs have gained popularity, there remains a notable gap in the availability of domain-specific solutions tailored to the unique needs of specific industries. In particular, the human resources domain stands to benefit significantly from the implementation of VUI personal assistants capable of understanding, interpreting, and executing commands specific to HR tasks.

1.4 Project Planning

To be able to develop this literary review, we planned the time according to the table **??**.

Phase	Period
Review Writing	hey
Definition of research methodologies	oi
Solution Analysis & Design	545

Tabela 1.1: Table to test captions and labels.

1.5 Literary Review Structure

This Literature Review is structured through the following chapters:

- Introduction
- Systematic Literature Review
- Solution Analysis & Design
- Conclusion

In the first chapter, the introduction, we give a resume about the problem and the goals of this review. Besides, it shows how the document is organized.

In the second, we go deep in the literature review, explaining the methdology and steps we followed, the questions we established, and the answers and conclusions we obtained for each of those questions.

In the third chpater, we come up with a possible solution to the problem we present in this literature review.

By the fourth and final chapter, we conclude this literature review.

Systematic Literature Review

The development of artificial intelligence technologies in recent times is undeniable. Therefore, it is expected that research and screening of documents that represent this knowledge obtained can lead us to understand how voice assistants work and how to implement a possible template that is capable of receiving different domains/contexts and training the platform to be able to execute commands. in these respective domains, especially, in our case, in human resources.

2.1 Research Methodology

This section explains the strategy by which our research was carried out, including the questions that were defined, the sources used, the search terms, and the inclusion and exclusion criteria. At the end, we present a small summary of what this process was like.

2.1.1 Research Questions

The general objective of our literature review is to understand how voice assistants trained for specific domain contexts work. To be able to answer this question, it is necessary to divide it into others, which will be able to offer a general picture of the current state of the art, and how a solution should be designed. The questions defined in our research are found in table 2.

item 11	item 12	item 13
item 21	item 22	item 23

Research Question ID	
RQ1	What are the main artificial intelligence and machine learning technologies relate
RQ2	What is the state-of-th
RQ3	How does one i

Tabela 2.1: Research questions

2.1.2 Research Terms

2.1.3 Inclusion and Exclusion Criteria

2.1.4 Data Extraction

2.2 SEARCH RESULTS

2.2.1 What are the main artificial intelligence and machine learning technologies related to voice user interfaces, specially in Speech Recognition, Speech Synthesis, Natural Language Processing, and Trigger-word detection?

Li et al. [1] proposes a name-free domain classification that can continuous learn and adapt the model to incoming domains without the need of retraining. He et al. [2] defines the DeBERTa pre-trained language model, that can be fine-tuned in a number of Natural Language Processing(NLP) downstream tasks.

2.2.2 What is the state-of-the-art and the main services that exist in the market on Voice User Interfaces?

In [3] the main voice user assistants in the market are Amazon's Alexa, Microsoft's Cortana, Google's Google Assistant, and Apple's Siri. These assistants have mostly common features that includes be able to search for content in the internet, help the user organize its life by setting reminders, tasks or calendar events, and it can be integrate with third-party application to execute commands related to them, like request a trip on Uber, or a food order in a food delivery application, and also control IoT devices like TVs, thermostats, door locks, etc. These services are usually executed through brand-specific smart devices, like Amazon's Echo, and Google's Home.

Those software platforms have issues related to security and privacy. Those devices cannot yet authenticate their users by voice, and considering their privileges, they can be a huge threat. Also, it was comproved that those devices are capable of recognizing ultrasonic frequencies and execute accordingly. Also, many users feel afraid that their data is being constantly recording and being sent to private data centers.

2.2.3 How does one implement a Voice User Assistants(VUIs) for domain-specific contexts?

Li et al. [1] implemented a name-free domain classification model capable of using personalized information to support the classification of an utterance in a domain. The model's name is CoNDA, and it is baselined on SHORLISTER. Besides its name-free feature, CoNDA supports domain adaptation, by continuous learning the new domains without the need to retrain the whole model. Just like its baseline model, CoNDA contains three modules: The first is a LSTM encoder that converts utterances in dense vector representation by using word embeddings. The second model is the personalized domain summarization, which outputs an enabled personalized domain dense vector. and finally the third module, which is a two-layer feed forward network that will act as our classifier. In their experimentation, the model results

in a 95.6% prediction accuracy for the initial trained models, and 88.2% accuracy after we feed the model 100 new domains, which is only 3.6

In He et al. [2], The Decoding-enhanced BERT with disentangled attention, DeBERTa, is a pre-trained language model, based on BERT, from Google, which adds two main new techniques: A disentangled attention mechanism, and a enhanced mask decoder. The disentangled attention mechanism consider two vectors representing its word embeddings, for content, and for position, instead of a concatenated vector like in BERT, and the attention weights are measured as disentangled matrices computed by its these vectors in position and content . The enhanced mask decoder, used in masked language modeling, is very similar to BERT's one, but its absolute position mask decoder is used before the soft-max layer processing. To prove the efficiency of both techniques in DeBERTa, the model was trained in half the data necessary for the BERT model, and achieved a 0.9% increase in MNLI, on SQuAD v2.0 by 2.3%, and RACE by 3.6%.

2.3 Search Conclusions

2.3.1 What are the main artificial intelligence and machine learning technologies related to voice user interfaces, specially in Speech Recognition, Speech Synthesis, Natural Language Processing, and Trigger-word detection?

todo

2.3.2 What is the state-of-the-art and the main services that exist in the market on Voice User Interfaces?

todo

2.3.3 How does one implement a Voice User Assistants(VUIs) for domain-specific contexts?

todo

2.4 Additional Resolutions

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APÊNDICE A

Additional content