Francisco Maria Calisto

Curriculum Vitae

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Education

PhD Degree in Information Systems and Computer Engineering, *Instituto Superior Técnico*, Universidade de Lisboa, Portugal.

MSc Degree in Information Systems and Computer Engineering, *Instituto Superior Técnico*, Universidade de Lisboa, Portugal.

BSc Degree in Computer Science and Engineering, *Instituto Superior Técnico*, Universidade de Lisboa, Portugal.

Doctoral Thesis

Title   *Medical Imaging Diagnosis Assistant*

Supervisors   Professor Jacinto Nascimento, Professor Nuno Nunes

Description   The MIDA Project aims to develop a new assistant (i.e. a system that will provide a diagnosis support as a second opinion), for several human tissues. The PhD Thesis goal is the Research and Development (R&D) of an assistant that will support the automation of cancer diagnosis across Medical Imaging (MI) technologies. Based on the State-Of-The-Art, it is planned to apply an User-Centered Design (UCD) approach within a context of Human-Computer Interaction (HCI) for the qualitative and quantitative User Research (UR) to understand how clinical institutions can use *AI-Assistive* methods to create effective Health Informatics (HI) with impactful healthcare systems.

Masters Thesis

Title   *Medical Imaging Multimodality Breast Cancer Diagnosis User Interface*

Supervisors   Professor Jacinto Nascimento, Professor Daniel Gonçalves

Description   The MIMBCD-UI Project deals with the use of a recently proposed technique in literature: Deep Convolutional Neural Networks (DCNNs). These deep networks will incorporate information from several different modes: magnetic resonance imaging volumes (MRI), ultrasound images, mammographic images (both views CC and MLO) and text. The Master Thesis primary goal is the development of the user interface for diagnosis of breast cancer in medical imaging multimodality that enable an improved breast cancer diagnosis system based. The second goal is to develop a system to produce a dataset from those user interface annotations and diagnosis classification to be consumed by the Deep Convolutional Neural Networks (DCNNs).

Professional Experience

June 2017 – Present
Research Engineer, LARSYS, Lisbon, Portugal.
Working as Research Assistant for the UID/EEA/50009/2013 project at LARSys. Developing interdisciplinary research in Robotics and Engineering Systems, LARSys covers a dynamical Cyber-Physical System (CPS), Human-Computer Interaction (HCI) and Social-Technical Systems (STS), as well as policy research dealing with uncertainty and risk governance.

November 2018 – Present
Research Fellow, ITI, Lisbon, Portugal.
Working as Research Assistant for the Interactive Technologies Institute (ITI), that is a center of design for global change, creating socio-technical systems suited to holistic challenges. Researching and Developing novel AI-Assistive systems and techniques to support automation, and respectively explainability, in several areas. We plan to apply an User-Centered Design (UCD) approach within a context of Human-Computer Interaction (HCI) for the qualitative and quantitative User Research (UR) to understand how workflow spaces can use AI-Assistive systems and techniques to create effective and impactful intelligent systems.

May 2016 – October 2018
Research Engineer, ISR-LISBOA, Lisbon, Portugal.
Working as Research Engineer at the Signal and Image Processing Group (SIPG), a research group from ISR-Lisboa. The inside project was related to Human-Computer Interaction and Robotics fields of research, as well as, Health Information Systems, where this project proposes the development of a methodology for detection and cancer targeting breast using multimodality medical imaging and textual information.

May 2016 – December 2017
Web Developer, ELSEVIER, London (Remote), United Kingdom.
Developing, analyzing and researching propaganda, as well as content dissemination strategies using the web and social networks as a tool for the Computers & Graphics Journal of Elsevier. The journal is dedicated to disseminate information on research and applications of Computer Graphics (CG) techniques.

November 2015 – December 2017
Software Developer, INESC-ID, Lisbon.
Working as Research Assistant into a Research Collaborator Program to the Visualization and Intelligent Multimodal Interfaces Group (VIMMI) at INESC-ID. The VIMMI group does research in novel user interaction paradigms and high-performance graphics rendering with applications to Health, Design and Manufacturing areas.

July 2015 – October 2015
Summer Intern, INESC-ID, Lisbon.
Working as Web Developer into a Summer Intern Program to the Visualization and Intelligent Multimodal Interfaces Group (VIMMI) at INESC-ID. Developing and creating the New VIMMI Webpage Prototype.

July 2015 – September 2015
Summer Intern, INESC-ID, Lisbon.
Working as User Interface Developer into a Summer Intern Program to the Information and Decision Support Systems Group (IDSS) at INESC-ID. Developing and creating the Software Interface of a DELPHI Method for a Survey Platform.

Teaching Experience

February
2019 – July
2019

Teaching Assistant, Instituto Superior Técnico (IST), Lisbon.

Working as Teaching Assistant on the Human-Computer Interaction (HCI) unit from Bachelor Degree of Computer Science and Engineering (LEIC). This unit intends to give students knowledge regarding how to understand the principles and basic rules required to design and develop usable user interfaces. Identify the users and the tasks they want to carry out with the interactive system we plan to develop. Be able to evaluate interfaces at different stages of their development, applying the most correct evaluation technique. Identify the critical factors in the design of user interfaces. Understand and apply tradeoffs between the different restrictions affecting the design of interfaces. Learn to frame the design of interfaces within the scope of computer science engineering projects.

September
2018 –
February
2019

Supporting Lecturer, Instituto Superior Técnico, Lisbon.

Working as Supporting Lecturer on the Usability and Information Systems (USI) unit from Master Degree of Information and Enterprise Systems (MISE). This unit intends to give students knowledge about the basic principles and rules for designing and developing user interfaces.

September
2016 –
February
2017

Supporting Lecturer, Instituto Superior Técnico, Lisbon.

Working as Supporting Lecturer on the Usability and Information Systems (USI) unit from Master Degree of Information and Enterprise Systems (MISE). This unit intends to give students knowledge about the basic principles and rules for designing and developing user interfaces.

Students Advisor

September 2019 – October 2020
Hugo Lencastre, *Master Student*, Instituto Superior Técnico, ULisboa.
In this Master Thesis, the author proposes the design of novel interactive techniques in a platform that enhances the annotation process of medical images, in the breast cancer domain. The author will do that by taking several interaction techniques to improve the engagement and production of qualified datasets also fostering their sharing and practical evaluation among physicians.

September 2019 – October 2020
Nádia Mourão, *Master Student*, Instituto Superior Técnico, ULisboa.
In this Master Thesis, the author seeks to strengthen empirical clinical applications of XAI by exploring underpinnings of medical decision making, drawing from the field of medical imaging. In order to facilitate physician's understanding towards AI, the author proposes the development of a novel XAI framework for clinical purposes.

Reviewer Experience

July 2020 **ICMI 2020**, Demonstrations, Utrecht, Netherlands.

ICMI 2020 is the premier international forum for multidisciplinary research on multimodal human-human and human-computer interaction, interfaces, and system development. The conference focuses on theoretical and empirical foundations, component technologies, and combined multimodal processing techniques that define the field of multimodal interaction analysis, interface design, and system development. For this venue, I reviewed two Demonstrations.

June 2020 **ICWSM 2021**, Full Papers, Atlanta, Georgia, USA.

The International AAAI Conference on Web and Social Media (ICWSM) is a forum for researchers from multiple disciplines to come together to share knowledge, discuss ideas, exchange information, and learn about cutting-edge research in diverse fields with the common theme of online social media. This overall theme includes research in new perspectives in social theories, as well as computational algorithms for analyzing social media. ICWSM is a singularly fitting venue for research that blends social science and computational approaches to answer important and challenging questions about human social behavior through social media while advancing computational tools for vast and unstructured data. For this venue, I reviewed one Full Paper.

March 2020 **AVI 2020**, Papers, Toronto, Canada.

AVI 2020 will take place on the island Ischia, the largest island in the Gulf of Naples, easily connected to the city of Naples. The meeting venue for the period of June 8-12 is in the historic Regina Isabella hotel, in the charming village of Lacco Ameno d'Ischia. For this venue, I reviewed one Full Paper and one Short Paper.

March 2020 **DIS 2020**, Papers, Eindhoven, Netherlands.

The ACM conference on Designing Interactive Systems (DIS) is the premier, international arena where designers, artists, psychologists, user experience researchers, systems engineers and many more come together to debate and shape the future of interactive systems design and practice. For this venue, I reviewed only one Paper.

March 2020 **CogSci 2020**, Papers, Toronto, Canada.

The 42nd Annual Meeting of the Cognitive Science Society will be held in Toronto, Canada at the Metro Toronto Convention Centre (South Building) on Wednesday July 29th - Saturday August 1st, 2020 (Wednesday, July 29th is the Tutorials and Workshops day). For this venue, I reviewed only one paper.

February 2020 **Springer Human-Centric Computing and Information Sciences Book**, Digital Anatomy, CHAP-2.3-R2, The Virtual Dissection Table: A 3D Atlas Of The Human Body Using Vectorial Modeling From Anatomical Slices.

This chapter describes the methodology of the manual segmentation from the anatomical slices. The authors use a novel segmentation technique and refinement of the 3D meshes resulting on 3D vectorial models of the whole body with several anatomical objects. The chapter will be published among the Springer HCIS Book on Digital Anatomy. The book plans to publish high quality papers which cover the various theories and practical applications related to Human-Centric Computing and Information Sciences.

January 2020 **ETRA 2020**, Full Papers, Stuttgart, Germany.

The 12th ACM Symposium on Eye Tracking Research and Applications (ETRA2020) aims to bring together eye tracking researchers from Computer Science and Psychology/Cognitive Science under the motto Bridging Communities.

January 2020 **CHI 2020 Late-Breaking Works**, Extended Abstracts, Honolulu, Hawai'i, USA.
CHI 2020 Late-Breaking Works (LBWs) track provides the CHI community with an opportunity to present new and exciting contributions that showcase innovative technologies, extend prior research conversations, detail short self-contained studies, or provide provocations for new work and ideas to emerge.

January 2020 **CHI 2020 alt.chi**, Extended Abstracts, Honolulu, Hawai'i, USA.
CHI 2020 alt.chi is a forum for controversial, risk-taking, and boundary pushing presentations at CHI 2020. The CHI program committee formed alt.chi to act as a forum for innovative and insightful work that can go unrecognized through the standard review process. Contributions to alt.chi often innovate methodologically, critique accepted practices, or take on controversial questions. Moreover, alt.chi presentations are often innovative in format as well as content, and we wish to encourage authors to consider how they might present their work in alternative ways. Previous years have seen alt.chi contributions presented through theatre, carnival, music, poetry, and graphic novels.

January 2020 **ECIS 2020**, Conference Papers, Marrakech, Morocco.
ECIS 2020 is especially interested in papers that discuss and expand our understanding of how digital technologies are influencing and impacting fundamental human values, whether at the individual, the organization and/or the societal level. In addition to the conference theme, ECIS 2020 hopes to attract a range of traditional track themes that have been at the heart of the IS community in Europe, as well as tracks covering new emergent themes. The aim of ECIS 2020 is to form a meeting place for people in the IS field to discuss fundamental and innovative issues related to Information Systems.

December 2019 **HRI 2020 alt.HRI**, Conference Papers, Cambridge, UK.
HRI 2020 is the 15th annual conference for basic and applied human-robot interaction research. Researchers from across the world present their best work to HRI to exchange ideas about the theory, technology, data, and science furthering the state-of-the-art in human-robot interaction. Each year, the HRI Conference highlights a particular area through a theme. The theme of HRI 2020 is "Real World Human-Robot Interaction". The HRI conference is a highly selective annual international conference that aims to showcase the very best interdisciplinary and multidisciplinary research in human-robot interaction with roots in and broad participation from communities that include but are not limited to robotics, artificial intelligence, human-computer interaction, human factors, design, and social and behavioral sciences.

October 2019 **IEEE VR 2020**, Journal Papers, Atlanta, USA.
The IEEE Journal Papers on Virtual Reality and 3D User Interfaces (IEEE VR) is the premier international venue for the presentation of research results in the broad area of virtual reality (VR). Since 1993, IEEE VR has presented groundbreaking research and accomplishments by virtual reality pioneers: scientists, engineers, designers, and artists, paving the way for the future.

July 2019 **Springer Human-Centric Computing and Information Sciences Book**, Digital Anatomy, CHAP-2.1-R3, The Interest of 3D Modeling from Anatomical or Histological Slices for Research: Methodology and Results of Computer-Assisted Anatomical Dissection (CAAD) Method.
This chapter describes, how clinical research techniques in morphology have some limitations. Also, the chapter presents a novel method called "Computer Assisted Anatomical Dissection" (CAAD) and respective applications. The chapter will be published among the Springer HCIS Book on Digital Anatomy. The book plans to publish high quality papers which cover the various theories and practical applications related to Human-Centric Computing and Information Sciences.

July 2019   **Springer Human-Centric Computing and Information Sciences Book**, Digital Anatomy, CHAP-2.4-R1, Segmentation and 3D Printing of Anatomical Models from CT Angiograms.

CT scans provide images with an exhaustive anatomical detail, the 2D information can be reconstructed for posterior segmentation and edition. Once the data is obtained it should be segmented to recognize and isolate the different structures. This process must be done by someone able to recognize the normal anatomy of each organ while he uses the 3D dissecting tools. The chapter will be published among the Springer HCIS Book on Digital Anatomy. The book plans to publish high quality papers which cover the various theories and practical applications related to Human-Centric Computing and Information Sciences.

April 2018   **EICS PACM Q2 2018**, Journal & Conference Papers, Paris, France.

The Engineering Interactive Computing Systems (EICS) conference is the tenth international conference devoted to engineering usable and effective interactive computing systems. Work presented at EICS covers the full range of aspects that come into play when "engineering" interactive systems, such as innovations in the design, development, deployment, verification and validation of interactive systems.

Training Activity

February 2017 – May 2017 **How to Build a Startup**, UDACITY, Online.
Learn what it takes to build a successful startup using the Customer Development process, where entrepreneurs "get out of the building" to gather and iterate on feedback.

February 2017 **React-Native: The Mobile Paradigm Native vs Hybrid**, SINFO 2017, Lisbon, Portugal.
A workshop on the React Native framework. React Native let us build mobile apps using only JavaScript. It uses the same design as React, letting you compose a rich mobile UI from declarative components.

July 2016 – August 2016 **Learn React.js: The Basics**, JAVASCRIPT, Online.
The course wraps with a chapter dedicated to building a more complete app with React.js and companion tools like Babel, NPM, and more.

March 2016 – May 2016 **Mastering GitHub**, GIT, Online.
Learn advanced tips, tricks, and proven best practices for collaborating more effectively with GitHub.

Articles

October 2017 **Towards Touch-Based Medical Image Diagnosis Annotation**, ACM ISS 2017, Brighton, UK.
This article aims to present a performance and experience analysis conducting a study of touch and traditional environments. As a Conference Poster (in Proceedings of the 2017 ACM International Conference) format and Extended Abstract at the ACM ISS 2017. Taking place from October 17 to 20 in Brighton, UK, the ACM ISS 2017 is the premier venue for research addressing the design, development and use of new and emerging tabletop, digital surface, interactive spaces and multi-surface technologies.

December 2015 **Adaptive Q-Sort Matrix Generation: A Simplified Approach**, INESC-ID, Lisbon, Portugal.
This technical report aims to use the previous work related to the DELPHI method, and, in particular, the Q-Sort method for information retrieval of a panel of experts, to provide a new and simple algorithm to generate Q-Sort matrices that adjust to the size of a given survey to have more questions whose weight is null for the outcome of the round, giving experts the need to prioritize some questions above others in order to reach a consensus in a more direct way.

Posters

July 2019 **BreastScreening: Towards Breast Cancer Clinical Decision Support Systems**, National Science Summit'19, Lisbon, Portugal.

In this poster, we utilized the unprecedented opportunity presented by developing Radiomics to investigate how a Clinical Decision Support System (CDSS) could add value in the breast cancer chain, including improvements of the workflow. It was presented on the Ciência 2019. The conference aims at promote a broad debate on the main topics and challenges of the scientific agenda beyond the world of research. The meeting main goal, therefore, is to stimulate not just the participation but also the interaction between researchers, the business sector and the general public.

July 2019 **FeedBot: Understanding Users With Physical Difficulties During Meal**, National Science Summit'19, Lisbon, Portugal.

FeedBot is a robotic arm that can feed a Cerebral Palsy (CP) patient without any type of external help. In this poster, we apply several HCI techniques to understand users Point-of-View (POV) and other measurements during meal. It was presented on the Ciência 2019. The conference aims at promote a broad debate on the main topics and challenges of the scientific agenda beyond the world of research. The meeting main goal, therefore, is to stimulate not just the participation but also the interaction between researchers, the business sector and the general public.

May 2019 **Medical Imaging Diagnosis Assistant: AI-Assisted Radiomics Framework User Validation**, Keep In Touch'19, Instituto Superior Técnico, Lisbon, Portugal.

In this poster, we utilized the unprecedented opportunity presented by developing Radiomics to investigate how a Multi-Modality Framework and AI could add value in the Medical Imaging (MI) chain, including improvements of the workflow. It was presented on the Ciência 2019. The conference aims at promote a broad debate on the main topics and challenges of the scientific agenda beyond the world of research. The meeting main goal, therefore, is to stimulate not just the participation but also the interaction between researchers, the business sector and the general public.

May 2019 **FeedBot: Feeding Users With Motion-Related Disabilities HCI Approach**, Keep In Touch'19, Instituto Superior Técnico, Lisbon, Portugal.

FeedBot is a robotic arm that can feed a Cerebral Palsy (CP) patient without any type of external help. Our work in HCI will be to understand what is needed by both patients and his caregivers, while we want to know how can we achieve their expectations, as well as the user requirements. It was presented on the Ciência 2019. The conference aims at promote a broad debate on the main topics and challenges of the scientific agenda beyond the world of research. The meeting main goal, therefore, is to stimulate not just the participation but also the interaction between researchers, the business sector and the general public.

July 2018 **BreastScreening: A Multimodality Diagnostic Assistant**, National Science Summit'18, Lisbon, Portugal.

This poster aims to present an assistant for a fully automated breast cancer detection and segmentation from multi-modal medical images introducing clinical covariates. It was presented on the Ciência 2018. The conference aims at promote a broad debate on the main topics and challenges of the scientific agenda beyond the world of research. The meeting main goal, therefore, is to stimulate not just the participation but also the interaction between researchers, the business sector and the general public.

June 2018	**BreastScreening: A Multimodality Diagnostic Assistant**, LARSyS 2018 Annual Meeting, Lisbon, Portugal.
	This poster aims to present an assistant for a fully automated breast cancer detection and segmentation from multi-modal medical images introducing clinical covariates. It was presented on the LARSyS 2018 Annual Meeting, a two-day event designed to provide an opportunity for LARSyS researchers to engage in interdisciplinary debates about current and future aspects in robotics and systems research with applications in engineering systems with large society implications.
October 2017	**Towards Touch-Based Medical Image Diagnosis Annotation**, ACM ISS 2017, Brighton, UK.
	This poster aims to present a performance and experience analysis conducting a study of touch and traditional environments. As a Conference Poster (in Proceedings of the 2017 ACM International Conference) format and Extended Abstract at the ACM ISS 2017. Taking place from October 17 to 20 in Brighton, UK, the ACM ISS 2017 is the premier venue for research addressing the design, development and use of new and emerging tabletop, digital surface, interactive spaces and multi-surface technologies.

Technical Skills

Programming Languages	Python, PHP, Java, Lisp, Scheme, Prolog, C++, C, Assembly
Web	JavaScript, HTML, CSS, JSON, XML, WordPress, Apache, Tomcat, WebServices (SOAP), Maven, NPM, Babel, WebPack, Composer
IDE	SublimeText, Eclipse, NetBeans, VisualStudio
Libraries / Frameworks	React, Redux, Router, Laravel, Bootstrap, Foundation
Technologies	MVC, J2EE, Git
Database	MySQL, MongoDB
Modeling	UML, SysUML, BPMN
Methodologies	Agile, Scrum, Lean, Kanban
Operating Systems	Windows, Linux, Unix, Macintosh
Software	Triskell, Bizagi, Microsoft Project, Microsoft Office

Projects

- FeedBot
- BreastScreening
- Medical Imaging Diagnosis Assistant
- Medical Imaging Multimodality Breast Cancer Diagnosis User Interface
- SnapJob (formerly GigZap): Temporary Jobs Application
- Agroop Livestock: Livestock Web Application
- Computers & Graphics Journal Web Dissemination
- VIMMI Webpage
- Support System Delphi Studies

Organizations

September 2017 – Membership ongoing
ACM SIGCHI, ACM MEMBER.
The ACM Special Interest Group on Computer-Human Interaction is the world's largest association of professionals who work in the research and practice of computer-human interaction.

July 2016 – Membership ongoing
Association for Computing Machinery (ACM), ACM STUDENT MEMBER.
The ACM and the IEEE Computer Society are the umbrella organizations for US academic and scholarly interests in computing. Unlike the IEEE, the ACM is solely dedicated to computing.

October 2015 – Membership ongoing
Interaction Design Foundation, STUDENT MEMBER.
The Interaction Design Foundation is a non-profit educational organization which produces open content and Open Access educational materials online with the stated goal of "democratizing education by making world-class educational materials free for anyone, anywhere".

September 2012 – Membership ongoing
College Tennis Team, FOUNDER.
Official College Tennis Team supported by the Students College Association. The goal of the Tennis Team is to promote the practice of tennis within the IST Alameda campus, bringing together the community and the sport, including students, ex-students, teachers and staff.

September 2008 – Present
oppr Group, FOUNDER.
Technological Organization with projects in the R&D, Open Source, Health Care, Software Development and others fields.

Volunteer

November 2016
Web Summit 2016, OPERATIONS TEAM - SURVEY, Lisbon.
Working as Operations Team - Survey Volunteer at Web Summit 2016.

Languages

Português	**Native proficiency**	*Mother language.*
English	**Professional working proficiency**	*Professional oral communication and writing.*
Spanish	**Limited working proficiency**	*Good oral communication but limited to write.*
French	**Elementary proficiency**	*Understand basic words and phrases only.*
Italian	**Elementary proficiency**	*Understand basic words and phrases only.*

Interests

- R&D
- Computer Science
- Entrepreneurship
- Web Development
- Open Source