Manuel Guimarães

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About me:
Manuel Guimarães is a PhD Student at Instituto Superior Técnico and is currently working as a researcher at GAIPS, INESC-ID in Lisbon, Portugal.

In 2016 he received his Master's Degree in Information Systems and Computer Engineering from the Instituto Superior Técnico, University of Lisbon in Portugal. His Master's Thesis was about empowering computer controlled characters with Social awareness and decision making. The end result was a mod for the popular video game The Elder Scrolls V: Skyrim. The mod quickly gained popularity and was widely talked about around the world.

Immediately after finishing his Masters, Manuel started working in the RAGE Project as a researcher, since December 2016 until the end of the project, in January 2019, particularly, in the development of FAtiMA Toolkit. During that final year Manuel was awarded a PhD scholarship by Universidade de Lisboa to finish his thesis, the scholarship started in January 2019.

The scholarship allows him to work on his thesis while consulting for on-going projects within the GAIPS group such as the Slice Project. In 2019, while working in Slice, Manuel also attended the 2nd International Summer School of Artificial Intelligence and Games, published several papers and taught Artificial Intelligence in Games practical lessons' from September to January (semester) of 2019, 2020 and 2021. Finally for all his work during the year (2019) Manuel was nominated for best PhD student of INESC-ID.

His research interests are in artificial intelligence, virtual agents, affective computing, social interaction and their application in games. Outside of research Manuel is interested in making games and has participated in (and won) several Game Jams. Additionally, he is one of the founders of Game Dev Técnico: a student's group focused "on providing students at our university with the resources and mentorship required to develop their own games in an extracurricular and not for profit way."

In his PhD Manuel has been creating a framework that can create help the authoring task of creating believable Social Intelligent Agents using a Data Driven Approach.

WORK EXPERIENCE

01/11/2016 – 31/01/2020 – Lisbon, Portugal
RESEARCHER AND SOFTWARE DEVELOPER – INESC-ID

I worked for the Project RAGE (RAGE - Realizing an Applied Gaming Eco-system - H2020-ICT-2014-1/644187) from November 2016 until the end of the project in January 2020. During these 3 years I've contributed to the project in several different ways:

1. Implementation of new functionalities of FAtiMA-Toolkit, an intelligent agent-modelling framework, in order to improve the Integrating Authoring Tool and CIF-CK modules.
2. Execution of the quality and control assurance plan for the assets developed in WP3, led by INESC-ID.
3. Creation of Documentation and Training Materials for the use of assets developed by INESC ID.
4. Creation of a website for FAtiMA-Toolkit (http://fatima-toolkit.eu) with several different tutorials, demos and technical information regarding the tool
5. Realization of user studies, writing of scientific articles and their presentation in peer-reviewed venues.
6. Participation in project meetings, planning and writing of project deliverables.

01/09/2019 – CURRENT – Lisbon, Portugal
ASSISTANT TEACHER – INSTITUTO SUPERIOR TÉCNICO

I have been the (in 2019, in 2020 and currently, 2021) assistant teacher of the course: Artificial Intelligence in Games of the Games specialization of the Computer Science Master's of Instituto Superior Técnico.

My responsibilities as an Assistant Teacher include:
1. Preparing the Artificial Intelligence in Games Projects (using Unity as a platform students have to implement several different projects regarding content such as Local Movement, Pathfinding, Decision Making, Interactive Narrative and Deep Learning)
2. Prepare and Teach practical classes
3. Perform Project Discussions.
4. Grade the student's projects

01/03/2019 – CURRENT – Lisbon, Portugal
CONSULTING RESEARCHER AND DEVELOPER – INESC-ID

SLICE Project this project's objective is to develop and validate an authoring-friendly framework for the creation of transparent social intelligent agents capable of being deployed as virtual characters in training simulations or games, or used to drive the behavior of social robots.

It intends to join two disparate AI research areas -- Social Agent Architectures and Machine Learning -- in one framework.
By using machine learning techniques over a solid social theory foundation that defines the structure of the learning task, our framework provides a new methodology where authors can create intelligent characters by providing examples of social interaction.

During the past 2 years I've contributed to the project in several different ways:

1. Development of a Natural Language Data Driven pipeline that is able to extrapolated social-agent-relevant concepts from a short description.
2. Implementation of new functionalities of FAtiMA-Toolkit, an intelligent agent-modelling framework, in order to match the pipeline's output and integration the developed components
3. Creation of Documentation and Training Materials for the use of the new functionalities of the tool.
4. Development of several different tutorials, demos and technical information regarding the tool
5. Writing of scientific articles and their presentation in peer-reviewed venues.
6. Participation in project meetings, planning and writing of project deliverables.

https://gaips.inesc-id.pt/slice/index.html

01/09/2017 – 12/12/2019 – Lisbon, Portugal
COLLABORATOR – LABORATÓRIO DE JOGOS DO IST

My job as an active member and collaborator of Laboratório de Jogos do IST started in 2017, it was my responsibility to organize Talks (such as Talk n' Plays), Events and help the students of the Games specialization of the Computer Science Master's of Instituto Superior Técnico in general.

https://www.facebook.com/LabJogosIST/videos/596751937798318

01/02/2020 – CURRENT – Lisbon, Portugal
COORDINATOR – GAME DEV TÉCNICO

I am one of the founders of Game Dev Técnico: a student group from Instituto Superior Técnico of Lisbon University located on Campus Taguspark, we were founded in January of 2020.

We aim to provide students at our university with the resources and mentorship required to develop their own games in an extracurricular and not for profit way. Our objective is to act as an accelerator inside the university, filling a gap in the offered courses and allowing students to go through all the steps of game

development, but not forgetting the academic spirit participating in international competitions called game jams.

Our team is composed of around 50 members with all kinds of backgrounds, experience, courses, and universities. We have members from Instituto Superior Técnico, the Faculty of Fine Arts of the University of Lisbon and Universidade Lusófona.

As a coordination member I am in charge of operating, managing and participating in the group. I've had many different roles, from Community Manager to Head of the General Assembly.

gamedev@tecnico.ulisboa.pt | www.gamedev.tecnico.ulisboa.pt/welcome/

https://www.youtube.com/watch?v=AjO6yqIQCYk

EDUCATION AND TRAINING

01/09/2011 – 15/07/2014 – Av. Rovisco Pais 1, Lisbon, Portugal
BOLOGNA DEGREE IN INFORMATION SYSTEMS AND COMPUTER ENGINEERING – Instituto Superior Técnico, Universidade de Lisboa

https://tecnico.ulisboa.pt/pt/

15/09/2014 – 31/10/2016 – Av. Rovisco Pais 1, Lisbon, Portugal
BOLOGNA MASTER'S DEGREE IN INFORMATION SYSTEMS AND COMPUTER ENGINEERING – Instituto Superior Técnico, Universidade de Lisboa

https://tecnico.ulisboa.pt/pt/ensino/cursos/mestrados/engenharia-informatica-e-de-computadores/

15/09/2018 – CURRENT – Av. Rovisco Pais 1, Lisbon, Portugal
ADVANCED STUDIES DIPLOMA IN INFORMATION SYSTEMS AND COMPUTER ENGINEERING – Instituto Superior Técnico, Universidade de Lisboa

https://fenix.tecnico.ulisboa.pt/cursos/deic

LANGUAGE SKILLS

Mother tongue(s): **PORTUGUESE**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● HONOURS AND AWARDS

23/05/2021
Excellence in Teaching – Instituto Superior Técnico

"The QUC sub-system (Técnico Course Unit Quality System) is a respected system within the Técnico academic community, not only by students but also by teaching staff and non-teaching staff.

One of the system's results is the recognition of teaching excellence at Técnico, by students and the School.

At the end of each semester, students are invited to respond to surveys, identifying the professors who stood out for their teaching excellence and commitment."

https://diadotecnico.tecnico.ulisboa.pt/docentes-excelentes-20192020/?lang=en

2020
Best Phd Student of 2019 Nomination of INESC-ID – INESC-ID

The INESC-ID Awards were created in 2009. These awards are annually given, usually at the annual general institutional kick-off meeting. The juri is composed by the Advisory Board members, an independent committee made of world class experts.

The existence of awards for the best researchers has a high importance and value for the institution. It is a contribution to strengthen the scientific prestige and social intervention of INESC-ID in its scientific environment.
https://www.inesc-id.pt/news-events/awards/

● PUBLICATIONS

FAtiMA Toolkit--Toward an effective and accessible tool for the development of intelligent virtual agents and social robots

arXiv preprint arXiv:2103.03020 (2021).
https://arxiv.org/pdf/2103.03020.pdf – 2021
ore than a decade has passed since the development of FearNot!, an application designed to help children deal with bullying through role-playing with virtual characters. It was also the application that led to the creation of FAtiMA, an affective agent architecture for creating autonomous characters that can evoke empathic responses. In this paper, we describe FAtiMA Toolkit, a collection of open-source tools that is designed to help researchers, game developers and roboticists incorporate a computational model of emotion and decision-making in their work. The toolkit was developed with the goal of making FAtiMA more accessible, easier to incorporate into different projects and more flexible in its capabilities for human-agent interaction, based upon the experience gathered over the years across different virtual environments and human-robot interaction scenarios. As a result, this work makes several different contributions to the field of Agent-Based Architectures. More precisely, FAtiMA Toolkit's library based design allows developers to easily integrate it with other frameworks, its meta-cognitive model affords different internal reasoners and affective components and its explicit dialogue structure gives control to the author even within highly complex scenarios. To demonstrate the use of FAtiMA Toolkit, several different use cases where the toolkit was successfully applied are described and discussed.

The impact of virtual reality in the social presence of a virtual agent

Proceedings of the 20th ACM International Conference on Intelligent Virtual Agents
https://dl.acm.org/doi/abs/10.1145/3383652.3423879 – 2020
In this work we test the hypothesis that interacting with an intelligent virtual character in Virtual Reality (VR) has a stronger impact compared to the same interaction in a traditional non-immersive platform, both in terms of presence and believability.
We designed a Social Skills Training scenario of a police interview, based on interactions observed in real cases with the help of teachers and experts from that field. To test our hypothesis, we conducted experiments with two treatments: one in VR and the other displayed on a conventional computer screen. We collected qualitative and quantitative data using instruments with elements from well-established presence and situated interaction questionnaires. Results indicate that participant perception of social presence of virtual characters is higher in VR. No significant difference in believability was observed across treatments
The experimental design encourages further work on measurement of effects of social presence and its impact on design of intelligent interactions in the context of Social Skills Training environments and immersive platforms.

Artificial intelligence moving serious gaming: Presenting reusable game AI components

Education and Information Technologies, 25(1), 351-380.
https://link.springer.com/article/10.1007/s10639-019-09968-2 – 2020
This article provides a comprehensive overview of artificial intelligence (AI) for serious games. Reporting about the work of a European flagship project on serious game technologies, it presents a set of advanced game AI components that enable pedagogical affordances and that can be easily reused across a wide diversity of game engines and game platforms. Serious game AI functionalities include player modelling (real-time facial emotion recognition, automated difficulty adaptation, stealth assessment), natural language processing (sentiment analysis and essay scoring on free texts), and believable non-playing characters (emotional and socio-cultural, non-verbal bodily motion, and lip-synchronised speech), respectively. The reuse of these components enables game developers to develop high quality serious games at reduced costs and in shorter periods of time. All these components are open source software and can be freely downloaded from the newly launched portal at gamecomponents.eu. The components come with detailed installation manuals and tutorial videos. All components have been applied and validated in serious games that were tested with real end-users.

An Accessible Toolkit for the Creation of Socio-EmotionalAgents

Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems
https://www.ifaamas.org/Proceedings/aamas2019/pdfs/p2357.pdf – 2019
FAtiMA Toolkit is a collection of open-source tools that is designed to facilitate the creation and use of cognitive agents with socioemotional skills. The toolkit was developed with a focus on accessibility so it could be used by both researchers and game developers. It provides a computational model of emotions that is based on the OCC appraisal theory as well as an explicit dialogue structure that is familiar to game developers while maintaining the flexibility of an approach based on autonomous agents. Among various use cases, the toolkit has been successfully applied by an external game studio in their development of two serious games.

https://youtu.be/tlA7Rvsm5xc

A virtual agent toolkit for serious games developers

2018 IEEE Conference on Computational Intelligence and Games (CIG). IEEE, 2018.
https://ieeexplore.ieee.org/abstract/document/8490399 – 2018
The design of serious games requires developers to tackle pedagogical challenges calling for advanced solutions that the entertainment industry might deem too risky to pursue. One such challenge is the creation of autonomous socially intelligent characters with whom players can practice different social skills. Although there are several architectures in the field of virtual agents that are designed specifically to enable more human-like interactions, they are still not widely adopted by game studios that develop serious games, in particular for learning. In this paper, we present a virtual agent toolkit that was specifically developed with the intent of making agent-based solutions more accessible and reliable to game developers. To this end, a collaborative effort was established with a game studio that has used the toolkit to develop two different serious games. Among other advantages, the toolkit facilitated the inclusion of a dynamic model of emotions that affects not just how the character looks and acts but also how the player's performance is determined.

CiF-CK: An architecture for social NPCS in commercial games

Computational Intelligence & Games, CIG '17. IEEE Computational Intelligence Society.
https://ieeexplore.ieee.org/abstract/document/8080425/ – 2017
We present and describe CiF-CK - a social agent architecture that models reasoning about persistent social interactions to improve narrative engagement and play experience for human interactors. The architecture is inspired by McCoy et al's Comme il-Faut (CiF) architecture that represented rich social interactions between agents that included emotions, social and relationship contexts, and longer term mood. The key contribution of this work is in adapting the richness of social interactions from CiF to a first-person interaction experience and a released distribution of its implementation on the Skyrim game engine. The released modification has been successful in the player community for the popular game.

Prom Week Meets Skyrim.

Proceedings of the 2017 International Conference on Autonomous Agents and Multi-agent Systems
https://www.games.ncsu.edu/wp-content/uploads/sites/13/2017/05/prom-week-meets.pdf – 2017
We present and describe CIF-CK—a social agent architecture that models reasoning about persistent social interactions to improve narrative engagement and play experience for human interactors. The architecture is inspired by McCoy et al's Comme il-Faut (CiF) architecture that represented rich social interactions between agents that included feelings, social and relationship contexts, and longer term mood. The key contribution of this work is in adapting the richness of social interactions from CiF to a first-person interaction experience and a released distribution of its implementation on the Skyrim game engine. The released modification has been successful in the player community for the popular game.

Prom week meets Skyrim (Demonstration)

International Conference on Autonomous Agents and Multi-agent Systems, AAMAS '17.
https://www.games.ncsu.edu/wp-content/uploads/sites/13/2017/05/prom-week-meets.pdf – 2017
We present and describe CIF-CK—a social agent architecture that models reasoning about persistent social interactions to improve narrative engagement and play experience for human interactors. The architecture is inspired by McCoy et al's Comme il-Faut (CiF) architecture that represented rich social interactions between agents that included feelings, social and relationship contexts, and longer term mood. The key contribution of this work is in adapting the richness of social interactions from CiF to a first-person interaction experience and a released distribution of its implementation on the Skyrim game engine. The released modification has been successful in the player community for the popular game.

https://youtu.be/1mfqo7_xZw8

CHARET: Character-centered Approach to Emotion Tracking in Stories

CHARET: Character-centered Approach to Emotion Tracking in Stories. arXiv preprint arXiv:2102.07537
https://arxiv.org/abs/2102.07537 – 2021
Autonomous agents that can engage in social interactions witha human is the ultimate goal of a myriad of applications. A keychallenge in the design of these applications is to define the socialbehavior of the agent, which requires extensive content creation.In this research, we explore how we can leverage current state-of-the-art tools to make inferences about the emotional state ofa character in a story as events unfold, in a coherent way. Wepropose a character role-labelling approach to emotion tracking thataccounts for the semantics of emotions. We show that by identifyingactors and objects of events and considering the emotional stateof the characters, we can achieve better performance in this task,when compared to end-to-end approaches.

D8. 4–Second RAGE Evaluation Report

D8.4 – Second RAGE Evaluation Report. RAGE project.
https://research.ou.nl/en/publications/d84-second-rage-evaluation-report – 2018
This document presents the results of the summative evaluation and validation studies carried out in WP8 of the RAGE project. Summative evaluation by definition represents evaluation at the end of the development process and aims at collecting information on the outcomes of the implementation. Correspondingly, the summative evaluations in RAGE aimed at obtaining a concluding statement and evidence on the quality and effects of the final versions of (a) the RAGE components,(b) the Ecosystem portal, and (c) the games at the end of the project. Overall, the summative evaluation studies have demonstrated the usefulness and potential benefits of the technologies and methodologies developed in the project for applied game development and for educational application, and argue for the usefulness and significance of the RAGE approach. In addition, valuable suggestions for further improvement or enrichment of the games, game components, and Ecosystem portal could be collected and, thus meaningful information and inspiration for future work beyond the RAGE project lifetime could be obtained.

D3. 6–Final Storytelling Framework

D3. 6–Final Storytelling Framework Report. RAGE project.
https://www.narcis.nl/publication/RecordID/oai:research.ou.nl:publications%2Fc7246eb8-88c7-48ea-ae2e-5ca5de581966 – 2017
This document presents the Final Release of the project's storytelling framework, which is composed by two assets. The framework is meant to aid developers in the creation of game scenarios where both players and autonomous characters are playing an active role in a narrative that unfolds according to their actions. Links to the source code of the assets as well as associated demonstrations and documentation are included.

● CREATIVE WORKS

15/09/2016 – CURRENT
Game Developer

Since the final stages of my Master's Degree I have been quite interested in making games. I have come to love this medium as a way to express myself and enjoy the many different challenges behind it.

In order to satiate this artistic-expression hunger I started participating in several different Game Jams: These are "Short or Mid term competitions that can span from 48 hours to 1 month where the team has to develop a game under some restrictions, usually around a theme". In this short time-frame you are challenged in many different ways and have to work as a team with people from many different fields and background.

The occasional participations in game jams only left me desiring for more. It all culminated into the foundation of Game Dev Técnico in January 2020. Since then, not only have I been an active coordinator of the group but also an active member by participating in quite a few game jams and even co-producing different long-term projects.

You can find almost all of the games I have designed either in Itch.io: https://thedarkryze.itch.io/
or in the global game jam website: https://globalgamejam.org/users/thedarkryze

In some of these events my team has won a couple of prizes:
- BreakingDev Marathon 2016, Best Game Award ("Breaking Heads", made with Unity, unpublished)
- Global Game Jam Best Game Award, Taguspark Campus, 2017, ("Don't Stress", made with Unity)
- BreakingDev Marathon 2017, Best Game Award ("Space Olympics", made with Unity, unpublished)
- Global Game Jam Best Game Award, Taguspark Campus, 2018, ("5$ Milkshake", made with Unity)

https://thedarkryze.itch.io/

● MEDIA

15/08/2017 – CURRENT
Media and Press

Some media articles about my Master's work

Interview about a Virtual Reality Experience for a Portuguese Science Meeting
https://www.youtube.com/watch?v=j85sBTeekWw