

Plaza Juan XXIII Nº5 Piso 8 Puerta B
Alcalá de Henares, Madrid 28804,
Spain.
+34 601 391 502
jcb7777777@gmail.com

Juan Casado Ballesteros

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[Personal webpage: @mrblissfulgrin](#)
[GitHub: @JuanCasado](#)
[LinkedIn: @juancasadoballesteros](#)

Born September 6, 1998.

Employment

Watford, United Kingdom	StarLeaf	2021 – 2022
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Software engineer at StarLeaf, a company specialized on providing software and hardware solutions for enterprise communications through messaging, video calls and video conferences. During the two years that I worked on their cloud backend writing **C++ and python software**.

Working there I acquired great experience on solving problems related to the nature of the environment, a distributed system where multiple nodes would talk to each other, with the mobile apps and web clients through multiple protocols as well as to internal and external service providers.

- **Implementation of new messaging features: conversation archiving, marking conversations as unread and blocking users.** The greater challenge that I overcome to develop them was creating an efficient and distributed view of the state of each user and conversation that could be shared consistently between the nodes of the cloud.
- **Optimization of the communication with the database.** This project improved how the servers talked to the PostgreSQL database. The goal was to unify the changes performed over the in-memory data, the data stored on the database and the data shared between nodes to avoid inconsistencies. Other implemented features were to support paginated access to the tables on the database, merging and caching multiple in-memory changes reducing the number of writes to the database and providing support for transaction rollbacks.
- **Improvements on how notifications were sent to mobile apps.** The protocol that was used to send notifications to iOS devices through the APN servers was deprecated so the client code needed to be upgraded to use HTTP2. Additionally, the client structure was reworked adding exponential back off to retry the requests based on the notification's TTL to reduce the chances of any notification not being delivered on time.

Alcalá de Henares, Madrid	Universidad de Alcalá de Henares	2019 – 2020
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Junior investigator scholarship, received on the last year of my degree to work on a **web simulator that calculates signal loss of multiple antennas placed on a map using empirical methods and ray tracing allowing to optimise the location for new antennas using genetic algorithms**.

During the scholarship I continued with the work that I started a year ago when I started collaborating with the research team implementing multiple components of both the back end and the front end of the simulator. The main improvement implemented during this time was to support real time inspection from the simulator of the data that was being generated as output by the algorithms. Displaying the result as they were being generated created a pleasant and interactive experience while using the simulator.

The work done was published on two articles and a book. **Currently I keep collaborating with the research team as a project manager and external consultant.**

Alcalá de Henares, Madrid	Complubot	2016 – 2018
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During the first three years of my career I worked at a local company that teaches robotics. I was in charge of **developing robots that could be used in demonstration, competitions, fairs and conferences**.

As a part of the developer team I designed the software architecture of the robots, programmed their planning and control algorithms as well as mobile and desktop applications to control them. Some mainstream frameworks and libraries in the robotics and artificial vision fields like ROS, Arduino and OpenCV were used.

- Autonomous ROS based robot capable of localize itself on a map, create maps of the environment and follow people. Programed with Python and C++. Once localized on the environment, the robot can identify a person by its face and follow him though a crowded environment while avoiding obstacles.
- Semi-teleoperated Arduino based robot that mimics the educative robot TrueTrue being eight times bigger than the original. The robot implements a state machine that reads colored cards that encode the actions that the robot should perform. Additionally, the robot can be fully teleoperated from a multi-platform, mobile and desktop C++ application available to download on the App Store and Google Play Store.
- Couple of autonomous robots that coordinates through Bluetooth to play robot soccer. Both robots have a modular two layered software architecture programmed on C++. The first layer is in charge of reading the robot sensors and controlling the robot actuators which include an electronic compass, a 360° infrared detector and four motors with encoders. The second layer takes decisions and coordinates both robots using diffuse logic.

Education

Alcalá de Henares, Madrid	Universidad de Alcalá de Henares	2016 – 2020
<ul style="list-style-type: none"> • Bachelor's degree in Computer Science, GPA de 3.29/4 (8.23/10). • A total of 6 Honor Registrations obtained. • Coursework: Statistics, Linear Algebra, Calculus, Logic, Algorithmics and Complexity, Data Structures, Operative Systems, Data Bases, Distributed Systems, Robotics, Artificial Vision, Functional Programming, Software Engineering, Physics, Communication Networks, Artificial Intelligence, Compilers, Object Oriented Programming, Logical Programming, Cloud Systems, GPU Programming, Testing, Quality and Software Maintenance. 		

Alcalá de Henares, Madrid	British Council	2016 – 2018
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During the first three years of my degree I attended English classes, the first year they were oriented to a B2 level of English and the last two years they were oriented to a C1 level.

- **Cambridge CAE C1**, TOEFL 110-114 level English classes.

Investigation

Alcalá de Henares, Madrid	Universidad de Alcalá de Henares	2018 – 2022
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During the last three years of my degree, I started working with one of the research groups of the Computer Science department on multiple projects related to the calculation of antenna propagation and optimization of its positioning with genetic algorithms. During this time, I participated in six articles and a book.

Currently I keep working with the team as a project manager and external consultant.

- **Docker security in web simulation tools: a layered approach.** Marcos Barranquero, Juan Casado, Josefa Gómez, Abdelhamid Tayebi, Jose Ángel Jimenez. In Proceedings of Eurasiaweb International Conference, Marrakesh (Morocco), 26- 27/08/2021. ISBN: 978-93-90150-28-1. Pages 11-14.
- **On the use of ray tracing programable frameworks for radio wave propagation prediction.** Marcos Barranquero, Juan Casado, Josefa Gómez, Abdelhamid Tayebi. In Proceedings of Eurasiaweb International Conference, Marrakesh (Morocco), 26- 27/08/2021. ISBN: 978-93-90150-28-1. Pages 15-17.
- **Applications of Geographic Information Systems for Wireless Network Planning.** Practical book on the use of geographic information systems to manage global scale spatial data to be used on wave propagation calculation with empirical methods. Artech House, Incorporated. ISBN: 9781630817640. Francisco Sáez de Adana, Abdelhamid Tayebi, Josefa Gómez, Juan Casado.
- **Extraction and Use of Geometry Data to Obtain 3D Buildings on a Web Map.** Juan Casado, Josefa Gómez, Abdelhamid Tayebi. Conference: ACCSE 2020. The Fifth International Conference on Advances in Computation, Communications and Services. At: Lisbon, Portugal. ISSN: 2519-8459 ISBN: 978-1-61208-810-5 Pages 8-11

- **On the Use of Websockets to Maintain Temporal States in Stateless Applications.** Juan Casado, Josefa Gómez, Abdelhamid Tayebi. Conference: ACCSE 2020. The Fifth International Conference on Advances in Computation, Communications and Services. At: Lisbon, Portugal. ISSN: 2308-3972 ISBN: 978-1-61208-803-7 Pages 21-24
- **Development of Competence Maps for Training Programs Based on the European Frameworks e-CF and ESCO** Josefa Gómez, Luis Fernández, Ana Castillo, Juan Casado, Abdelhamid Tayebi. ACCSE 2019: The fourth International Conference on Advances in Computation Communications and Services. July 28, 2019/August 02, 2019 at Nice, France. ISBN: 978-1-61208-735-1. Pages 12-15.
- **Application of bioinspired algorithms for the optimization of a radio-propagation system simulator based on OpenStreetMap** Juan Casado, José Luis González, Abdelhamid Tayebi, Josefa Gómez, Francisco Sáez de Adana ACCSE 2019: The fourth International Conference on Advances in Computation Communications and Services. July 28, 2019/August 02, 2019, at Nice, France. ISBN: 978-1-61208-735-1. Pages 8-11.

Personal projects

Parallel to university and work, I have created various libraries and applications using novel technologies that are of interest to me. Most of these projects are published on GitHub as open source.

- **Web simulator of Crumble circuits written on TypeScript and React making use of Recoil.** The simulator allows to join Crumble components with cables to create the circuit. Once the circuit is complete Crumble code can be run on the simulator as if it was executed over the actual hardware.
- **Visualization tool for the results of a pddl robot planner.** Using a json API planification problem can be sent to a server that creates and resolved a pddl problem on a pre-defined model. The results are exported to a webpage as images that can be inspected to evaluate the planification results.
- **Distributed multi-node Hadoop installation using Docker Swarm.** It was used to analyze data recollected from Twitter API using Flume. The recollected data is stored on HDFS, processed with Pig and saved on Hbase following the lambda architecture. The data is then accessed with Hive and analyzed with Knime and RapidMiner.
- **Real time person tracker** implemented with Python using OpenCV, Yolov3. It recognizes features of a single face and distinguish it from other faces on the picture using a Kalman filter.
- **Graphic simulator of ten different sorting algorithms.** The simulator has a React web front end and a Type Script back end that communicate through Websockets or REST depending on the user configuration.
- **State space search library** developed on C++ with common algorithms like A*, breadth first and depth first search.
- **ColorQueue and GameOfLife:** multi-platform iOS, Android and desktop implemented with C++ using cocos-2d.
- **JAVA program that translates JSON to DOT and DOT to SVG files** with a Parser and a Lexer using antlr4 library.
- **Imitations of the 2048 game** implemented one with CUDA and another with Scala including an auto-play mode.
- **Set of common algorithms** implemented on Swift: greedy, recursive backtracking and dynamic.
- **Shutter Earth:** shooter and platform 2D game developed on JAVA with the game engine slick2d.

Technical experience with:

- **Programming languages:** C++, C, JAVA, Python, NodeJS, R, Matlab, Scala, Swift, SQL, CUDA, Ocaml, Lisp, Prolog.
- **Deployment and virtualization:** Docker, Docker Swarm, Docker Machine, Kubernetes.
- **Front-end web:** React, Recoil, P5, Leaflet, Open Layers, TypeScript, JavaScript, HTML, CSS, WordPress.
- **Robotics, planning and artificial vision:** ROS, Arduino, PDDL, Optic, SGplan, OpenCV.
- **Databases:** PostgreSQL, MongoDB, Firebase, Neo4j, MySQL.
- **Hadoop:** Hbase, Hive, Pig, Flume, HDFS, Mapreduce, Knime, RapidMiner.
- **Documentation and project management:** Modelio, Rational, Markdown, LaTeX, JIRA, MS Project, Gantt Project.
- **Version control and continuous integrations:** Git, GitHub, GitLab, Jenkins.
- **IDEs:** Visual Code, NetBeans, XCode, Emacs, Vim, CLion, PyCharm, Code Blocks, Code Lite, Android Studio.
- **Other:** Linux, macOS, Windows, Wireshark, antlr4, cocos2d-x, pygame, slick2d, JAVA-Swing, graphviz.