# *Alex Goldhoorn* Curriculum Vitae


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| *Address* | Barcelona, Spain |
| *Date of birth* | 20 July 1982 |
| *Place of birth* | Groningen, The Netherlands |
| *Nationality* | Dutch |
| *Web* | http://alex.goldhoorn.net |


## EDUCATION

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| 2011 (March) – 2017 (June) | **PhD in Automatic Control, Robotics and Computer Vision**<br>Polytechnic University of Catalonia (UPC), Spain |
| 2005 (Sept.) – 2008 (Jan.) | **Master of Science in Artificial Intelligence**<br>University of Groningen, The Netherlands |
| 2003 (Aug.) – 2006 (April) | **Bachelor of Computer Science**<br>University of Groningen, The Netherlands |
| 2003 (Aug). – 2005 (June) | **Artificial Intelligence**, University of Groningen, The Netherlands<br>*special program for HIO students (to Artificial Intelligence)* |
| 1999 (Aug.) – 2003 (June) | **Bachelor of Information and Communication Technology**<br>HIO (Higher Informatics), Hanzehogeschool Groningen, The Netherlands |
| 1994 (Aug.) – 1999 (June) | HAVO (high school), Nienoordcollege, Leek, The Netherlands |

## RESEARCH EXPERIENCE

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| 2011 (Feb.) - 2017 (June) | **Institute of Robotics and Industrial Informatics (IRI),**<br>Polytechnical University of Catalonia (UPC), Barcelona, Spain<br>PhD in Automatic Control Robotics, and Computer Vision |

Thesis title: *Improving Hide-and-Seek models for Human-Robot Interaction Applied to Urban Humanoid Robots*

**Purpose**: Research focusing on the searching and following a person with humanoid robots in an urban environment. We used Reinforcement Learning methods and variants of the Particle Filter to generate a cooperative find-and-follow method that works in urban environments with noisy sensors and other disturbing dynamic obstacles.

For this work I used two mobile robots with sensors (cameras and lasers), and a Segway platform to move themselves. *Matlab* was used to do preliminary tests, and the algorithms and the simulator were developed in C++. For the simulator I made use of *Qt*, a *MySQL* database to store all the data, and the data was analysed using *SQL,* and *Python*. To connect to the real robot and communicate with the sensors ROS was used. As OS *Ubuntu* was used, and for the development *Qt Creator* and *vim*.

I also have been working in a multi-disciplinary European project where we integrated software systems of different other European groups (universities). We worked with multiple servers of which some were running Windows (8 and 10), and some Linux (Suse and Ubuntu); programming was done in *Ubuntu*, using *C++, Qt* and *MySQL*; and on *Windows Visual Studio* with *C++* and *C#*.

**Technical skills used**: C++, Qt, Python, Matlab, SQL, MySQL, bash, C#, OpenCV, Qt Creator, vim, Visual Studio, Linux (Ubuntu, Suse), Windows (8, 10), ROS

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| 2007 (Jan.-July) | **Artificial Intelligence Research Institute (IIIA-CSIC)**, Bellaterra, Spain<br>Master project and continued research |

Thesis title: *Solving Ambiguity in Global Localization of Autonomous Robots*
Created a local navigation method based on a model of navigation by ants. Development was done in Visual Studio in the *C++* language using *OpenCV* to process images and models were first created and tested in *Matlab*.

***Technical skills used**:* C++, Matlab, OpenCV, Visual Studio, Windows, Linux (Ubuntu)

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| 2006 (Aug.-Dec.) | **University of Groningen**, Grongingen, The Netherlands<br>**Project of the Bachelor AI** |

Report title: *Implementation of a Simultaneous Localization and Mapping system using Growing Neural Gas*
Implemented (together with two other students) a Simultaneous Localization and Mapping (SLAM) technique on a robot using Growing Neural Gas (GNG), a Kohonen based algorithm. We programmed in *C++* using Visual Studio and *OpenCV* to process images.

***Technical skills used**:* C++, OpenCV, Visual Studio, Windows

## WORK EXPERIENCE

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| 2019 (Nov) – | **Glovo**, Barcelona, Spain<br>*Data Scientist* |

Data Scientist at the Dispatching team.
**Technical skills used**: Python, AWS

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| 2017 (Jun) –<br>2019 (Nov) | **Atomian**, Sant Cugat, Spain<br>*Research & Development Engineer* |

Atomian is a Cognitive Engineering company and make it possible to access the client's data using Natural language queries.

- Development of ETL (Extract Transfer Load) software to convert to the Atomian framework.
- Creating framework to load documents, read them, and transfer them to the Atomian framework.
- Improvements to the Atomian technology.
- Technical lead of the Atomian healthcare development.

**Technical skills used**: C++, MySQL, Bash, Visual Studio, Powershell

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| 2008 (Jan) –<br>2011 (Feb) | **Vestas Eolica SAU**, Barcelona, Spain<br>*Software Engineer* |

- Design, development, support, and maintenance of an ERP system to manage, plan and optimize maintenance. [Jan. 2008 – Jan. 2009]
- Design of a system to generate contracts. [Sept. 2009-Dec. 2009]
- Supported the migration of the ERP system to SAP. [Jan. 2009 – Jul. 20009]
- Use, creation and maintenance of different database systems [2008-2011].
- Statistical validation of several wind and turbine production forecast companies. [Oct. 2009 – Feb. 2011]
- Developed a Java program to setup projects in Primavera from a webpage. [March-April 2010]
- KPI dashboard and report generation [May 2010 – Feb. 2011]
- Statistical error analyses of wind turbines. [Sept. 2010-Nov. 2010]
- Presentations of the Performance & Diagnostics department to Vestas' clients. [Jul. 2010-Feb. 2011]
- Basic SQL class to colleagues without Database / IT systems background. [Sep. 2010]

**Technical skills used**: MS SQL Server, VBA, (Excel, Access), SQL, MS Excel, MS Access, Powershell, PHP, JavaScript, jQuery,

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|---|---|
| 2007 (Jan.-July) | **Vestas Eolica SAU**, Barcelona, Spain<br>*Software Engineer* |

- Administration digitalization of official company documents to increase efficiency and reduce paper.
- Creation and design of entrance cards using personnel data from a database.
- Design of a system to check the phone cost of different providers to reduce cost.
- Other tools to benchmark the main service problems (analysis and presentation of KPI).

**Technical skills used**: MS SQL Server, VBA, (Excel, Access), SQL, MS Excel, MS Access

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| 2004 – 2006 | **DevSquad**, Groningen, The Netherlands<br>Software Engineer |

- Integration of two laboratory software systems: Laboras (behaviours) and DataSciences (sensors).
- Developed a reporting module for circling behaviour.
- Implemented a signature module for file authentication (a Good Laboratory Practices requirement).

**Technical skills used**: Visual Basic 6, C#, Visual Studio, Windows

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| 2003 (Jan.-July) | **Thales Nederland BV**, Hengelo, The Netherlands<br>*Software Engineer* (industrial placement) |

Porting of the Man Machine Interface of the Infrared targeting system (IRScan) for a maritime anti-missile defense (Goalkeeper). The software was ported from Sun Sparc to a PC Linux platform.
The program was written in *C,* and for the GUI we used *Qt.* The development was done using processes of extreme programming, such as pair programming.
**Technical skills used**: C, Qt, Linux, Sun Sparc, extreme programming

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| 2001 (April-July)<br>2002 (Jan.-July) | **University of Groningen**, Groningen, The Netherlands<br>*Junior Software Engineer* (industrial placement) |

Enhanced an expert system used by the Faculty of Law to determine consequences of rules (laws) given certain facts. I created a graphical rule database designer (like the MS Access relationship editor).
The software was developed in *Java*, whereby I learned to use Design *patterns;* the used IDE was *IntelliJ IDEA.*
**Technical skills used**: Java, IntelliJ IDEA, Design Patterns

## SKILLS & INTERESTS

**Languages**: *Dutch* (mother tongue), English (fluent), Spanish (Very Good), Catalan (Good)

**Programming languages/scripts**: C++, C, Python, Java, R, Matlab, C#, Visual Basic, Pascal, SQL, bash

**Operating systems**: Linux (Ubuntu), Microsoft Windows, DOS

**Databases systems**: Microsoft SQL Server, MySQL

**IDEs**: Qt Creator, Microsoft Visual Studio, IntelliJ IDEA, JBuilder, Eclipse, CodeGuide, vim

**Other packages**: ROS (Robot Operating System), OpenCV, Python's NumPy&SciPy&Panda

**Interests**: research & development, software engineering, artificial intelligence, machine learning, forecasting, data science, big data, robots, programming, walking, biking, sightseeing.

## SCIENTIFIC PUBLICATIONS


Goldhoorn, A. (2017) Searching and Tracking of Humans in Urban Environments by Humanoid Robots. PhD dissertation, Institut de Robòtica i Informàtica Industrial, CSIC-UPC. Barcelona.

Goldhoorn, A., Garrell, A., Alquézar, R. and Sanfeliu, A. (2017) Searching and Tracking People with Cooperative Mobile Robots. Autonomous Robots.

Goldhoorn, A., Garrell, A., Alquézar, R. and Sanfeliu, A. (2017) Searching and tracking people in urban environments with static and dynamic obstacles. Robotics and Autonomous Systems.

A. Goldhoorn, A. Garrell, A. Sanfeliu and R. Alquézar. (2016) Un Nuevo Método Cooperativo para Encontrar Personas en un Entorno Urbano con Robots Móviles. Jornadas Automáticas 2016, Madrid, Spain.

Goldhoorn, A., Garrell, A., Alquézar, R. and Sanfeliu, A. (2014) Continuous real time POMCP to find-and-follow people by a humanoid service robot. IEEE-RAS International Conference on Humanoid Robots, Madrid, Spain, IEEE Press, pp. 741-747.

Omedas, P., Betella, A., Zucca, A., Arsiwalla, X.D., Pacheco, D., Wagner, J., Lingenfelser, F., Andre, E., Mazzei, E., Lanatá, A., Rossi, D. de, Grau, A., Goldhoorn, A., Guerra, E., Alquézar, R., Sanfeliu, A. and Verschure, P.F.M.J. (2014) XIM-Engine: a software framework to support the development of interactive applications that uses conscious and unconscious reactions in immersive mix. Virtual Reality International Conference, Laval, France, pp. 26:1-4, ACM New York, NY, USA.

Goldhoorn, A., Sanfeliu, A. and Alquézar, R. (2013) Analysis of methods for playing human robot hide-and-seek in a simple real world urban environment. 1st Iberian Robotics Conference, Madrid, Spain, in ROBOT2013: First Iberian Robotics Conference, Springer, Vol. 252-3 of Advances in Intelligent Systems and Computing, pp. 505-520.

Goldhoorn, A., Sanfeliu, A. and Alquézar, R. (2013) Comparison of MOMDP and heuristic methods to play hide-and-seek. CCIA'13: 16th International Conference of the ACIA, Vic, Spain, in Frontiers in Artificial Intelligence and Applications, IOS Press Vol. 256: pp. 31-40.

Ramisa, A., Goldhoorn, A., López de Mántaras, R. and Toledo, R. (2011) Combining invariant features and the ALV homing method for autonomous robot navigation based on panoramas. Journal of Intelligent and Robotic Systems, 64(3): pp. 625-649.

Goldhoorn, A. (2008) Solving Ambiguity in Global Localization of Autonomous Robots. M.Sc. thesis, University of Groningen, The Netherlands.

Goldhoorn, A., Ramisa, A., López de Mántaras, R. and Toledo, R. (2007) Using the Average Landmark Vector Method for Robot Homing. CCIA'07: 10th International Conference of the ACIA, Andorra, in Frontiers in Artificial Intelligence and Applications, IOS Press, Vol. 163: pp. 331-338.

Goldhoorn, A., Stadman, H. and Eldering. H. (2006) Implementation of a Simultaneous Localization and Mapping system using Growing Neural Gas. B.Sc. thesis, University of Groningen, The Netherlands.