Andrés E. Gómez H.

Curriculum Vitae

Education

2013–2018 **PhD in Computer Science**, *Sciences Institute of Mathematics and Computers*, University of São Paulo, Brazil.
Title: Cooperative driver assistance system for the lane change

2010–2012 **Master of Science**, *Systems Engineering*, Industrial University of Santander, Colombia.
Title: A Study of Lower Limb Movement Implementing a Computer Model through of Kinematics Robotics, Signal Processing and MEMS Technology

1998–2003 **Bachelor of Science**, *Electronics Engineering*, University of Pamplona, Colombia.
Title: Design of a Control System by Telemetry

Positions

2024– **Development engineer for robotics applications**, (***Inria*** - ***Sophia Antipolis***), **France**.
Description: Developing algorithms for cartography, localization, and control(LIDAR and Visual SLAM), considering the new algorithms presented in the SOTA; designing experiments to measure the algorithms' performance and documenting the whole process; planning and executing the demonstrations on real scenarios; and finally, adapting the tools obtained to the user's needs.

2021–2023 **Product Owner - SW simulation tools**, (***Aptiv***), **Poland**.
Description: As a simulation tools member in the Global Software Services team, I gave access and support to the simulation tools users at Aptiv. Furthermore, I managed the simulator's licenses, prepared the usage reports, contacted the vendors, and maintained all the documentation of the simulation tools in our knowledge database.

2018–2021 **Post-Doc Researcher**, ***Cooperative and Human-aware Robot Navigation in Dynamic Environments (CHROMA)***, **French national research institute for the digital sciences** (***Inria*** - ***Grenoble Rhône-Alpes***), **France**.
Description: I developed and evaluated a new perception technique to recognize the risk of autonomous vehicles used in public transportation. This research considered the fusion of deep learning approaches and Bayesian probabilistic methods. The result of this research can be found in <https://youtu.be/Rd-0B0--mlc>.

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2013–2018 **Researcher**, ***Mobile Robotics Laboratory (LRM)***, **University of São Paulo (*USP*), Brazil**.

Description: We created a cooperative driver assistance system for lane change by combining a kinematic and a probabilistic-graphical model. One of the motivations for using probabilistic graphical models is the flexibility of this machine's learning technique in modeling the problem addressed in this research. Another contribution to this research was the development of a driving simulation platform with a reconfigurable structure. The result of this research can be found in <https://youtu.be/TZN-SIaPNhg?si=65KU3bfukRVYtXzN>.

2015–2016 **PhD internship**, ***Institut du Véhicule Décarboné et Communicant et de sa Mobilité***, ***VEDECOM***, **France**.

Description: We created a cooperative collision warning for driving assistance. This research proposes and evaluates a new alternative for driving assistance using vehicle-to-vehicle ($V2V$) communication. This system can serve to warn and prevent collisions among vehicles. Our contribution consisted of modeling the system that determines vehicles' presence around the ego vehicle. The result of this research can be found in <https://youtu.be/UP-FCkLGRSU?si=X9NlN9FOxiqvWmA2>.

2010–2012 **Researcher**, ***Research Group in Service Robotics and Industrial Design (GIROD)***, **Industrial University of Santander (*UIS*), Colombia**.

Description: We created a model to quantify human movement through kinematic analysis tools that allow the specialist to diagnose, and see the evolution of the therapy applied to patients with disabilities by movement. Some mathematical concepts of the robotic manipulators and an accelerometer were part of the tools that enabled the quantification of movement.

2010–2011 **Lecturer**, ***School of Systems and Information Engineering***, **Industrial University of Santander (*UIS*), Colombia**.

Description: The teaching in the digital systems course consisted of the following activities: *i)* planning, *ii)* selection, *iii)* development of materials and activities, *iv)* evaluation, and *v)* offering classes. Load of 138 hours.

2009–2011 **Lecturer**, ***Technology program in electromechanics***, **Technological units of Santander (*UTS*), Colombia**.

Description: Teaching in different technical courses, where I developed the following activities: *i)* planning, *ii)* selection, *iii)* development of materials and activities, *iv)* evaluation, and *v)* offering classes. Load of 973 hours.

Languages

French Basic.

English Intermediate.

Portuguese Fluent.

Spanish Mother-tongue.

Programming languages

C++, C, Cuda, Python

Other knowledge

Machine Learning: Bayesian Networks, Deep learning ($Fundamentals$).

Data science: Pandas, Numpy, Scipy, IPython, Matplotlib.

Blender: Blender game engine.

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Operating Systems	Ubuntu-Linux.
Hardware	Electronic instrument.
Robotics	Robot Operating System ($ROS/ROS\ 2$), Gazebo, carla simulator, carMaker, RoadRunner.
Computer Vision	Open Source Computer Vision Library ($OpenCV$).
Others	git, Jira, Google Test.

Publications

Gómez A, Genevois T, Lussereau J, Laugier C. Dynamic and Static Object Detection Considering Fusion Regions and Point-wise Features. arXiv preprint arXiv:2107.12692. 2021 Jul 27.

A. E. Gómez, O. Erkent and C. Laugier, Recognize Moving Objects Around an Autonomous Vehicle Considering a Deep-learning Detector Model and Dynamic Bayesian Occupancy. The 16th International Conference on Control, Automation, Robotics and Vision, 2020.

Gómez AE, Santos TC, Massera CM, Neto AD, Wolf DF. Driving simulator platform for development and evaluation of safety and emergency systems. arXiv preprint arXiv:1802.04104. 2018 Feb 1.

A. E. Gómez, S. Glaser, Y. Alayli, A. de M. Neto and D. F. Wolf, "Cooperative collision warning for driving assistance," 2016 IEEE 19th International Conference on Intelligent Transportation Systems (ITSC), Rio de Janeiro, 2016, pp. 990-997. doi: 10.1109/ITSC.2016.7795676

T. C. d. Santos, A. E. Gómez et al., "A Simulation Framework for Multi-Vehicle Communication," 2015 12th Latin American Robotics Symposium and 2015 3rd Brazilian Symposium on Robotics (LARS-SBR), Uberlandia, 2015, pp. 301-308. doi: 10.1109/LARS-SBR.2015.51

A. E. Gómez, T. C. dos Santos, C. M. Filho, D. Gomes, J. C. Perafan and D. F. Wolf, "Simulation platform for cooperative vehicle systems," 17th International IEEE Conference on Intelligent Transportation Systems (ITSC), Qingdao, 2014, pp. 1347-1352. doi: 10.1109/ITSC.2014.6957874

A. E. Gómez, F. A. R. Alencar, P. V. Prado, F. S. Osório and D. F. Wolf, "Traffic lights detection and state estimation using Hidden Markov Models," 2014 IEEE Intelligent Vehicles Symposium Proceedings, Dearborn, MI, 2014, pp. 750-755. doi: 10.1109/IVS.2014.6856486