Ignacio Montesino Valle

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SUMMARY

Roboticist and AI engineer in the final year of my PhD, with experience both in academia and the private sector. Experienced in building reliable robotic systems from scratch and coordinating a team of interdisciplinary researchers. Looking for a challenge in developing production ready AI.

EXPERIENCE

Reaserch Assistant
UC3M - Roboasset   **September 2021 - Present, Leganes, Spain**

· Researcher in the ROBOASSET PID2020-113508RB-I00 Project for intelligent robotic systems for assessment and rehabilitation in upper limb therapies.
· Creation of a real-time abstracting driver for C++ and python, allowing 1000Hz control loops.
· Created a robot agnostic control library for collaborative robots.
· Created a sim2real environment for the KUKA IIWA through PyBullet (Simulation) and FRI (real-time robot communication).
· Versioning and CI using github and GH Actions, Deployment and testing using Docker.
· Integrated rehabilitations using skeleton tracking (MediaPipe) and VR world and real world calibration (ArUco)for inmersive therapy.

PhD Student Researcher
UC3M   **September 2021 - Present, Madrid, Madrid**

· Working for the IROPER project (PLEC2021-007819) for intelligent human robot collaboration.
· Extended a curve fitting algorithm to robot trajectories using Lie Groups, and developed a new control scheme to simulate real world physical contact with curves.
· Working on fast Inverse dynamics solvers using Lie Theory and GPU computation for sparse matrix computation.

Software Engineer
eProsima   **July 2020 - February 2021, Tres Cantos, Spain**

· Member of the Team in charge of the ALMA (H2020-EIC-FETPROACT-2019) EU project for developing Model theory and Abstract Algebra base AI.
· Developed the capabilities of the Fast-DDS middleware, the default middleware in ROS2, in a C++ multiplatform Open source environment.
· Set-Up CI infrastructure for ARMv6 Cross compilation and testing.

Research Intern
RoboticsLab-UC3M   **September 2019 - May 2020, Madrid, Madrid**

· Developed algorithms for humanoid stability and gait generation for the TEO humanoid robot.
· Self led research into the combined use of Lie Algebras and GPU computing to obtain fast and precise dynamic models.
· Created a new formula to compute the ZMP for stability control.
· Created a Pybullet gym based DeepRL environment for gait-generation.

Research Intern
LSI-UC3M   **February 2019 - June 2019, Madrid, Madrid**

· Part of the deep learning team of the Renault autonomous car project focused on building a reliable and quasi real time (>10Hz) perception pipeline through LIDAR, camera and GPS sensor fusion.
· Main focused lied on understanding SOTA network architectures (PointNetV2 and Mask-RCNN) and porting unsupported layers to TensorRT framework.
· Improved database quality, by creating scripts to automate tasks such as: removing unwanted samples or create additional classes by training a classifier to create a bicycle and motorcycle class from a two-wheel vehicle class.

PROJECTS

Bachelor's Thesis
ENSAM Aix-en-Provence · June 2018

· Developed a GPU accelerated (CUDA) point cloud generator to create a database of labeled point clouds as one would obtain from hand scanning them. With the objective of generating a dataset to train a PointNet network for reverse engineering purposes.
· Cut down processing time per point cloud from 1-2 minutes to less than a second, depending on GPU power.

Ferrovial Autonomous Robots Competion
GREX 2017 · February, 2017

· Won third prize at the competition with my robotics association.
· Designed, built and programmed a robot to navigate a scaled down model of a Construction site.

EDUCATION

PhD in Robotics
Universidad Carlos III de Madrid · Madric, Spain · 2024

BSc in Mathematics
Universidad Nacional de Educación a Distancia (UNED) · Madrid, Madrid · 2024

Master's in Robotics and Automation
Carlos III University of Madrid · Madrid, Madrid · 2020

Full second year of General Engineer (Erasmus)
Grande École des Arts et Métiers ParisTech (ENSAM) · Paris, France · 2018

BEng in Industrial Technologies
Minor in Electronics and Automation · Carlos III University of Madrid (UC3M) · Madrid, Madrid · 2018

CONFERENCE PAPERS

Modelo Simplificado para el transporte de objetos sin agarre en humanoides
Robótica e Inteligencia Artificial: Retos y nuevas oportunidades · February 2020
Ignacio Montesino, J.M. Garcia-Haro, J. Hernández, S. Martinez, C. Balaguer

Hacia la bimanipulacion inteligente de cajas con robots humanoides
Robótica e Inteligencia Artificial: Retos y nuevas oportunidades · February 2020
J. Hernández, J.M . Garcia-Haro, Ignacio Montesino, S. Martinez, C. Balaguer

Multi-ZMP based Whole-Body Controller Approach in Humanoid Robots
Robótica e Inteligencia Artificial: Retos y nuevas oportunidades · February 2020
J.M. Garcia-Haro, Ignacio Montesino, J. Hernández, S. Martinez, C. Balaguer

VOLUNTER WORK

Volunteer Teacher
Caritas · September 2017 - June 2018
· I taught at a center for youth education helping low income primary and middle school students with their homework.

Tecnical Sessions Staff
IROS 2018 Volunteer · October2018
· Attended IROS 2018 in Madrid as a Volunteer.
· Helped the speakers with the setup of their presentation and attended numerous talks.

COURSEWORK

Escuela de Verano JAE (ICMAT)
Mathematics · Deepened my knowledge of mathematical fields useful to my research.
Assisted to the courses on Constant Mean Curvature Surfaces, Geometric Methods in Robotics and Computer assisted proofs in analysis.

SKILLS

Deep Learning: Tensorflow/Keras, PyTorch, TensorRT, OpenAI Gym/Gymnasium. Focus on DeepRL and SOTA Computer Vision.

Programming Languages: C/C++ (11-20), Python, CUDA, Matlab, Mathematica.

Project Managment: Scrum/Agile; Frameworks: Git, Trello, Slack, redmine.

Languages: Spanish (Mother Tongue), French (Fluent), English (Fluent)

CI/CD: Docker, Jenkins, GitHub Actions.