PEP LLUIS NEGRE

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plnegre.github.io

Principal Computer Vision Engineer

Experience

2024 - Current

Autonomy Team Lead

ROVCO Subsea, United Kingdom

Leading the subsea autonomy team to develop world-first autonomous subsea inspections. Designing the architectures and algorithms for fully autonomous underwater surveys of jacket structures, monopiles or floating wind turbines.

2020 - 2024

Principal Computer Vision Engineer

ROVCO Subsea, United Kingdom

Researching and prototyping emerging computer vision technologies to guide subsea exploration and inspection. Designing and developing the core of Rovco's cutting-edge live 3D vision for ROVs and AUVs. Working on tackling challenging underwater imagery problems to keep improving camera pose accuracy and dense 3D models.

2017 - 2020

Senior Computer Vision Engineer

ROVCO Subsea, United Kingdom

Designing online 3D underwater mapping algorithms, based on an accurate Visual-SLAM positioning system and semi-dense 3D reconstructions. I am developing cutting-edge solutions for reliable and impressive 3D underwater reconstructions to be executed online during the robot mission. The objective is to provide both ROVs pilots and technicians or inspectors with instant visualizations of marine structures.

2012 - 2017

Postgraduate Researcher

Systems, Robotics and Vision Group, University of the Balearic Islands, Spain

Co-responsible for the entire platform (software and hardware) of the autonomous underwater robot "Turbot". In charge of the whole localization pipeline based on various sensors: IMU, DVL, USBL, GPS and 2 stereo pairs. Specialized in stereo localization, loop closing detection and 3D reconstruction of the environment and the tools to visualize it.

Responsible for the design and development of the operating interface of the vehicle based on HTML5, Google maps API and Rosbridge.

2012 - 2015

CEO at Binibook.com

Binibook S.L.

Lead of the platform to write and distribute books online. In charge of the website and apps developed for iOS and Android. Create value, manage the group and keep developing code in HTML5, Javascript, CSS, PHP, NodeJS, Xcode and Java.

2011 - 2012

Software Developer

Sampol Comunications S.L.

Developing drivers for IAS/Wonderware, cameras, relies and many other sensors for factories and intelligent houses.

Implementing power monitoring systems to improve the building efficiency with powerful web front-ends and databases.

Responsible for the project of automatic reading of meters of water and electricity for the Palma de Mallorca Harbour's.

2009 - 2011

Control Engineer

Alstom Power S.L.U.

Responsible for the control design and tuning of the wind turbines ECO74 and ECO80.

Specialized in system identification and fault-tolerant control in adverse weather conditions.

Education

2008 - 2010

Master Degree in Automatics and Robotics
University of Catalonia UPC, Spain

Advanced control techniques. Mobile robotics. Computer vision.

Final grade: 8.23/10

2004 - 2008

Industrial Engineer in Industrial Electronics
University of the Balearic Islands, Spain

Computer vision. Robotics. Electronics. Control theory.

Final grade: 6.74/10

2002 - 2004

Bachelor Degree Scientific-technological
IES Guillem Colom Casasnovas, Soller, Spain

Skills

Tools & libraries

Expert in Linux command line, SSH, ROS1 ROS2, OpenCV, PCL, ceres-solver, g2o, git and docker.

Robotics

12+ years of experience in robotics systems development and operation. Highly focused on subsea autonomous robots, SLAM, sensor fusion and stereo vision-based localization systems.

Software

Senior programmer in C++ and python.
High background in web, C#, Java and Matlab.

Languages

Spanish and Catalan native.
English fluid (speaking, reading, writing).

Relevant Publications

P. L. Negre, F. Bonin-Font, G. Oliver. Global Image Signature for Visual Loop-Closure Detection. In Autonomous Robots, Published Online, Springer US, vol. 40, pp. 1403-1417, December 2016.

P. L. Negre, F. Bonin-Font, G. Oliver. Cluster-Based Loop Closing Detection for Underwater SLAM in Feature-Poor Regions. In IEEE International Conference on Robotics and Automation (ICRA), Stockholm (Sweeden), 2016. **BEST STUDENT PAPER AWARD FINALIST.**

P. L. Negre, F. Bonin-Font, M. Massot, G. Oliver. Stereo-Vision Graph-SLAM for Robust Navigation of the AUV SPARUS II. In IFAC Workshop on Navigation, Guidance and Control of Underwater Vehicles (NGCUV), Girona, 2015.

P. L. Negre, F. Bonin-Font, G. Oliver. Stereo Graph-SLAM for Autonomous Underwater Vehicles. In Intelligent Autonomous Systems 13 (Proceedings of the 13th International Conference on Intelligent Autonomous Systems IAS13), Padova/Venice, pp. 351-360, 2014.

Patents

- I. Wallace, PL. Negre, L. Hill. 2021. Computing device and method for video object detection. EP3651056. Filed Nov 6, 2018, and issued Mar 28, 2021.
- I. Wallace, L. Hill, PL. Negre, N. Read. 2020. Subsea surveying system. GB2582554. Filed Mar 21, 2019, and issued Sep 30, 2020.
- I. Wallace, L. Hill, PL. Negre N. Read. 2020. Surveying system for surveying in harsh environments. EP3712558. Filed Mar 21, 2019, and issued Sep 23, 2020.
- I. Wallace, L. Hill, B. Allen, PL. Negre. 2019. Subsea camera module and multi camera system. GB2570748. Filed Sep 4, 2018, and issued Aug 7, 2019.

Portfolio

Author or main contributor of the following repositories:

- Stereo Slam. A stereo camera SLAM system, based on my paper of ICRA'16. Nominated for the best student paper award.

- Libhaloc. A loop closure detection system, based on my paper of Autonomous Robots.

- Many contributions to ROS most popular visual odometers: viso2 and fovis.

- 3D mapping and reconstruction:

    * Rema (private repo). A full registration and mapping library for stereo cameras, using PnP for image to image registration, g2o for graph optimization and Ceres Solver for bundle adjustment.

    * Uware. Simple tool for image to image registration, based on PnP and ICP.

- 3D visualization

    * Pointcloud web viewer. A 3D pointcloud web viewer.

- Sensor drivers:

    * Camera drivers: https://github.com/srv/pg_spinnaker_camera and https://github.com/srv/prosilica_driver

- Thousands of public contributions over the last few years from my Github account: https://github.com/plnegre.

Other repositories that I am the owner or main contributor but are private due to licensing or security restrictions:

- ORB Tracker: visual odometry based on the popular ORB_SLAM2 algorithm.

- Collision avoidance: a local planner approach to avoid collisions, based on an octomap fed by stereo depth maps.

- Robot missions: web interface to teleoperate, setup autonomous missions and monitor the status of the robot.