Thomas Campagnolo

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RESEARCH INTEREST

The *sense of perception and vision* is an essential way to allow autonomous vehicles and UAVs, powered by AI, to interact with the environment and people. We use this in autonomous navigation to path planning, localization, mapping, collecting data and to verify the reactive behavior of autonomous mobile robots in the presence of dynamic objects. In these applications it is important to evaluate the parameters of vision and perception such as shape, distance, etc., to develop an awareness of the vehicle and for autonomous responses.

For the above reasons, my research interests concern the study of new technological solutions in vision and perception of the surrounding environment for autonomous robotics, particularly in the field of autonomous vehicles, AGVs and UAVs using cameras and other perception sensors.

ACTUAL EMPLOYMENT

MASTER'S THESIS INTERNSHIP AT INRIA, ACENTAURI TEAM, ANTIBES, FR   *September 2023 - Present*

ROBOTICS ENGINEERING MASTER DEGREE, ERASMUS+ INTERNSHIP PROGRAMME (6 MONTH)

Master thesis topic: Detection and tracking of moving objects with an event based camera on an autonomous car. This thesis aims to implement a robust framework for the detection and tracking of moving objects (e.g. vehicles, pedestrians, ...) viewed by an event camera on an autonomous car.

ACADEMIC QUALIFICATIONS & EDUCATION

MSC IN COMPUTER SYSTEMS ENGINEERING, ROBOTICS ENGINEERING   *September 2021 - Present*

Estimated end date: March 2024

UNIVERSITY OF GENOA (ITALY)

•Current Weighted Average: *27.37/30*

BSC IN INFORMATION TECHNOLOGY ENGINEERING, MECHATRONIC ENGINEERING   *Sept. 2017 - September 2021*

UNIVERSITY OF STUDY OF PADUA (ITALY)

Final Grade: 87/110
Thesis: "Analysis and Implementation of a RGBD Sensor - INTERACT Project". For further details, see Research Projects section.

EXPERIENCES

ADZ S.R.L.S.   *Dicember 2017 - June 2021*

Bassano del Grappa (VI), Italy

ELECTRICAL SYSTEM DESIGNER

Skills:

- CAD modelling, for the design of civil and industrial electrical systems;
- I-Project 6 & eXteem 6, for the design of electrical diagrams;
- Dialux Evo, for the design of lighting calculations for civil, industrial and road use environments.

M.P.A. Automazioni s.r.l. *May 2016 - June 2016*

Bassano del Grappa (VI), Italy

Curricular High School Internship

Skills:

- Electronic board design for handling automations, control, assembly and robotics.

Skills

Programming Languages	***Experienced:*** Python	C	PDDL/PDDL+ ***Familiar:*** C++	Bash
Frameworks & Libraries	***Experienced:*** ROS	SLAM algorithm	ROSPlan	OpenCV	Matplotlib	Numpy	Matlab/Simulink	PyTorch	LaTeX ***Familiar:*** ROS2	Unreal Engine	Jupyter	TensorFlow	pyrealsense2	Protègè	Doxygen
Software Development	GIT	CLI
CAD Modelling	LabVIEW	LTspice	AutoCAD	Fusion 360
Languages	***Native:*** Italian ***Fluent:*** English (B2)

Research projects

Navigation and 3D Mapping with ROS2

Software Architectures for Robotics, final project course at the University of Genoa (Italy)

This project aims to analyze the functionalities provided by ROS2 Navigation2 combined with the Spatio-Temporal Voxel Layer (STVL) plug-in for merging and 3D mapping into a environmental simulation. To verify the efficiency and resolution of the STVL plug-in we compared the results obtained with two different sensors of the mobile robot: 3D LIDAR and RGBD camera.

• GitHub repository: https://github.com/mich-pest/ros2_navigation_stvl.git

Mapping and obstacle detection in simulated neighborhood environment

Virtual Reality for Robotics, final project course at the University of Genoa (Italy)

ROS-based framework including the mapping algorithm from Open3D SLAM and an obstacle alerting system, exploiting a precompiled Unreal Engine based environment (i.e. neighborhood) for the open source AirSim simulator running on Windows. Once running an agent maps the surrounding world while it gets teleoperated, giving also warning for close objects (i.e. obstacle detection).

• GitHub repository: https://github.com/Fedezac/VR_Assignment1.git

INTERACT

University of Study of Padua (Italy)

Industrial inTernet of things architEctuRes and Algorithms for time-critical Cyber-physical sysTems – is a project that focuses on industrial applications of mobile robotics in interaction with the environment and aims to solve problems of localization and autonomous navigation through a network of fixed and mobile IoT sensors, cooperating in mapping and motion planning. The fixed IoT network, consisting of sensors such as an Intel RealSense Depth Camera D435 and a Rasberry Pi 4, allows you to reconstruct the map of the three-dimensional environment with a frequency fast enough but not necessarily high to be time-critical. The LoCoBOT mobile robot, for example to carry out pick and place operations, will be able to move and self-locate within the known environment by exploiting the information from the created map and performing the detection of dynamic spaces to move more quickly. The communication network between the sensors is completely Wi-Fi.

Subtask of my BSc thesis in the INTERACT project:

- Study of the architecture and operation of the Intel RealSense Depth Camera D435 and the Raspberry Pi 4 board;
- Configuration, calibration and programming in python of a system for the acquisition of RGBD images for the reconstruction of the 3D map of the indoor environment.

CERTIFICATES

- Pursuant to Legislative Decree 81/08 and D.M. 388/03 "Emergency First Aid " certificate (12 hours)

OTHERS INFO

- Driving License: B - Europe