Leonardo Saraceni

WORK EXPERIENCE

[09/06/2019 – 09/07/2019]

Curricular internship

Marche Polytechnic University

City: Ancona

Country: Italy

Acquisition of photopletysmographic signals using a Maxim sensor and processing using a machine learning algorithm to then develop a program that recognizes the type of activity performed (running, walking, climbing steps, etc.). Skills used and acquired:

- C programming (basic)
- Matlab for signal processing and filtering
- Biometric signals acquisition through multiple experiments
- Team working

[01/02/2022 – 01/06/2022]

Scholarship "Automatic simulation and planning for person-robot collaboration systems"

Sapienza University of Rome

City: Rome

Country: Italy

Management of a Gazebo simulation environment (ROS based) for motion planning and task execution, in the context of the European project AIPlan4EU. It consisted in the integration of a UR5 robotic manipulator with several instruments (scale, pressure test machine, ...) equipped with LEDs to indicate if the instrument is busy or not.

EDUCATION AND TRAINING

[31/08/2016 – 25/07/2019]

Bachelor degree - Biomedical engineering

Marche Polytechnic University - Department of Information Engineering https://www.univpm.it/Entra/

Address: Via Brecce Bianche, 12, 60131 , Ancona, Italy

Field(s) of study: Electronic Engineering | Biomedical Engineering

Final grade: 105 **Level in EQF:** EQF level 6

Type of credits: ECTS **Number of credits:** 180

Thesis: Acquisition of the photoplethysmographic signal (PPG) and classification activities

[01/09/2019 – 17/01/2022]

Master of Science in Artificial Intelligence and Robotics

Sapienza University of Rome - Department: computer, automatic and management engineering https://corsidilaurea.uniroma1.it/it/corso/2020/30431/home

Address: Via Ariosto, 25, 00185 , Rome, Italy

Field(s) of study: Computer Engineering | Control Engineering | Computer Science

Final grade: 110 & Lode **Level in EQF:** EQF level 7

Type of credits: ECTS **Number of credits:** 120

PUBLICATIONS

[2020] **Dataset from PPG wireless sensor for activity monitoring**

We introduce a dataset to provide insights about the photoplethysmography (PPG) signal captured from the wrist in presence of motion artifacts and the accelerometer signal, simultaneously acquired from the same wrist. The data presented were collected by the electronics research team of the Department of Information Engineering, Polytechnic University of Marche, Ancona, Italy. This article describes data recorded from 7 subjects and includes 105 PPG signals (15 for each subject) and the corresponding 105 tri-axial accelerometer signals measured with a sampling frequency of 400 Hz. These data can be reused for testing machine learning algorithms for human activity recognition.

[2022] **Pseudo-Label Generation for Agricultural Robotics Applications**

In the context of table grape cultivation there is rising interest in robotic solutions for harvesting, pruning, precision spraying and other agronomic tasks. Perception algorithms at the core of these systems require large amounts of labelled data, which in this context is often not available. In this work, we propose a semi-supervised solution to reduce the data needed to get state-of-the-art detection and segmentation of fruits in orchards. We present the case of table grape vineyards in southern Lazio (Italy) since grapes are a difficult fruit to segment due to occlusion, color and general illumination conditions. We consider the concrete scenario where the source labelled data is wine grape, while the target data is table grape, with considerable covariate shift. Starting from a simple video input, our method generates first bounding box labels, leveraging the structure from motion information, then segmentation masks, using the same weakly generated bounding box labels and a refining step based on Grab Cut. This system is able to produce labels that considerably reduce the covariate shift from source to target data and that requires very limited data acquisition effort. Comparisons with SotA supervised solutions show how our methods are able to train new models that achieve high performances with few labelled images, with very simple labelling.