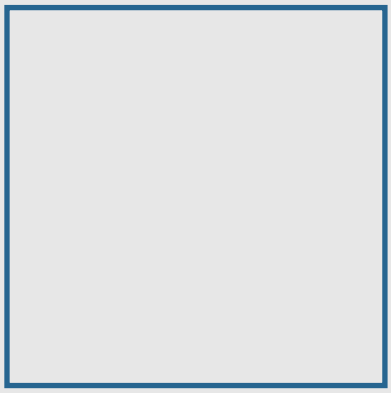

Ariel Gjaci

Robotics Engineer

Social Networks

Linkedin Profile

Github Projects

Languages

- Italian
- Albanian
- English

About Me

Currently I am a PhD student in Robotics and Artificial Intelligence who completed a Master's degree in Robotics Engineering and a Bachelor Degree in Biomedical Engineering. I am a technology enthusiast who always loves to learn and create. My favourite subjects are the ones related to the Robotics and Machine Learning fields.

Working Experience

11/2021 – now
PhD student in Robotics and Artificial Intelligence — Università degli studi di Genova
Working in a PhD related to Culture-Aware Artificial Intelligence for Social Robots.

05/2021 – 10/2021
Junior Software Engineer Consultant — Akka Technologies
I worked in a team for developing embedded software solutions for military applications.

Education

Study

2018 – 2021
Master's Degree in Robotics Engineering — Università degli Studi di Genova
Worked on many projects concerning robotic applications alone and with teams.
Learnt how to use ROS, Linux, some programming languages and studied subjects of different kinds (AI, Embedded Systems, Computer Vision, Multi-variable and Non-Linear control, Mechanical Design, ecc.).
Graduated defending the thesis: Culture-Aware Co-Speech Gestures Using Generative Adversarial Nerworks.

2014–2018
Bachelor Degree in Biomedical Engineering — Università degli Studi di Genova
Learnt typical subjects of Biomedical Engineering and some programming languages (C,C++,Matlab).
Graduated defending the thesis: Characterization of the Activity Evoked by Stimuli in Hippocampal Neuronal Networks.

2009 – 2014
High School Diploma — ITIS Galileo Ferraris
Graduated as IT Engineering Technician and learned some programming languages: C++, PHP, HTML, Assembler 32-bit, SQL.

Skills

Programming Skills

- C
- R
- Python
- Matlab/Simulink
- C++
- LaTex

System Level Programming Skills

- ROS
- Linux
- Windows

Mechanical design skills

- Creo

Embedded Systems and Electronics skills

- Raspberry Pi
- Arduino
- dsPICDEM 2

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Educational Experience

06/2020 – 06/2021

Culture-Aware Talking Gestures using Generative Adversarial Networks

The project was about finding a new method for generating non-verbal gestures for a specific culture. To achieve the goal many frameworks and Neural Network models were exploited and adapted to work together: 'Openpose' for gesture detection, 'PySceneDetect' for scene detection, a model for many-to-one Voice Conversion, a model for Audio-To-Gesture mapping (based on Generative Adversarial Networks), a model for 2D-to-3D pose transformation. Moreover, a Python code for reproducing the speech and the gestures on the humanoid robot Pepper was written. It was used Python 3 for writing the scripts and Google Colaboratory Notebook for running them. A specific Dataset for the Indian Culture was created to train the models.

09/2020 –– 11/2020

Robots Play Football

This project involved a team of 3 people and it was completed both in simulation and in reality using Python, OpenCV and ROS. For this project we created a robotic setup consisting of four mechanum wheels, four motors ST XH 6 pin Connector (one for each wheel), Arduino Due, Raspberry Pi, RGB camera module for Raspberry, two L298N dual H-Bridge Drivers, Batteries for Raspberry and the motors. In this project the robot had to recognize a red ball using the color segmentation technique, finding its position exploiting the knowledge of the size of the ball and the focal length of the camera, and then find a way to push the ball to the goal. In the original project the position of the robot in arena is assumed known thanks to a Motion-Detection setup, but since we didn't have access to the setup at that time, we relied on the odometry by analyzing the data coming from the encoders of the wheels. The simulation was completed in ROS Gazebo and the problem of obstacle avoidance was not considered.

04/2020 –– 07/2020

Implementation of an Architecture for Multimodal Semantic Perception Fusion

This project involved a team of 10 people and the goal was to implement a Software Architecture for recognizing objects using different perception modules. For instance, we used 2 cameras (RGB and RGB-D) of the Baxter Robot for detecting the common features among objects, then we computed the correlation among these features such that it is possible to know, for each object on a table and with some computed confidence, if it is the same object perceived by the other camera module. Finally we put together all the features (common and not common) such that they can be also used out of Architecture. The latter was thought to be as modular as possible so that can be added unlimited perception modules with a minimal change of code. What I did in particular for this project, is the test of the overall Architecture for checking its performance, limits, bugs, and finally I generated a Doxygen documentation.

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04/2020 -- 07/2020

Implementing a Basic Control System for an Autonomous Catamaran

This project involved a team of 2 people and the aim was to implement a system for controlling the motors of an autonomous Catamaran using the dsPICDEM 2 board. Everything was written using the C language, the MPLab software, and some low-level functions of the dsPIC30F4011 micro-controller embedded inside the board. We scheduled many tasks using some timers of the latter: led blinking (to indicate some state), management of the temperature, control of RPM of motors using PWM signals, control UART for sending and receiving messages, management of the LCD of the board for showing them, management of different modalities (timeout mode, safe mode ecc.)..

11/2020 -- 02/2021

Culturally-Competent Verbal Interaction Service Integration for Pillo Robot

This project involved a team of 3 people and has, as main goal, the integration of the Rest Server of the Pillo Robot with the Cloud server of Caresses. Caresses is a project with different modules and aim is to implement a culturally-competent behavior for robots. It can be accessed by TCP/IP connection while the Rest server used to manage the Pillo Robot is called 'Swagger' and can be accessed with the common HTTP methods. What we done is to create a third server called 'CaressesBridge' that communicates with the 'Swagger' Server using the Rest API implemented by Flask, decode the messages coming from it (for example the words that the robot have listened from the user), send the results to the Caresses Server using TCP/IP connection, getting something from Caresses Server (a message, an action to be performed ecc.), sending back the message or action to the Swagger Server, put the robot in Listen mode, and finally restart the loop. Many of the actions implemented by Caresses can't be reproduced by the Pillo Robot so we created a method for managing only the chit-chat messaging. The architecture can be easily expanded.

04/2020 -- 07/2020

Design of a new Robot Starting from a Toy Robot

The project was realized by a team of 3 people. Here we bought a spider toy-robot, we did an accurate measurement of all its components, and then we modelled each part of it using PTC-Creo to have a complete model of the toy. Using this as a starting point, we designed and modelled (again on Creo) a newer Robot that has the possibility to be 3D printed and then moved by 2 motors instead of 1 that we had on the toy. The only constraints were given by the printer limits and by our imagination.

05/2019 -- 07/2019

Multi-View Calibrated Acquisition of Upper Body Human Movements

This project involved a team of 3 people and was about the implementation of a multi-view setup with 3 syncronized industrial cameras connected through Ethernet cables. These were used for the reprojection of some upper-body keypoints in a 3D space. All the work can be resumed in 3 main steps: -Find a solid setup for the cameras such that it is possible to have a good view of 8 upper-body keypoints coming from a violinist playing his instrument -Calibrate all the possible pairs of cameras using the 'Stereo Camera Calibrator' Matlab Toolbox and extract the internal and external parameters -Detect and track keypoints of some videos (captured by the setup) using a given Deep Learning model, and reproject them in a 3D space for creating a video showing the movements of the violinist. We had a video for each pair of cameras.