

# Gabriel TAORMINA

## MSc in Computer Engineering

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I have always been passionate about technology and science, and I have cultivated this interest through personal and university studies. I completed a Bachelor's degree in Computer Engineering, which provided me with a solid foundation in the fields of engineering and computer science. I then continued my studies with a Master's degree in Computer Engineering - Artificial Intelligence and Robotics, a program taught in english that allowed me to specialize in the areas of Computer Vision, Robotics, Natural Language Processing and Machine Learning. I am always looking for opportunities to further develop my skills and interests with the aim of designing something that can make life better.

## EDUCATION

- 11/22 - 07/25 University of Padua, Padua, Italy | MSc. in Computer Engineering - Artificial Intelligence and Robotics  
10/19 - 11/22 University of Padua, Padua, Italy | BSc. in Computer Engineering

## EXPERIENCE

09/2025 ongoing	<b>Software Engineer, Plank, Venice-Milan, Italy</b> <ul style="list-style-type: none"><li>&gt; Full-stack developer.</li><li>&gt; Integration of LLM and AI into existing systems and software</li><li>&gt; Testing and automation</li></ul> <p>TypeScript PHP C# React MySQL Node.js Python REST API AI LLM</p>
09/2024 02/2025	<b>Research Internship, University of Padua, Padua, Italy</b> <ul style="list-style-type: none"><li>&gt; Research and development activities in the field of 3D Reconstruction and Novel View Synthesis, using SOTA approaches and models, with a particular focus on Gaussian Splatting, specifically 3DGS, 2DGS and related evolutions.</li><li>&gt; Development of the initial stages of the master's thesis, based on 2D Gaussian Splatting.</li></ul> <p>Research 3D Reconstruction Novel-view Synthesis Gaussian Splatting 3DGS 2DGS Python</p>
11/2022 09/2025	<b>Freelance Developer, Individuals, Venice, Italy</b> <ul style="list-style-type: none"><li>&gt; Help software development for individuals and associations</li><li>&gt; Web application and software development</li></ul> <p>Web application HTML CSS JavaScript Java Electron SQL Python</p>
12/2019 08/2025	<b>Private Lessons, Individuals, Venice, Italy</b> <ul style="list-style-type: none"><li>&gt; Lessons in computer science and programming</li><li>&gt; Math and physics tutoring</li></ul> <p>Tutoring Teaching Organisation Communication Time management</p>

## SKILLS

<b>Programming Languages</b>	C++, Python, Java, C, JavaScript, Kotlin, PHP, TypeScript, C#
<b>Tools &amp; Framework</b>	OpenCV-3D, ROS, MoveIt, Langchain, Scikit, PyTorch, Pandas, Numpy, CUDA, Git, Playwright
<b>Web technologies</b>	HTML, CSS, Bootstrap, Electron, NodeJS, ReactJS
<b>Database</b>	SQL, PostgreSQL, SQLite, MySQL
<b>Operating System</b>	Linux, Windows, MacOS

## SOFT SKILLS

- > Problem solving
- > Great adaptability
- > Teamwork
- > Creative
- > Leadership
- > Time management
- > Curious

## LANGUAGES

- > Italian (Native)
- > English (Advanced)
- > Spanish (Intermediate)
- > German (Beginner-ongoing)

## ACADEMIC AND PERSONAL PROJECTS

### MASTER'S THESIS : QUANTIZE 2D GAUSSIAN SPLATTING

FEB. 2025 - JUL. 2025

#### Repository

The aim of the thesis is to modify the existing 2D Gaussian Splatting model in order to obtain reconstructions with the same quality but with a lower weight, thus expanding the possibilities of using the 3D models obtained. The results allowed for a saving of approximately 50% in MB compared to reconstruction using 2DGs. The savings were achieved by applying vector quantization, opacity pruning and a modification to the CUDA kernel present in the original rasterizer.

Gaussian Splatting | 2DGs | 3DGs | 3D Reconstruction | Novel View Synthesis | Vector Quantization | Pruning | OpenCV | Python | CUDA | PyTorch

### 3D DATA PROCESSING & COMPUTER VISION : TINY POINTNET

#### Repository

Development of a reduced version of the PointNet network, called Tiny PointNet, which provides a unified architecture for applications ranging from object classification to part segmentation to semantic scene parsing through a series of MLPs. In this case, the focus is on 3D descriptors.

Neural Network | MLP | Point Cloud | OpenCV | Open3D | Object Classification | Segmentation | Python

### 3D DATA PROCESSING & COMPUTER VISION : STRUCTURE FROM MOTION

#### Repository

Implementation of Structure from motion (SfM), the process of reconstructing the 3D structure of a scene from its projections into a series of images taken from different viewpoints. The code was tested on two provided datasets of images and a new one acquired with a smartphone camera. The entire calibration phase was also performed to obtain the camera parameters.

3D Reconstruction | Point Cloud | Camera Calibration | OpenCV | C++

### 3D DATA PROCESSING & COMPUTER VISION : 3D STEREO MATCHING

#### Repository

In this project It was developed the code of a basic implementation of the Semi-Global Block Matching (SGM) stereo matching algorithm. Furthermore, in addition to the pair of input stereo images an initial guess of the disparity map is provided. After computing the disparity map with SGM, it can compute the scalar factor present in the initial guess and use the scaled initial guess disparity map to refine/complete the disparity map computed with SGM

Stereo Matching | Depth Estimation | Disparity Map | OpenCV | C++

### 3D DATA PROCESSING & COMPUTER VISION : FOOD RECOGNITION AND LEFTOVER ESTIMATION

#### Repository

The developed system is able to recognize and localize all the food items in the tray images, considering the food categories detailed in the dataset and segment each food item to compute the corresponding food quantity (i.e., amount of pixels) compare the “before meal” and “after meal” images to find which food among the initial ones was eaten and which was not. The part relating to food recognition is not based on a pre-trained neural network (a constraint of the project as specified in the assignment) but on template matching, considering the available dataset.

Object Recognition | Segmentation | Object Detection | Template Matching | Change Detection | OpenCV | C++

### 3D DATA PROCESSING & COMPUTER VISION : CLOUD REGISTRATION

#### Repository

The project is about iterative closest point cloud registration : given a source and a target point cloud roughly aligned, find the fine alignment transformation of the source to the target cloud

ICP | Point Cloud | OpenCV | Open3D | C++

## ROBOTICS : TIAGO PICK AND PLACE

### Repository

The goal of the project is to implement a fetch and delivery behavior for the robot Tiago. In the simulated environment there are two rooms separated by a wall, plus some obstacles. In the first room is placed a table with some objects above that the robot has to fetch, plus gold hexagons that Tiago has to avoid, and thus not collide with them. Tiago has to grasp the correct objects in some defined order, not collide to not wanted objects, move to the second room where are present colored tables, detect the color-associated table, move towards it, place the object and come back in the previous room.

Object Manipulation | Kinematics | Object Detection | Object Classification | Robot Manipulation | Navigation | ROS | Gazebo | MoveIt! | Rviz  
C++

## ROBOTICS : TIAGO NAVIGATION

### Repository

The goal of the project is to get the robot Tiago from the initial point Starting Pose to point Pose B by navigating through the environment that includes two rooms, corridor and obstacles. Once Tiago reaches the Pose B, it must recognize the obstacles, cylindrical in shape, from his surroundings and indicate how many there are and their location in the room. Tiago can reach Pose B in three different ways : using a motion control law developed for the project from scratch, using the one already present natively through the Navigation Stack, and lastly a combination of the two options.

Navigation | Object detection | Control Law | ROS | Gazebo | MoveIt! | Rviz | C++

## ROBOTICS : PROGRAMMING OF SCARA AND ARTICULATED INDUSTRIAL ROBOTS

### Repository not available

Series of projects carried out in the laboratory, relating to the programming of robots such as SCARA or articulated robots. The aim was to create precise and continuous routines for the robotic arm to position objects from a roller to a flat surface. The objects had to be arranged according to very precise configurations and with specific geometries in order to test the accuracy of the commands.

Object Manipulation | Object Detection | Kinematics | AdeptV+

## NATURAL LANGUAGE PROCESSING : CHATBOT RAG-BASED

### Repository

The project allows to talk to the system and get information, opinions and recommendations regarding BnBs in the city of New Orleans based on customer reviews on the AirBnb platform. It is based on RAG, using Mistral-7B Instruct as LLM and all-mpnet-base-v2 as embedding model

Chatbot | RAG | Embeddings | LLM | Mistral 7B | Text Generation | Retrieval | Python | PyTorch

## NATURAL LANGUAGE PROCESSING : WORD EMBEDDINGS AND TRANSFORMERS

### Repository not available

Series of laboratory activities aimed at exploring and working with embeddings and transformers.

Embeddings | Word2Vec | Transformers | Semantic Parsing | Python

## LEARNING FROM NETWORKS : GRAPH BASED ACCIDENT ESTIMATOR

### Repository

This project aims to develop a system that can estimate the severity of accidents near the intersections in London. The research focuses on evaluating and comparing the effectiveness of conventional ML techniques versus graph neural networks with the goal of identifying the most suitable model for the problem. The severity prediction task is transformed into a classification problem. Four models are employed as SVM, K-NN, RF, GCNN

Graph Theory | GCNN | SVM | K-NN | Random Forest | Classification | Estimation | Python | PyTorch

## BACHELOR THESIS : AI PLANNING MIP

### Repository

AI Planning allows us to achieve a goal that was not initially verified, starting from an initial state and moving between states with cost and effect through a sequence of actions. The approach taken in the thesis to solve these problems is based on the use of integer linear programming. The experiments used instances of problems belonging to the MICONIC class.

Linear Programming | Mixed-Integer Programming | Heuristic Algorithm | Planning | Python | CPLEX

## SOFTWARE ENGINEERING : ADAPTERS FOR MAP AND LIST INTERFACES

### Repository

Using Hashtable and Vector as adaptees, this project focuses on implementing Adapters for the Map and List interfaces in the J2SE 1.4.2 environment. Each adapter has been thoroughly tested with a dedicated testing phase.

Design Patterns | Interfaces | Adapters | Testing | Java | JUnit

## WEB APPLICATION : SAGRONE

### Repository

This project SAGRONE targets local festivals and aims to provide a complete food services management system. The resulting solution will assist the event staff in managing orders through their lifecycle by means of an intuitive interface while providing at the same time a web portal for customers to place orders autonomously. There are three main protagonists, each one has its relative interface : customer, cashier, administrator

Web Application | Html | CSS | Javascript | Java | SQL | Servlets | Tomcat