# Vishnu VEILUMUTHU

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## OBJECTIVE

Interested in innovation, research and development in the field of Computer vision, Robotics and Machine learning. Also interested in products/apps & services in newer areas of technology; Seeking areas with Security, Autonomous control systems, vision/voice-based system and its software application.

## EXPERTISE

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| Programming Skills | C/C++, Python, vhdl |
| Tools | Matlab, QT, OpenCV, ROS |
| Hardware | Embedded Development Boards, Processor & FPGA |

## JOBS

- Freelancer in Industrial robotics and AI (Jan 2019 – Present)
- STOP Project – Research Engineer, Universidade de coimbra (1 year; 2017-2018),Coimbra, Portugal.

## EDUCATION

- Masters 4th Semester – Research Training, Università degli studi di Udine (2017),Udine, Italy. - Thesis topic: "Synchronization of projective frames" Supervisor: Prof. Andrea Fusiello.
- Masters 3rd Semester - Computer Vision and Robotics, université de bourgogne (2016-2017),Le Creusot, France. - ROS with Computer vision, Real time tracking, VHDL programming.
- Maters 2nd Semester - Computer Vision and Robotics, universitat de girona (2016),Girona, Spain. - Visual Perception, probabilistic robotics.
- Masters 1st Semester - Computer Vision & Robotics, université de bourgogne (2015-2016),Le Creusot, France. - Applied Mathematics, Image processing.
- Licences - Computer Vision and Robotics, University of Burgundy (2014-2015),Le Creusot, France. - Software Designing, Basics of Image processing.
- B.E-Electronics & Instrumentation, Adhiyamaan College of Engineering (2010-2014), Hosur, Tamilnadu.

## ACCOMPLISHMENTS

- Design and Development of an Autonomous underwater robot, controlled with Image Processing for Vision for the AUVSI foundation and ONR's(U.S. Office of Naval Research) 16th International Robosub competition:SSC Pacific TRANSDEC, San Diego, CA, USA in 2013.
- Design and Development of an Agricultural Autonomous Robot(AGROBOT) for Remote Area Farming - that could drill the ground and drop seeds, an real time application. Indigenous & Innovative design for the Final year Engineering project in 2014.

## STUDENT INTERN

- Luxembourg institute of science and technology - Summer Internship (3 months; 2017) in ReacTIVision.
- Universitat de girona - Summer Internship (2016); Structure from Motion.
- Le2I laboratory - Summer Internship (2015); Camera Calibration.
- BangaloreRobotics Pvt. Ltd. (2012 - 2014); Hardware and Software Design for Robotic Application.

## PROJECTS

(Project images are displayed in the website)

**STOP Project:** My research work is on multi-robot patrolling of infrastructures, with an emphasis on robot artificial perception methods for detection and recognition of abnormal situations. The security threats in the context of automatic surveillance system includes detecting Objects/Humans using Deep learning algorithm, activity analysis of people, and localization of Objects/Humans using multiple robot and 3D sensors.

**Internship LIST:** I had the opportunity to develop an application using ReacTIVision software. ReacTIVision is an open source framework for the development of tabletop tangible user interfaces and multi-touch surface. Fiducial markers are tagged physical objects placed on the table and used as a target locator. When the fiducial marker is placed over the table, the projected screen below the marker are not visible. My work was to design a hollow space in the center of the fiducial marker and program software to detect it.

**Master's thesis:** 'Synchronization of projective frames', method to integrate group of different frame projective reconstructed matrices by a single global projective transformation. Most projective reconstruction method suffers from common drawbacks which requires multiple iterative process and may not converge or only converge to a local minimum. To avoid such problems, by arranging the transformation between each camera of different views in a global network and solving them using graph modeling.

**Cleaning Robot:** This project is part of master's course work; the main objective of the project is to detect the trash from a roadside environment or in an after-party site. The process is designed that the robot is programmed to navigate the entire area and search for required object (trash). Later, after detecting the trash they are categorized into three sections - paper cup, can or bottle, which helps for the recycling process.

**Internship Girona:** I had the opportunity to learn and understand the dynamics of moving objects in a video. My work was to extract the optical flow information in a video, captured from a moving vehicle. The work includes visual perception using Structure from Motion Techniques and scene segmentation.

**Seeded image segmentation:** This project is part of master's course work, the Software engineering module in the first semester of study, "Laplacian coordinates for seeded image segmentation" a CVPR2014 research paper was implemented. The key feature of the paper is mathematically simple to implement and guaranteed to produce a unique solution. The project is implemented in C++ programing with QT, a simple design using GUI and the project is credited for the teamwork.

**Internship Le2i:** I had the opportunity to learn the basic concepts of camera calibration techniques and visual perception concepts. My work was to capture multiple images projected over the wall with unknown camera parameter and calibrate it using Jean-Yves Bouguet's camera calibration Toolbox.

**Software engineering Project (2015):** The project is part of bachelor's course (Software engineering module), the work is to design GUI for robotic framework with C++ as programming language. The application contains a server and client section to manage the network connect between a robot and the workstation. After the connection is established, the server sends data to the connected clients like sensor parameters. In the algorithm, server section manages password for security access, control camera display portion and serial communication port for sensors. The client section displays and monitors the data from the server.