Karim Samaha

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OBJECTIVE

A self-motivated electronics hobbyist, looking to leverage his extensive fast-prototyping skills, both in hardware and software, in the development of innovative robotics and automation solutions.

EDUCATION

Swiss Federal Insitute of Technology(EPFL),   **September 2020-Present**
Switzerland
Master's in Robotics, Microengineering
GPA 5.5/6

American University of Beirut
Lebanon
Bachelor of Engineering, Mechanical Engineering
GPA 4/4

Collège Notre Dame de Nazareth
Lebanon
French Baccalauréat TS
17.47/20

PROFESSIONAL EXPERIENCE

Synkers, Local Tutoring Company, Lebanon   **June 2018-Present**
Certified Tutor
- Tutoring university courses related to engineering and sciences both in groups and in private.

American University of Beirut, Lebanon   **September 2018-June 2020**
Undergraduate Research Assistant with Prof. Daniel Asmar at the Mechanical Engineering Department
- Worked closely with different mobile robots such as the Pioneer 3AT and the KUKA Youbot.
- Participated in a research project related to computer vision and machine learning.

University of Waterloo, Canada   **May-August 2019**
Research Intern with Prof. John Zelek at the Systems Design Department
- Implemented a deep neural network for camera calibration from video sequences.
- Developed a new image generation algorithm using Unity as a game engine.

ACADEMIC PROJECTS

Tensegrity-Based Morphing Wing   **February 2021-June 2021**
Semester Project
- Explored the feasibility of morphing tensegrity structures in an aerodynamic setting
- Designed, modelled and manufactured a tensegrity-based wing that can achieve roll and pitch control through morphing

Autonomous Navigation System for a Drone February 2021-June 2021
Aerial Robots
- Implemented an autonomous navigation algorithm on the Crazyflie drone using Python
- The navigation system relies on a velocity controller which uses optical flow for stability and range sensors in a potential field framework for obstacle avoidance

Camera Controller Design using an FPGA September 2020-January 2021
Embedded Systems
- Designed a camera controller for the TRDB-D5M CMOS camera using Intel Quartus and NIOS
- The controller reads pixel values in real-time from the CMOS sensor, processes them, and stores them in memory.

TECHNICAL SKILLS

Modeling and Manufacturing
- Modeling mechanical components using AutoCAD, Creo or Solidworks.
- Performing stress and motion analysis on Solidworks.
- Building mechanical components using different manufacturing processes (3D printing, CNC, Drilling, Lathing, Milling).

Electronics
- Programming microprocessors or microcontrollers (Raspberry Pi, Arduino, PIC, MSP432).
- Designing and testing embedded systems on FPGA using Nios and Intel Quartus.
- Building complex electronics systems using multiple sensors, actuators and communication interfaces.

Programming Skills Python, OpenCV, Tensorflow, Keras, Numpy, C++, MATLAB, C#, LabVIEW, Linux, GitHub

IT Microsoft Office, Adobe Photoshop, Adobe Illustrator, Techsmith Camtasia

Soft Skills Organized, Creative, Hardworking, Ambitious, Maker

LANGUAGES

CEFR C2 in **English, French and Arabic**
CEFR A2 in **German**

HONORS AND AWARDS

First Place in FYP Accelerator Program 2020	**Spring 2020**
Dean's Honor List	**Spring 2016-Spring 2020**
First Place in FEA Robotics Competition	**Fall 2016-2017**

EXTRACURR-ICULARS

01Tutor, Interactive Learning Platform July 2020-Present
Developing an online interactive learning platform with MOOC. The platform offers university students an accessible and innovative means to consolidate their knowledge in engineering and sciences

HiveMate, Vision System for Bee Swarm Prevention September 2019-Present
Developing a vision system capable of identifying swarm cells withing a hive. The intricate design consisting of a rotating fish-eye camera coupled to a convolutional network estimates the presence of swarm cells attached at the bottom of the frames.

IEEE Robotics Hackaton February 2019
Designed a quadruped robot capable of replicating the creep gait using Solidworks as a modelling tool and an Arduino as a microcontroller. The robot can be used for the inspection of tight spaces such as ventilations and electrical systems.

PERSONAL DETAILS

Age 23, Single
Type B Permit, No Military Obligation