Alexander Fache

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OBJECTIVE

Master's electrical engineering student seeking full-time employment for spring 2022. Experience with control theory, advanced programming, and quadcopter builds. Interested in software and controls engineering developing advanced robotic systems.

EDUCATION

Georgia Institute of Technology (Georgia Tech) | Atlanta, GA

M.S. Electrical Engineering (GPA: 3.88 / 4.00) **01/2021 - 12/2021**

- Systems and Controls

B.S. Electrical Engineering (GPA: 3.83 / 4.00) Highest Honors **08/2016 - 12/2020**

- Minor: Computer Science, Robotics

SKILLS

YouTube Channel: Drone tutorials, builds, and flights. 900+ subscribers, 90,000+ views
Programming: [advanced] Python, [intermediate] Matlab, C, C++, JavaScript, Java
Software: [advanced] Jupyter Notebook, Numpy, [intermediate] Git, React.JS, MongoDB, MERN full stack web application, Heroku, Postman, OpenCV, iMovie, Inventor, Linux, [beginner] PyTorch, ROS 2, CUDA, OpenGL
Hardware: [intermediate] Arduino, Raspberry Pi, Pixhawk 4, soldering, benchtop electronics equipment
Prototyping: [intermediate] 3D printing, laser cutting, woodshop
Coursework: linear controls, non-linear controls, multi-robot controls, image processing, computer vision, machine learning, game AI, data structures and algorithms, multi-threading, Android mobile applications
Communication: public speaking, technical presentations, technical writing, multi-functional teamwork, LaTeX
Interests: ultimate frisbee (Division I), quadcopter FPV flying, scuba diving (PADI open water certified), snowboarding
Spoken Languages: English (native), Flemish (native)

INTERNSHIP EXPERIENCE

Software Engineering Intern - Avionics Integration | Bell Textron Inc | Fort Worth, TX **07/2020 – 08/2020**

- Researched air-launched effects integration requirements for FARA mission via technical data sheets and development meetings.
- Implemented and validated fuzz burn chip detect module through loopback testing for early engine failure warning for DCU.

R&D Intern - Center for Cyber Defenders | Sandia National Laboratories | Albuquerque, NM **05/2019 - 07/2019**

- Engineered functionality of an automated hardware tester to increase efficiency of chip testing and analysis for an internal lab.
- Constructed ontologies and developed natural language processing techniques to categorize and structure PDF data.

RESEARCH EXPERIENCE

Undergraduate Research Assistant | Intelligent Vision and Automation Laboratory (IVALab) | Georgia Tech **08/2018 – 04/2020**

- Prototyped rectilinear motion primitive commands in Matlab for a robotic snake exploration then transcribed to ROS-Python.
- Developed ahead scan motion primitive increasing camera field of view for more detailed SLAM keypoint detection.
- Tracked robotic snake with Turtlebot using web camera through linear and angular PID control to expand snake operating range.

PUBLICATIONS

A. Faché, et al., "Marsupially-Aided Robotic Snake Exploration and Navigation of Cluttered Environments," in *Proc. Nat. Conf. Undergraduate Res.*, Kennesaw, GA, USA, Oct. 2019, pp. 526-536.

PROJECTS

Obstacle Avoidance using Adaptive Formation Control | Networked and Multi-Agent Control | Georgia Tech **11/2021 – 12/2021**

- Implementing graph theory algorithms on robots at Georgia Tech Robotarium to validate formation control theory using Matlab.

Fantasy Football Matchup Visualization Tool + MERN Web Framework | Personal Project **07/2021 – 10/2021**

- Detailed visualizations for historical fantasy matchups. Developed using web scraping, React.JS, JavaScript, MongoDB, Heroku.

Pixhawk 4 Quadcopter + YouTube Channel | Personal Project **05/2020 – Present**

- Built quadcopter using Pixhawk 4 flight controller. Created complementary step-by-step YouTube tutorials. Search: "Alex Fache".

Kidney Cancer Clinical Decision Support | Introduction to Medical Image Processing | Georgia Tech **02/2020 – 04/2020**

- Used patient tissue samples to perform preprocessing, feature extraction, and supervised learning to develop predictive models.

Property Management via Aerial Drone Imaging, Processing, Change Detection | ECE Capstone | Georgia Tech **01/2020 – 12/2020**

- Team lead using drone for data capture. Created procedures for anomaly detection through preprocessing and score analysis.

PID Ball Balancer | Introduction to Automation and Robotics | Georgia Tech **10/2019 – 12/2019**

- Assembled and programmed 3-legged platform capable of stabilizing ping pong ball using camera feed input and PID control laws.

LEADERSHIP

Peer Instructor | The Hive (Electrical and Computer Engineering Makerspace) | Georgia Tech **09/2018 - 12/2021**

- Teach and assist students to use prototyping equipment and tools for hands-on projects and engineering development.