Sina Aghli

sina.aghli@colorado.edu
Residency Status: US Permanent Resident
GitHub: //sinaaghli
LinkedIn: //sina-aghli

Notable Projects

https://sinaaghli.com/projects

Expertise

Planning, Nonlinear/Adaptive/Robust/Optimal Controls, Motion Planning, Robot Modeling, Online/Offline Model Identification, SLAM, Sensor Fusion, Nonlinear State Estimation

Education

University of Colorado Boulder 2014 – 2018
PhD in Computer Science
Mentors: Professors Christoffer Heckman, John Hauser, Gabe Sibley
Thesis: Model Identification and Control of Autonomous Ground Vehicles

George Washington University 2012 – 2014
PhD in Aerospace Eng (Transferred to CU Boulder)
Mentor: Professor Gabe Sibley

University of Tabriz 2010 – 2012
MS in Mechatronics
Thesis: Modeling, Design and Control of a Cable Driven Parallel Robotic Manipulator

Azad University 2004 – 2008
BS in Computer Hardware Engineering
Thesis: Design of an Eight Bit CPU Data-Path and Control Unit With Custom Instruction-Set in VHDL

Industry Experience

PickNik Robotics R&D Jan 2021 – Present
Motion Planning Researcher (Consultant)
I investigate application requirements and possibility of using different motion planning algorithms on a wheeled quadrupedal robot platform and plan future steps with the engineering team.

Scythe Robotics Inc Aug 2019 – Aug 2020
Senior Controls Engineer (Consultant)
Led the motion planning team to design an adaptive non-linear controller based on Contraction Analysis which reduced controller computation requirement on the robot from 40% to 2% while increasing controller update rate from 30Hz to 2KHz.

Zoox Inc June 2015 – Aug 2015
Hardware/Control Engineer
Designed multiple ECUs from scratch to communicate with the main computer of zoox's autonomous car to control steering, acceleration and brakes.

Magnelab Inc June 2015 – Aug 2018
Research Advisor
Led a team of two engineers in designing several electronic products (PCB+Firmware) related to Smart Home technologies involving signal processing and network communication algorithms.

Honors

Gold Medal in 11th Iran Skills National Contest 2011
Exceptionally Talented Student scholarship (Tabriz University, Iran) 2010
Silver Medal in Khwarizmi National Science Festival (Iran) 2010
Second Place at IRANOPEN International Robotcup Contest 2008

Research/Teaching Experience

Assistant Teaching Professor Jan 2019 – Present

Computer Science Department, University of Colorado Boulder

Developed several undergraduate courses such as Data-Structures, Computer Systems and Introduction to Robotics.

Currently working on using numerical optimization techniques on trajectories in a banach space.

Graduate Research Assistant 2014 – 2018

University of Colorado Boulder

Developed a full pipeline for motion planning, online system identification and adaptive model predictive control of autonomous vehicles. A custom 1/8th scale car was designed and mentioned algorithms were verified on the hardware in real-time.

Grant Collaboration

Co-PI of NSF-CPS grant, Learning and Verifying Conformant Data-Driven Models for Cyber-Physical Systems ($1.2M) 2020

Research Assistant for DARPA Tactical Technology Office Subterranean Challenge: MARBLE ($4.5M) 2018

Research Assistant for NSF CPS: Synergy: Verified Control of Cooperative Autonomous Vehicles ($777K) 2018

Research Assistant for DARPA Defense Sciences Office: Ninja Car ($1.04M) 2017

Publications and Patents

An Adaptive Method for Autonomous Control of Robotic Grass Cutting Machine

S Aghli, Scythe Robotics Inc.

Patented, pending publication.

Online system identification and calibration of dynamic models for autonomous ground vehicles

S Aghli, C Heckman.

IEEE International Conference On Robotics and Automation, 2018.

Path-Following though Control Funnel Functions

H Ravanbakhsh, S Aghli, C Heckman, S Sankaranarayanan.

IEEE International Conference on Intelligent Robots and Systems, 2018.

Game-Theoretic Cooperative Lane Changing Using Data-Driven Models

G Ding, S Aghli, C Heckman, L Chen.

IEEE/RSJ International Conference on Intelligent Robots and Systems, 2018.

Terrain Aware Model Predictive Controller for Autonomous Ground Vehicles

S Aghli, C Heckman.

BGSR workshop at Robotics: Science and Systems Conference 2017, 2017.

Design and Fabrication of a Worm Robot Prototype

M Noorani, A Ghanbari, S Aghli.

RSI International Conference on Robotics and Mechatronics (ICROM), 2015.