

# HAMED DAMIRCHI

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## EDUCATION

### K. N. Toosi University of Technology

M.Sc. in Mechatronics Engineering (GPA: 18.36/20)

Thesis: Deep Multimodal Localization Subsystem Implemented on the ARAS Cable Driven Robot

Tehran, Iran

Sep. 2018 – Present

### Tabriz University

B.Sc. in Mechanical Engineering (GPA: 14.53/20)

Thesis: Design and Implementation of an Attitude Stabilizer for a Mini Quad-Copter

Tabriz, Iran

Sep. 2013 – Apr 2018

## RESEARCH INTERESTS

- Motion Prediction and Scene Understanding
- Joint Perception and Prediction
- Multimodal Representation Learning
- Machine Intelligence

## PUBLICATIONS

### Conferences

- **H. Damirchi**, R. Khorrambakht, H. D. Taghirad, "[Exploring Self-Attention for Visual Odometry](#)", International Conference on Intelligent Robots and Systems (IROS), 2021 (Under Review), [arxiv.org/abs/2011.08634](#)
- **H. Damirchi**, R. Khorrambakht, H. D. Taghirad, "[ARC-Net: Activity Recognition Through Capsules](#)", International Conference on Machine Learning and Applications (ICMLA), 2020 (Accepted), [arxiv.org/abs/2007.03063](#)
- R. Khorrambakht, **H. Damirchi**, Muhamad Risqi U. Saputra, Chris Xiaoxuan Lu, "[Deep Inertial Odometry Using Preintegrated and STFT IMU Features](#)", 2021
- R. Khorrambakht, **H. Damirchi**, H. D. Taghirad, "[Preintegrated IMU Features For Efficient Deep Inertial Odometry](#)", 2020, [arxiv.org/abs/2007.02929](#)
- **H. Damirchi**, R. Khorrambakht, H. D. Taghirad, "[ARAS-IREF: An Open-Source Low-Cost Framework for Pose Estimation](#)", International Conference on Robotics and Mechatronics (Best poster paper award), 2019
- R. Khorrambakht, **H. Damirchi**, H. D. Taghirad, "[A Calibration Framework for Deployable Cable Driven Parallel Robots with Flexible Cables](#)", International Conference on Robotics and Mechatronics, 2019
- MRJ. Harandi, S. A. Khalilpour, **H. Damirchi**, H. D. Taghirad, "[Stabilization of Cable Driven Robots Using Interconnection Matrix: Ensuring Positive Tension](#)", 2019, International Conference on Robotics and Mechatronics
- MRJ. Harandi, **H. Damirchi**, S. A. Khalilpour, H. D. Taghirad, "[Point-to-Point Motion Control of an Underactuated Planar Cable Driven Robot](#)", 2019, Iranian Conference on Electrical Engineering

### Books

- M. Delrobaei, A. Riasi, **H. Damirchi**, A. Hassani, H. D. Yaghoubi, "A Biomechatronics Handbook"

## SKILLS

### Languages

- **English:** Fluent (TOEFL iBT: 114, Reading: 29, Listening: 30, Speaking: 27, Writing: 28)
- **Azeri, Persian:** Native

### Programming/Software

- **Languages:** Python, C, C++, Matlab
- **Development Platforms:** PyTorch, PyTorchLightning, TensorFlow, Keras, Qt, ROS, GTSAM
- **NLP Platforms:** Natural Language Toolkit (NLTK), TextBlob
- **Embedded Platforms:** Keil+HAL Libraries, Buildroot (Embedded Linux), Arduino
- **Developer Tools:** Git, Docker, Google Cloud Platform
- **CAD/CAM:** CATIA, SolidWorks, Altium Designer, Fusion 360

## RESEARCH EXPERIENCE

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### Autonomous Robotics Group at ARAS Labs

Global Localization for a Large-Scale Cable Robot

Thesis  
Tehran, Iran

- Collected a dataset consisting of data from a BumbleBee stereo camera, four encoders, four force sensors, one downward facing monocular camera and an IMU
- The data from one stream of camera images is used alongside the IMU readings to provide egomotion estimates. The result is fused with the data from the encoder to achieve global localization in an accurate and robust manner.

### Autonomous Robotics Group at ARAS Labs

Cryptocurrency Price Direction Forecasting

Research Assistant  
Tehran, Iran

- Used historical data alongside sentiment analyses of Reddit and major news sources to predict the direction of the next-day price movement.
- The RNN based pipelines were compared against classical time series forecasting methods such as SARIMAX.

### Parallel and Cable Robotics Group at ARAS Labs

Universal Cable Robot End-Effector

Research Assistant  
Tehran, Iran

- In collaboration with a colleague, an end-effector was designed in order to house a sensor array and allow for data collection.
- A DAQ system was also devised where a node was mounted with each anchor point and the CAN protocol was used to transfer data from each actuator to the central system.

### Tabriz University Robotics Group

Quadcopter Attitude Estimation

Thesis  
Tabriz, Iran

- Design, implementation and control of a mini quad copter with a cascaded PID controller.
- The goal of this project was to evaluate the efficiency of different filter-based methods such as KF, EKF, UKF and the complementary filter in estimation of a quad-copter's attitude.

### Tabriz University Robotics Group

Custom Robotic Arm

Undergraduate  
Tabriz, Iran

- Design and implementation of a robotic arm. An Arduino based system was developed in order to control a miniature robotic arm.
- Nonlinear regression methods were used to model the inverse kinematics of the arm.

## TEACHING EXPERIENCE

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2015, Tabriz University, Iran Teaching Assistant, Robotics, Faculty of Mechanical Engineering

2016, Tabriz University, Iran Tutor, Introduction to Robotics, Scientific Association of Mechanical Engineering Department

2017, Tabriz University, Iran Teaching Assistant, Robotics, Faculty of Mechanical Engineering

2017, Tabriz University, Iran Tutor, Programming with C++, Scientific Association of Mechanical Engineering Department

### NOTABLE GRADUATE COURSES

- Machine learning
- Data Fusion
- System Identification
- Control in Robotics
- Advanced Control
- Mechatronics
- Biomechatronics

### ONLINE COURSES

- Intro to Deep Learning Course Instructed by Prof. Hinton on Coursera
- Deep Learning Specialization Course Instructed by Prof. Ng on Coursera
- Introduction to Self-Driving Cars Course Instructed by Prof. Waslander on Coursera

## REFERENCES

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**Prof. Hamid D. Taghirad**

*Faculty of Electrical Engineering*

*K. N. Toosi University of Technology*

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