Sadra Naddaf

GRADUATE STUDENT · COMPUTER ENGINEER

Beaumont, TX, U.S.A.

☐ (+1) 409-499-1613 | ✉ naddafsadra@gmail.com | snaddafsharg@lamar.edu | ⌂ sadra.dev | � sadransh |

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Education

Lamar University (LU) *Beaumont, TX*

DOCTORATE IN ELECTRICAL ENGINEERING *Aug. 2019 - Present*

MASTER OF COMPUTER SCIENCE *Aug. 2020 - present*

- GPA : 4.0/4.0

Ferdowsi University of Mashhad (FUM) *Mashhad, Iran*

B.SC. IN COMPUTER ENGINEERING *Sep. 2013 - Sep. 2018*

- Thesis Title : Multiple Magnet Localization with Medical Applications

Skills

Programming	C/C++, Matlab, Node.js., Python **Familiar:** HTML, Node add-ons, Linux Shell Programming, device tree (DTS).
	ARM ST controller(STM32Cube, eclipse),RTOS
Embedded Sys.	**Experienced:** Linux-Based Embedded Sys. (e.g., NVIDIA Jetson, raspberry pi, Odroid).
	Familiar: AVR and ARM LPC series, Arduino, TI MSP microcontrollers (code composer, MSP432E4 series)
Circuit Design	Altium Desinger, Proteus(simulation).
Robotics	ROS(Robot Operating System), robotics principles, sensors, modules, MoCap.
Database	NoSQL (MongoDB) , relational Database under course (database principals).
Machine Vision	**Experienced:** Pytorch, Matlab, OpenCV, Intel RealSense Cameras. **Familiar:** Spark, Tensorflow, Keras.
Other	Microsoft Office, TEX, Visual studio, Eclipse, VScode, git, Docker, Linux OS command line.

Experience

Weld Inspection and Defect Analysis based on X-ray Images and Time-series Data *Beaumont, TX*

RESEARCH ASSISTANT, STANLEY BLACK AND DECKER - RICS LAB *December 2020 - Present*

- Funded by Stanley Black and Decker.
- Experienced with State of the art DNNs for both Image and TS Data.
- Hands-on with python, Keras, PCA, T-SNE, K-means and etc.
- Data Cleaning, annotating, compressing, clustering, feature engineering, multivariate analysis.

Road Damage Object Detection and Classification Using SOTA Deep CNN *Beaumont, TX*

RESEARCH ASSISTANT, RICS LAB *May. 2020 - Present*

- Experienced with State of the art Object Detection Deep ConvNets.
- Hands-on with python, pytorch, and SOTA research platforms(e.g., detectron2 ...)
- Implemented a family of modern, scalable and efficient damage detectors with AP_{50} 53.6, F1-score 56.5% and Inference Time 200 images/sec.
- Got familiar with different methods to enhance the process of training and deploying a network (e.g. AA, RA, mixed precision training, ensemble methods, TTA, ...)
- Contributed to several Open-source GitHub repositories e.g. google/autoML, bbaug.

SLAM-Based 3D reconstruction on mobile robot and Motion Capture(MoCap) Analysis of multiple Drones. *Beaumont, TX*

RESEARCH ASSISTANT, RICS LAB *Oct. 2019 - May 2020*

- Technologies: ROS, MIT racecar platform, Intel Realsense Cameras, NVIDIA Jetson Boards, Crazyflie Drones, Motion Capture Cameras.
- Performed 3D reconstruction of areas with sparse features(e.g. tunnels) in realtime on mobile robot platform and implementation of swarm algorithms.
- Fused different Odometry sources using EKF.(IMU, VIO, Wheel).
- Experienced with different ROS tools e.g., RTABMAP, RVIZ, TF.
- Developed an Interface for linking MoCap,ROS and Matlab.

Coral Detection and classification by Image Segmentation *Beaumont, TX*

FREELANCE *March. 2020 - May. 2020*

- Pre-processed images using PIL and OpenCV and annotated dataset. Augmentaed Dataset(3x) which enhanced result by 5%.
- Trained and Compared different models e.g. Segnet, FCN, UNet, PSPNet with several backbones ResNet-50, VGG-16.
- Performed Image Segmentation on images with 8 different categories of corals with the accuracy of mIoU 60.1 %.

FUM Bionic Hand-III R&D Project

Mashhad, Iran

EMBEDDED SOFTWARE ENGINEER AND RESEARCH ASSISTANT, FUM ADVANCED ROBOTICS LAB

Mar. 2016 - May. 2019

- Tools: ARM STM32, Altium Designer, WIZ5500, LIS3MDL, RTOS.
- Performed Simulation and Machine Learning for localizing Magnet(s).
- Designed several Electronic board, programmed ARM micro-controllers and Implemented Device Drivers for several modules.
- The 'Fum Bionic Hand-III is a project to develop a bionic hand that aims to rehabilitate disabled people. The exclusive characteristic of this device is the reproduction of body's muscle muscle movement by detecting movements through magnet's movements, which is implanted inside the body. My thesis was based on localizing and tracking magnets to mimic actual body muscle movements.
- At the moment, magnets are implemented in hand of a disabled person and the development is on going.

CRM Web-Application (Ordered by Khorasan Newspaper)

Mashhad, Iran

NODE.JS BACK-END DEVELOPER

Sep. 2017 - Jun. 2018

- Designed back-end and back-end programming of a CRM web application due to order Of Khorasan Newspaper.
- Developed using MongoDB and Node.js, REST API (front-end is Angular 4)
- To the best of my knowledge the product is in use by the marketers of the company.

Pasokhplus Software Development Team

Tehran & Mashhad, Iran

BACK-END DEVELOPER, COMPUTER VISION DEVELOPER

Sep. 2016 - Feb. 2019

- Pasokhplus is a mobile software started by Ferdowsi University Students, which aims to Speed up the process of grading multiple-choice Tests. This software can grade a multiple Choice test Answer sheet in less than 300ms with Image processing (depend on the System). See Pasokhplus.ir (in Persian)
- Developed C++, OpenCV, and Node.js Add-on library partly for a server's back-end. Ordered by Rose Computer System Inc(AWS EC2 & docker).
- The product is a now a part commercial products(Lernito app platform and Pasokhplus Android Application.)
- Developed and Synchronized a part of the library to be compatible with Cordova plug-ins for IOS.

Robotics Association

Mashhad, Iran

EMBEDDED DESIGNER AND DEVELOPER

Aug. 2015 - Apr. 2016

- Developed RFID gesture detection For FUM Bionic Hand-I, resulted in one patent and one paper publication.
- Experienced in designing and implementing Security Door lock Based on RFID. Used as prototype of a commercial product. Implemented in freeRTOS.
- Designed and Implemented IoT devices with Application in Building Management Systems. Used as prototype for fundraising (RFID-Wireless modules(ESP12)-Touch Sensors)

Honors & Awards

2020	**4th Place ,** IEEE BigData Big Cup Challenge - Road Damage Detection 2020(among USA participants)	*Atlanta, GA, USA*
2018	**3rd Place,** RoboCup IranOpen International Competitions - Fum-BionicHand in senior Demo League	*Tehran, Iran*

Teaching Experiences

2017	**Introduction to Computer Engineering Course,** Assistant	*Mashhad, Iran*
2017	**Artificial Intelligence Course,** Assistant Team Member	*Mashhad, Iran*
2017	**Robotics principles Course,** Assistant	*Mashhad, Iran*
2016	**STM32 ARM microcontroller Programming Courses(two courses),** Assistant	*Mashhad, Iran*

Selected Publications

AN EFFICIENT AND SCALABLE DEEP LEARNING APPROACH FOR ROAD DAMAGE DETECTION

2020

Sadra Naddaf-sh, M-Mahdi Naddaf-sh, Amir Kashani, Hassan Zargarzadeh

Accepted at IEEE BigData

FAULT DIAGNOSIS AND PROGNOSIS TECHNIQUES FOR COMPLEX ENGINEERING SYSTEMS

2021

Accepted - In Press

Elsevier Book Chapter

NEXT-GENERATION OF WELD QUALITY ASSESSMENT USING DEEP LEARNING AND DIGITAL RADIOGRAPHIC IMAGES

2020

M-Mahdi Naddaf-Sh, Sadra Naddaf-Sh, Hassan Zargaradeh, Mohammad R. Zahiri, Amir R.Kashani

AAAI Spring Symposium

ROBUST REAL-TIME MAGNETIC-BASED OBJECT LOCALIZATION TO SENSOR'S FAULT USING RNN

2019

S. Naseri-G, H. Rafei, M. Akbarzadeh, A. Akbarzadeh, A. Naddaf and S. Naddaf shargh

9th ICCKE

SIMPLIFYING USER INTERACTION SOLUTIONS FOR THE FUM BIONIC HAND-I

2016

S. Bahrami M., Hamed Jafarzadeh, Sadra Naddaf, Sina Darvishi, Seyyed Alireza Esfahani, Pouya Pishbin, Farsad Babazadeh, Aryan Makhdoumi, Alireza Akbarzadeh, and Ahmad Hajipour

4th Int. Conf. on Robotics and Mechatronics (ICROM)