Sadra Naddaf

GRADUATE STUDENT · COMPUTER ENGINEER

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Education

Lamar University (LU) *Beaumont, TX*

DOCTORATE IN ELECTRICAL ENGINEERING

MASTER OF COMPUTER SCIENCE *Aug. 2019 - 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

Experience

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

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

- Experienced with State of the art DNNs (Classification, Object Detection, Bayesian, GAN) for both MTS and Images.
- Data cleaning, annotating, compressing, clustering, feature engineering, multivariate analysis, major pre-processing, wavelet Transforms.
- Configured Deep learning infrastructure for RICS Lab.
- Proposed a set of scalable weld defect detection and provided interpretability for deep models in the pipeline.
- Predicting uncertainty in CNN models with Bayesian CNN.
- Fully-Funded by Stanley Black and Decker AI Lab for entire doctoral course.

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

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

- 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.
- 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 sand 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.

Selected Publications

REAL-TIME EXPLAINABLE MULTI-CLASS OBJECT DETECTION FOR QUALITY ASSESSMENT IN 2-DIMENSIONAL RADIOGRAPHY IMAGES *2021*

Sadra Naddaf-Sh, M-Mahdi Naddaf-Sh, Hassan Zargarzadeh, Maxim Dalton, Soodabeh Ramezani, Gabriel Elpers, Vinay Baburao, Amir R. Kashani

Accepted - In publication at Complexity Journal (IF:2.8)

DEFECT DETECTION AND CLASSIFICATION IN WELDING USING DEEP LEARNING AND DIGITAL RADIOGRAPHY *2021*

M-Mahdi Naddaf-Sh, Sadra Naddaf-Sh, Hassan Zargarzadeh, Sayyed M Zahiri, Maxim Dalton, Gabriel Elpers, Amir R Kashani

Elsevier Book Chapter

AN EFFICIENT AND SCALABLE DEEP LEARNING APPROACH FOR ROAD DAMAGE DETECTION *2020*

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

IEEE BigData

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)

Skills

Programming	C/C++, Matlab, Node.js., Python **Familiar:** HTML, Node add-ons, Linux Shell Programming, device tree (DTS).
Embedded Sys.	ARM ST controller(STM32Cube, eclipse),RTOS **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, robotics principles, sensors, modules, MoCap.
Database	NoSQL (MongoDB)
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.

Honors & Awards

2020	**4th Place** , IEEE BigData Big Cup Challenge - Road Damage Detection 2020(among USA participants)	*Atlanta, GA, USA*
2019-2022	**Full - Financial Support,** Received full financial support as RA for entire doctoral from Stanley B&D	*Beaumont, TX*
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*