






REZA KARIMZADEH



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EDUCATION

SHARIF UNIVERSITY OF TECHNOLOGY

Tehran, Iran

MASTER OF SCIENCE IN BIOMEDICAL ENGINEERING

Sep. 2019 – May 2022

- **Thesis:** “Medical Image Segmentation Using Deep Learning Methods” , [PDF](#) **Advisors:** Prof. Fatemizadeh, Prof. Arabi
- **GPA:** 17.10/20

AMIRKABIR UNIVERSITY OF TECHNOLOGY

Tehran, Iran

BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING

Sep. 2014 – Sep. 2019

- **Thesis:** “Design and implementation of brain surgery bipolar electrocoagulation simulator using haptic technology” , [PDF](#) **Advisor:** Prof. Azarnoush
- **GPA:** 16.44/20

PUBLICATIONS

• JOURNAL PAPERS

- ✳ **Karimzadeh R.**, Fatemizadeh E., Arabi H., Zaidi H.; “*Organ Morphology Loss Function: an approach to enforce deep neural networks to learn shape for medical images segmentation*”, Journal of Nuclear Medicine, Vol. 63, Issue supplement 2 June 1, 2022. [Link](#)
- ✳ **Karimzadeh R.**, Sheikh J., Azarnoush H., Arabi H.; “*Design and implementation of brain surgery bipolar electrocautery simulator using haptic technology*”, Springer International Publishing, Iranian Journal of Science and Technology, Transactions of Electrical Engineering, [Link](#)
- ✳ **Karimzadeh R.**, Fatemizadeh E., Arabi H.; “*A novel shape-based loss function for machine learning-based seminal organ segmentation in medical imaging*”. [arXiv Link](#)

• CONFERENCE PAPERS

- ✳ **Karimzadeh R.**, Fatemizadeh E., Arabi H.; “*Attention-based deep learning segmentation: Application to brain tumor delineation*”; 28th National and 6th International Iranian Conference on Biomedical Engineering (ICBME), November 2021, Pages 248-252. [Link](#)
- ✳ **Karimzadeh R.**, Rajabi N., Fatemizadeh E., Arabi H.; “*3D dilated and residual convolutional neural network for COVID-19 detection from the chest computed tomography*”; 28th National and 6th International Iranian Conference on Biomedical Engineering (ICBME), November 2021, Pages 33-37. [Link](#)
- ✳ Rasti A., **Karimzadeh R.**, Zarei A., Ghaffari A.; “*A Non-contact heart rate estimation framework based on photoplethysmography amplitude variation elimination and data fusion*”; 28th National and 6th International Iranian Conference on Biomedical Engineering (ICBME), November 2021, Pages 236-241. [Link](#)
- ✳ **Karimzadeh R.**, Fatemizadeh E., Arabi H., Zaidi H.; “*Knowledge distillation: a strategy to enhance performance of deep learning-based seminal segmentation*”; IEEE NSS and Medical Imaging Conference 2021. [Link](#)
- ✳ **Karimzadeh R.**, Fatemizadeh E., Arabi H., Zaidi H.; “*Prediction error propagation: A novel strategy to enhance performance of deep learning models in seminal segmentation*”; IEEE NSS and Medical Imaging Conference 2021. [Link](#)

* **Karimzadeh R.**, Rajabi N., Khodabakhsh A., Taghavi F., Fatemizadeh E., Arabi H., Zaidi H; "X-Net: A novel deep learning architecture with high-resolution feature maps for image segmentation"; IEEE NSS and Medical Imaging Conference 2021. [Link](#)

* TaghiBeyglou B., **Karimzadeh R.**, Bagheri F., Bayani A., Azarnoush H.; "New Platform for Automatic Iranian License Plate Detection and Recognition using Deep Learning Techniques"; Sixth National Congress on Electrical Engineering and Computer Engineering of Iran with a New Approach to New Energy. [Link](#)

• BOOK CHAPTER

* Abouie V., Taghizadeh S., Froozanfar A., **Karimzadeh R.**, Shaygan S., et al.; 2021; Medical Equipment Book, chapter: "Medical Imaging systems", (in persian language), [PDF](#)

RESEARCH INTERESTS

- Medical Image Processing / Image Segmentation / Deep Convolutional Neural Networks
- Computer Vision / Deep Learning / Machine Learning

SELECTED ACADEMIC PROJECTS

• COLLABORATION WITH PINLAB, GENEVA UNIVERSITY HOSPITAL

PET INSTRUMENTATION AND NEUROSCIENCES LAB (PINLAB). [Link](#)

* Organs at risks and Tumor segmentation with deep learning methods.

* COVID-19 diagnosis from CT images using deep learning.

• NATIONAL ELITES FOUNDATION PROGRAM

* Non-contact vital signs (Heart Rate and SPO_2) measurement using RGB camera image sequence.

In this teamwork project, we design and implement many methods to capture vital signs: 1) phone app. that exploits phone camera and user fingertip for HR estimation 2) design and implement pulse-oximeter device 3) develop an algorithm for HR estimation using face video 4) design and implement a setup for HR and SPO_2 extraction from the palm image sequence. [Github Link](#)

• DEEP LEARNING

* Image captioning system using Recurrent Neural Network (RNN) and Convolutional Neural Networks (CNN) trained with coco dataset. [Github Link](#) *Deep Learning Course Project*

* Generate fake images by exploiting Generative Adversarial Networks (GAN) and Conditional Variational Auto Encoders (CVAE). [Github Link](#)

* Three layer Multi-Layer Perceptron (MLP) from scratch for image classification. [Github Link](#)

* Predict the second hemistich of Shahnameh's couplet poem (Iranian epic poem book) using Recurrent Neural Networks (RNN). [Github Link](#)

• IMAGE PROCESSING AND COMPUTER VISION

* Video Synopsis. [Github Link](#) *Computer Vision Project*
Summarize long videos into a shorter time.

* Article Reproduction; "MRI noise estimation and denoising using non-local PCA" [Github Link](#)
Image Processing Project

* Implement image Stitching and panorama algorithm from scratch. [Github Link](#)

* Extract Eigenfaces from face images and reconstruct a face with weighted sum of eigenfaces. [Github Link](#)

• DESIGN AND IMPLEMENTATION OF ELECTRICAL DEVICES

* Digital Device for Measuring Blood Pressure. [Github Link](#)

In this work, an electrical device was designed and implemented to inflate a medical cuff and measure blood pressure with a pressure sensor and an AVR microcontroller.

* Electrocardiograph (ECG) Visualizer Device. [Github Link](#)

In this work, a PCB was designed and implemented to acquiesces and amplify ECG signals from Stuck electrodes to the body.

* Digital Piano Touch Keypad. [Github Link](#)

Made a piano using a touch keypad and ARM microcontroller.

* Design and Simulation of a MAZE game by AVR Programming. [Github Link](#)

Design a simple game by AVR and simulating in proteus.

WORKING EXPERIENCE

PART ARTIFICIAL INTELLIGENCE COMPANY

Oct. 2022 - Jan. 2023

Developer in Computer Vision Team

- Working on real-life challenges and trying to facilitate them with computer vision techniques

VIRA ARTIFICIAL INTELLIGENCE START UP

May 2022 - present

Co-Founder

- Working on clinical for better diagnosis and treatment planning in contract with clinics

ELECTRO-XRAY COMPANY

Summer 2017

ENGINEERING INTERN

- Becoming familiar with Repair and maintenance of imaging systems such as MRI, CT, Portable Radiology device, Angiography, C-Arm, Mammography and OPG

TEACHING EXPERIENCE

WORKSHOP TUTOR | *Deep Learning Coding Using Tensorflow*

winter 2022

- Deep Learning workshop at first international congress on 'Advanced Health Technologies-Artificial Intelligence in Medicine' , [Github Link](#)

TEACHING ASSISTANT | *Deep Learning*

Fall 2021

- Department of Electrical Engineering, Sharif University of Technology

Supervisor: Prof. Fatemizadeh

TUTOR | *From Basic Python to Deep Learning Coding*

Summer 2021

- Public Virtual Tutorial

TEACHING ASSISTANT | *Medical Images Analysis and Processing*

Spring 2021

- Department of Electrical Engineering, Sharif University of Technology

Supervisor: Prof. Fatemizadeh

TEACHING ASSISTANT | *Medical Imaging Systems*

Spring 2021

- Department of Electrical Engineering, Sharif University of Technology

Supervisor: Prof. Vosough Vahdat

TEACHING ASSISTANT | *Image Processing*

Fall 2018

- Department of Biomedical Engineering, Amirkabir University of Technology

Supervisor: Prof. Azarnoush

LANGUAGES

English (Professional Working Proficiency)

Persian/Farsi (Native)

TECHNICAL SKILLS

| | |
|-----------------------------------|--|
| Programming Languages: | Python, C/C++, Assembly |
| Python Selected Libraries: | Pytorch, Tensorflow, Keras, OpenCV, Matplotlib, Numpy, Scipy |
| Software Simulators: | Matlab, Simulink |
| Hardware Simulator: | Pspice, LTspice, Proteus, Altium Designer |
| Microcontrollers: | AVR, Arduino (CodeVision, Atmel Studio) |
| Typesetting: | T _E X, Microsoft Office(Word, Powerpoint, Excel) |
| Operating Systems: | Windows, Ubuntu |

HONORS & AWARDS

IRAN'S NATIONAL ELITES FOUNDATION

- Being a member, due to standing among top students of university.

TRAINEE GRANT IN NSS AND MEDICAL IMAGING CONFERENCE 2021

- Granted for conference due to numerous contributions.

M.Sc. NATIONAL UNIVERSITY ENTRANCE EXAM

- Achieved the 80th place in the national M.Sc entrance exam in Electrical Engineering among 40,000 students.

B.Sc. NATIONAL UNIVERSITY ENTRANCE EXAM

- Ranked in the top 0.3% among 222,500 students in the national university entrance exam in mathematics and physics discipline.

HOBBIES

SPORTS: Football(Soccer), Hiking

ART: Play Setar(Traditional Iranian Instrument), Pencil Drawing

READ BOOK: Persian Poems, History, Psychology

REFERENCES

Assoc. Prof. Hossein Arabi, Department of Medical Imaging, Geneva University Hospital

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Asst. Prof. Hamed Azarnoush, Department of Biomedical Engineering, Amirkabir University of Technology

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Asst. Prof. Bijan Vosoughi Vahdat, Department of Electrical Engineering, Sharif University of Technology

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