

# ARMAN HAGHANIFAR

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## WORK EXPERIENCE

### Graduate Research Assistant

University of Saskatchewan

📅 Oct 2019 – Present

📍 Saskatoon, SK

- Classification of dental caries in dental radiography with ensemble transfer learning and capsule network
- Automated segmentation of teeth in dental radiography using image processing techniques and genetic algorithm
- Visual screening of COVID-19 viral pneumonia in frontal chest x-rays using deep transfer learning

### Data Mining Engineer

Vesta Talk Aria (Vestaak)

📅 Apr 2018 – Aug 2018

📍 Tehran, Iran

- Implementation of Situation Recognition Tree-based Service (SitRTS) with graphical interface using Graphviz
- Text extraction from multilingual PDF files of job applicants and ranking them based on skills and competencies
- Web crawling with Selenium/lxml and data crawling with Instagram, Telegram and Twitter APIs

## SELECTED PROJECTS

### Localization, Segmentation, and Classification of Scars in Swine Carcasses

- Detection of carcass using YOLO v4 and tracking it through the video. Using Siamese network to find best view angle(s)
- Segmentation of scars with U-net and classification with a feed-forward neural network

### Canine Disease Diagnosis based on Chemical Tests [GitHub]

- Preprocessing and analysis of chemical tests (blood-work data) performed at the College of Vet. by PDS Inc.
- Application of XGBoost and MLP for multi-label and multi-class classification

### Pneumonia Identification and Segmentation in Chest X-rays

- Two-stage classifier/segmentor using EfficientNet, ResNeXt and SE-ResNeXt as backbones of U-Net

### COVID-19 Pneumonia Screening in Frontal Chest X-rays [GitHub]

- Transfer Learning based on CheXNet and visualization of the results using Grad-CAM and LIME to evaluate localization
- Providing the largest dataset of frontal chest x-rays from COVID-19 patients

### Electric Vehicles Fueling Data Analysis with Machine Learning [GitHub]

- Comparing ML algorithms in terms of consumption rate deviation classification and driving range estimation
- Building a dataset of fueling records by crawling data from SpritMonitor website using Selenium

### Tooth Segmentation and Dental Caries Classification in Panoramic Images [GitHub]

- Tooth segmentation from panoramic radiography with enhanced Sauvola thresholding, snake segmentor and genetic algorithm
- Classification of segmented teeth using fine-tuned models as feature extractors and capsule network

## TECHNICAL SKILLS

Programming Languages:

Python 3.x



MATLAB, GNU Octave



C/C++



VHDL, Verilog



Java



Python Libraries:

TensorFlow 2.x/Keras



Numpy, Scipy, Pandas



OpenCV, Scikit-Image



Selenium, SQLAlchemy



PySpark



Matplotlib, GraphViz



General Tools:

Git



PostgreSQL



LaTeX



Windows



Linux (Ubuntu)



## SOFT SKILLS

Teamwork

Critical Thinking

Decision Making

Problem Solving

Creativity

Willingness to Learn

## EDUCATION

### MSc in Biomedical Engineering

University of Saskatchewan (USask)

📅 Sep 2019 – Now

📍 Saskatoon, SK

- Research Area: Medical Image Processing, Application of Deep Learning/ Machine Learning in Healthcare

### BSc in Electrical Engineering – Electronics

Iran University of Science and Technology (IUST)

📅 Sep 2013 – Mar 2018

📍 Tehran, Iran

- Research Area: Machine Learning, Fuzzy Logic, Evolutionary Algorithm, Computer-Aided Diagnosis

## HONORS & AWARDS



Received Full funding for graduate studies at the University of Saskatchewan.



Won 1<sup>st</sup> place in IoT Hackathon 2016 held by Iran's Internet of Things Free Society.



Ranked 1347<sup>th</sup> among 260,000 participants in the nation-wide university entrance exam.

## PUBLICATIONS

- A. Haghanifar, A. Amirkhani and M. R. Mosavi, "Dental Caries Degree Detection based on Fuzzy Cognitive Maps and Genetic Algorithm," 26<sup>th</sup> Iranian Conference on Electrical Engineering (ICEE), Mashhad, Iran, 2018, pp. 976–81
- A. Amirkhani, A. Haghanifar and M. R. Mosavi, "Electric Vehicles Driving Range and Energy Consumption Investigation: A Comparative Study of Machine Learning Techniques," 5<sup>th</sup> Iranian Conference on Signal Processing and Intelligent Systems (ICSPIS), Shahrood, Iran, 2019, pp. 1–6
- A. Haghanifar, M. M. Majdabadi and S. B. Ko, "Automated Teeth Extraction from Dental Panoramic X-Ray Images using Genetic Algorithm," 2020 IEEE International Symposium on Circuits and Systems (ISCAS), Seville, Spain, 2020
- M. M. Majdabadi, A. Haghanifar and S. B. Ko, "MSG-CapsGAN: Multi-Scale Gradient Capsule GAN for Face Super Resolution," 2020 International Conference on Electronics, Information, and Communication (ICEIC), Barcelona, Spain, 2020, pp. 1–3
- A. Haghanifar, M. M. Majdabadi, Y. Choi, S. Deivalakshmi and S. B. Ko, "COVID-CXNet: Detecting COVID-19 in Frontal Chest X-ray Images using Deep Learning," arXiv preprint arXiv:2006.13807, 2020 (under review)
- A. Haghanifar, M. M. Majdabadi, S. B. Ko and S. Haghanifar, "PaXNet: Dental Caries Detection in Panoramic X-ray using Ensemble Transfer Learning and Capsule Classifier," arXiv preprint arXiv:2012.13666, 2020 (under review)
- A. Haghanifar and S. B. Ko, "AuGAN: Efficient Image Augmentation with Generative Networks; Boosting CNN Performance on Small Datasets," (in preparation)