Reza Katebi

Senior Machine Learning Engineer, Vision R&D, Tesla
Deep Learning and AI Researcher
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Work Authorization: Green Card (Eb2)

Programming & Computer Skills

- Artificial intelligence, computer vision, machine/deep learning, and model design in Python (Tensorflow, Pytorch, Keras, OpenCV, scikit-learn, sickit-image, pandas, Juptyer Notebook, numpy, and scipy) 5+ years
- Data cleaning, analysis, exploration, statistics, and visualization using Python, R, and IDL 7+ years
- Model optimization and deployment for cloud and edge computing 3+ years
- *Programing*: Python, BASH, IDL, and C/C++,
- Software version control and deployment using Git, Docker, and AWS cloud infrastructure
- *Softwares*: LaTeX, Orange, Paraview, Mathematica, and Maple

Experience

Senior Machine Learning Engineer, Vision R&D, Tesla Inc Feb 2022 - Present

Leading the research and development of computer vision and machine learning solutions for highly visible and critical projects across all Giga Factories.

- Leading the machine learning and computer vision design of an automated inspection software to be used across all Giga Factories.
- Leading the design of defect detection product leveraging machine learning, computer vision, and patterned lighting to be used across all Giga Factories.
- Leading the design of alignment measurement product leveraging machine learning and computer vision.

Senior Quality Inspection Engineer - ML/CV Tech Lead, Tesla Inc Feb 2022 - Oct 2022

Lead the design of computer vision and machine learning solutions for automating quality inspections of the Tesla products across all Giga Factories in Vision Automation Team. These quality inspection solutions include hardware selection and control, computer vision and machine learning architecture, and deployment on the manufacturing line.

Senior Advanced Artificial Intelligence Engineer, Honeywell Oct 2020 - Feb 2022

Lead a team of scientists and engineers on designing, deployment, and maintenance of innovative end-to-end deep learning and machine learning pipelines for computer vision, physics-based artificial intelligence, and remote sensing. Overseeing the project progress from concept validation to product launch. Ensuring successful deliverables to customers by tracking the project KPIs.

- Lead a team of scientists and software engineers on designing, deployment, and maintenance of an end-to-end pipeline to detect gas leaks and flames using Gas Cloud Imaging (GCI), physics, computer vision, and artificial intelligence (**link** to the product page).
- Lead the design, deployment, and maintenance of an end-to-end pipeline to detect elevated human skin temperature utilizing machine learning using Pytorch and classical computer vision using OpenCV on a remote sensing machine (**link** to the press release).

Senior Advanced Data Scientist, Honeywell Robotics June 2020 - Sept 2020

Lead the design and deployment of end-to-end deep learning and machine learning pipelines for computer vision and robotics vision. Overseeing the project progress from concept validation to product launch. Ensuring successful deliverables to customers by tracking the project KPIs.

- Architect and deploy a machine learning pipeline utilizing semantic segmentation models such as Mask-RCNN model for a packet-picking robotic arm for warehouse optimization using Tensorflow, Pytorch and OpenCV.
- Designing the point cloud perception of the robot for depth estimation and planning.
- Optimizing the models for edge devices to reduce inference time and cost.

Advanced Data Scientist, AI Engineering Focal in SIoT, Honeywell Nov 2019 - June 2020

Lead the design and deployment of end-to-end deep learning and machine learning pipelines for warehouse inspection and computer vision for SIoT division. Mentoring and leading junior data scientists in project implementation, by providing code reviews, and technical support. Preparing reports for higher level executives. Defining the direction of the software part of the project by tracking the project KPIs and ensuring successful deliverables to customers.

- Acting as an engineering focal on overseeing the design and deployment of global projects in SIoT division by overseeing data science efforts and providing technical consultation.
- Lead the design, deployment, and maintenance of an end-to-end pipeline to extract, mask, and classify bioaerosols utilizing machine learning using Pytorch, and classical computer vision using OpenCV on a SIoT device that incorporates Azure cloud infrastructure for inference and brought it from concept to a product that is currently in market (**link** to the press release).

Senior Data Scientist, Honeywell Jan 2019 - Nov 2019

Lead the design and deployment of end-to-end deep learning and machine learning pipelines for industrial robotics, warehouse inspection, computer vision, and SIoT. Engaging with customers in concept validation, pipeline design, and maintenance and helping them to define better KPI's for project success and maximize project ROI.

- Architect and deploy a machine learning pipeline utilizing semantic segmentation Mask-RCNN model for a packet-picking robotic arm for warehouse optimization using Tensorflow, Pytorch and OpenCV in python environment. The model is optimized to increase inference on the edge computational unit being used for the robot.
- Architect and deploy a pipeline to extract, mask, and to classify bioaerosols utilizing machine learning using Pytorch, Tensorflow, and classical computer vision using OpenCV.
- Lead the design and deployment of machine learning pipelines on embedded devices for image enhancement and restoration utilizing Generative Adversarial Networks (GANs) and U-net models for SIoT using Tensorflow and TensorRT in Python environment.
- Architect machine learning pipelines for object detection, segmentation, and classification and utilize pruning and quantization to optimize the inference for SIoT and robotics.

Education

Ph.D. in Physics, Ohio University, Athens, Ohio, USA Sep 2014 - Oct 2019
Supervisor: Prof. Ryan Chornock
Thesis: "Nuclear outbursts in the centers of galaxies"

- Developed a new method using a modern deep learning technique to predict galaxy morphologies
- Acquired and processed gigabytes of data from multiple telescopes (MDM, Swift, Magellan) using different instruments and large sky surveys (PS1, SDSS, and COSMOS)
- **Analytics**: sampling, statistics, interpolation/extrapolation, binning/clipping, multi-functional fitting, data modeling, model validation/testing, optimization, noise reduction, brightness profiles, Chi-squared fitting, Gaussian filters

M.Sc. in Physics, California State University at Fullerton, Fullerton, CA, USA Aug 2013 - Aug 2014
GPA: **3.9/4.0**, *Supervisor:* Prof. Geoffrey Lovelace
Research: "Numerical simulation of highly spinning binary black holes for LIGO gravitational wave detections."

B.Sc. in Physics, Yasuj University, Yasuj, Iran Sep 2008 - Jun 2011
GPA: **3.8/4.0**, Magna cum laude, *Supervisor:* Prof. Hossein Hendi

Fields of Interest Machine & Deep Learning • Computer Vision • Astrophysics • High Performance Computing • Big Data • Data Analysis

Selected Publications

• **Katebi, R.**, Zhou, Y., Chornock, R., and Bunescu, R. (2019). Galaxy morphology prediction using capsule networks. Monthly Notices of the Royal Astronomical Society, 486(2), 1539-1547.
• **Katebi, R.**, Chornock, R., Berger, E., Jones, D. O., Lunnan, R., Margutti, R., et al. (2019). PS1-13cbe: The Rapid Transition of a Seyfert 2 to a Seyfert 1. Monthly Notices of the Royal Astronomical Society, 487(3), 4057-4070.

Press

• Phys.org (November 18, 2018): Rapid 'turn-on' of a nuclear transient observed by astronomers (see the **Link**)
• Ohio University Arts and Sciences Forum (October 17, 2018): Katebi's Class Project Leads to More Accurate Way to Classify Galaxy Images (see the **Link**)

Invited Talks

- PandA GradS Alumni Industry Night, Ohio University 11/20/2020
- Examining extreme nuclear variability in the galaxies that host Active Galactic Nuclei at 233rd American Astronomical Society meeting at Seattle, WA 1/10/2019
- Generative adversarial Networks (GANs) at Atlanta Deep Learning Meetup 10/12/2018
- Classifying galaxies using deep learning at PyData Atlanta Meetup 10/11/2018
- Capsule Networks vs Convolutional Neural Networks (CNNs) at Atlanta Deep Learning Meetup 09/10/2018

Fun Facts

Judo, and Brazilian Jiujitsu practitioner, Enjoys playing chess and piano