Erfan Hamdi

Mechanical Engineering Student
erfan.hamdi@gmail.com | erfanhamdi.github.io | erfanhamdi

Education

Sharif University of Technology *Tehran, Iran*
M.Sc. in Mechanical Engineering *2020 - Present*
GPA: 3.9/4

Amirkabir University of Technology *Tehran, Iran*
B.Sc. in Mechanical Engineering *2015 - 2019*
GPA: 3.4/4

Software Skills

Language Skills	**IELTS: Overall 8.0, L: 9.0, R: 8.0, S: 7.5, W: 6.5**
Programming	**Python, C++, MATLAB, LaTeX**
FEA	**FEniCS, Comsol**
CAD	**Catia, Solidworks, FreeCad**
Other Tools	**Git, Docker, FIJI**

Publications

microAI: A machine learning tool for fast calculation of lift coefficients in microchannels
arxiv preprint *Oct. 2022*

- `https://arxiv.org/abs/2210.11591`
- Under Review

Prediction of Aqueous Solubility of Drug Molecules by Embedding Spatial Conformers Using Graph Neural Networks
ICBME 2022 conference *Sept. 2022*

Projects

microAI: Fast Inertial lift calculation on microfluidic channels with different cross sections using deep learning
Course Project

- This project was the final project of the Fundamentals of Bioengineering course
- By coupling MATLAB and COMSOL and generating data on different types of channel shapes and also using published opensource data, a method has been developed that can predict the inertial lift coefficient in every cross-section of a microfluidic channel
- The proof of concept is available here : erfanhamdi.github.io/microAI
- The deep learning model was developed using PyTorch
- The resulting model was deployed on Huggingface and the API was developed using gradio

Autonomous floorplan generation using 3D scan pointclouds based on LiDAR sensor data

Lead Developer

- I'm currently the AI team lead of the Opaltech.ai startup
- Have won the NSF-SBIR/STTR (2021) grant
- Have developed an algorithm for autonomous semantic segmentation and floorplan generation of cluttered indoor spaces using Graph Neural Networks on iPhone LiDAR sensor scans

torchPIV: Particle Image Velocimetry using PyTorch Conv2D module

Course Project

- Was able to get deeper into the mechanics of Conv2D modules in PyTorch
- The modified code got 2x faster

Real-Time digital droplet PCR device development with fluoresence image analysis using deep learning methods

M.Sc. Project

- Design and development of the portable low cost optical setup using 3D printing and opensource software and hardware
- Design and fabrication of the microfluidic chip
- Image capturing and Real-Time image analysis was implemented on a raspberry pi 4
- This device can be used as a fluorescent microscope for different applications too.
- Heating module is controlled using an arduino Uno with a live plot of the temperature of the thermal cycler

Object-Oriented Implementation of Streamline Curvature Method in Python

B.Sc Project

- Implemented in Python using the Object-Oriented Programming paradigm
- The modular program enabled the user to use different loss models
- A reduced order model used for predicting fluid flow properties, customized to simulate the flow inside an annulus with rotors and stators

Teaching Experience

Applicational Machine Learning

Mechanical Engineering Department

Teaching Assistant

2022-2023 Semester

- This course is offered for the first time in the ME department
- I presented the unsupervised learning section with a special treatment of its application in Reduced Order Modelling for solving Mechanical Engineering Problems.
- Designed the homework and the teaching materials in an interactive jupyter notebook

Thermodynamics Lab

Mechanical Engineering Department

Teaching Assistant

2022-2023

Stereoscopic PIV

Mechanical Engineering Department

Lecture

Mar. 2022

- I had a lecture on Stereoscopic Particle Image Velocimetry to the class of Optical Methods of Measurement in fluid dynamics
- It contained a comprehensive introduction on multiview geometry and camera parameters

Courses

Online Courses
Coursera.org *Dec. 2017 - Mar. 2021*

- Introduction to Machine Learning in Production
- Structuring Machine Learning Project
- Machine Learning with Python
- Machine Learning

Advanced Fluid Dynamics
Sharif University of Technology *2020*

Advanced Thermodynamics
Sharif University of Technology *2020*

Numerical Methods of Optimization
Amirkabir University of Technology *2017*

Fundamentals of Bioengineering
Sharif University of Technology *2021*

Applied Micro Nano Technology
Sharif University of Technology *2021*

Machine learning for Bioinformatics
Sharif University of Technology *2021*

Honors & Awards

2022 **Distinguished Reasearcher**, of the ME department of Sharif University of Technology
2020 **Ranked 26th.**, Graduate level university entrance exam among 8k participants.
2015 **Ranked 236th.**, Undergraduate level university entrance exam among 200k participants.
2008 **National Organization of Exceptional Talents**, After a 2-stage exam got accepted to the NODET nationwise program from elementary and highschool.

References

Dr. Amir Shamloo *shamloo@sharif.ir*
MS.c Thesis Supervisor

Dr. Hamid Naderan Tahan *hnaderan@aut.ac.ir*
BS.c Thesis Supervisor

Dr Pooriya Beyhaghi *p@opaltech.ai*
OpalAI CTO

Volunteer

Neurips 2021 *https://nips.cc/Conferences/2021*
Student Volunteer