



AIDA FARAHANI

PROFESSIONAL SUMMARY

As a machine learning enthusiast, I am passionate about applying deep learning models to new domains. In my current research project, I applied ML methods to metal deformation and deep drawing in 3D space. I utilized the Convolutional Mesh Autoencoder (CoMA 2017) to extend its applications from 3D facial reconstruction to deformed metal parts. I generated a labeled dataset for deformed shapes using Finite Element Method (FEM) simulations, to overcome the lack of existing standard datasets [\[link\]](#). Due to the limitations of mesh autoencoders, which require fixed structure and size, I explored alternative approaches and identified implicit representations as a promising alternative. To my knowledge, implicit methods have never been applied to shape deformation before. I am actively engaged in this research, with some preliminary findings already published here^[2].

CONTACT

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EDUCATION

PhD Student: Artificial Intelligence

Technical University of Chemnitz,
Chemnitz, Germany
Supervised by:
Prof. Dr. Fred Hamker, Dr. Julien Vitay

Currently pursuing a PhD in the field of 3D deep learning, with a focus on geometric deformation using mesh autoencoders and implicit representations

M.Sc.: Mechatronics Engineering

K.N. Toosi University of
Technology, Tehran, Iran
Thesis title: Implementation of
Visual Servoing, Simultaneous
Pose Estimation and Classification
of Objects

B.Sc.: Software Engineering

IAU, South Branch, Tehran, Iran
Thesis title: Online Persian Handwriting
Recognition

SKILLS

- Proficient in using python libraries such as: pandas, trimesh, plotly, meshlab, Pytorch Geometric
- Proficient in deep learning frameworks such as PyTorch and TensorFlow, as well as scikit-learn for machine learning
- Experience with containerization technologies such as Docker and conda, and working with interactive computing environments such as Ipython and Jupyter Notebooks.
- Strong understanding of Object-Oriented Programming concepts and experience with languages such as Visual C#.Net, C++, MATLAB, and Python.

WORK HISTORY

January 2022 - Current

Researcher, *BMBF Project Smart Airsense*

BMBF Project **Erforschung von KI-Methoden zur Entwicklung eines interaktiven Gesundheitsassistenten auf Basis von Human in the Loop Machine Learning.**

Partners: Corant GmbH, TU Chemnitz.

Completed the first phase of a time series classification project using air particle sensor measurements to predict environmental events.

Analyzed data and developed predictive models, contributing to project success.

February 2018 - June 2021

Researcher, *BMBF Project ML@Karoprod*

Project Title: **Maschinelles Lernen zur Prognose von Prozessparametern und Bauteilqualität in der automobilen Karosserieproduktion.**

Partners: Fraunhofer IWU Dresden, Scale GmbH, TU Chemnitz.

LINKS

- My [Mesh predictor](#)
- My [linkedin](#)

LANGUAGES

Persian



Bilingual or Proficient (C2)

English



Advanced (C1)

German



Intermediate (B1)

French



Basic (A1)

in this project my tasks included [\[link\]](#):

- generating a benchmark dataset of 3D deformed shapes using FEM simulations
- developing a Reinforcement Learning environment to run RL algorithms
- using implicit representations to design a small and efficient neural network for processing large 3D meshes
- successful prediction of properties such as thickness and deviation of the reference mesh in 1D, 2D, and 3D based on process parameters interactively
- Published papers as the main author in the proceedings of the LSDyna-Forum and KI2022 conference [1,2].

May 2015 - February 2019

Researcher, *TU Chemnitz*

Contributed to the development of a model for learning color selective cells, focusing on neuroscience

Conduct research on facial expression recognition, utilizing neuroscience approaches

January 2013 - January 2014

R&D Engineer, *Kumeshian Co, Iran*

Research project on Traffic sign recognition (neural network design)

January 2012 - October 2013

R&D Engineer, *Beamsmart Co., (remote working)*

Research on WSN in smart phones, smart vehicles and smart homes SarvSamaneh (in cooperation with Beamsmart Co., United States)

January 2010 - January 2012

R&D Engineer, *K.N. Toosi University of Tech, Iran*

Work on Sensors & Software Architecture Design for AsaRun Driving Simulator

LIST OF SELECTED PUBLICATIONS

- [1] Farahani, A., Vitay, J., Hamker, F.H. **A Deep Learning Approach to Predict the Deviation of Sheet Metal Parts in Deep Drawing Process.** 16th LS-DYNA Forum, October 11th -13rd 2022, Bamberg, Germany.
- [2] Farahani, A., Vitay, J., Hamker, F.H. **Deep Neural Networks for Geometric Shape Deformation. 45th German Conference on Artificial Intelligence**, In: Bergmann, R., Malburg, L., Rodermund, S.C., Timm, I.J. (eds). KI 2022: Advances in Artificial Intelligence. Lecture Notes in Computer Science, vol 13404. Springer, Cham doi:10.1007/978-3-031-15791-2_9
- [3] Farahani, A., Vitay, J., Hamker, F.H. **Geometric Deep Learning and solutions for the industry**, Workshop 3D-NordOst 2021, Berlin, 02. /03.12.2021: 105-113. ISBN: 978-3-942709-27-9.
- [4] M.Khademi, M.R.Golestani, A.Nikookar, A.Farahani, **A New Method For Detecting Segmentation Points In Persian Cursive Words**, Journal of Basic and Applied Scientific Research (JBASR) (Thomson Reuters ISI indexed), (Vol. 3, No. 9, in September, 2013).
- [5] A. Farahani and B. Ghiaseddin, **Implementation of an Automatic Vehicle Driving System on a Single FPGA Chip**, International Journal of Computer and Electrical Engineering (IJCEE), Vol.4, No.6, pp.875-877, 2012. DOI: 10.7763/IJCEE. 2012.V4.625
- [6] K. Samimi, M. Khademi, A. Nikookar and A. Farahani, **The Application of Local Linear Neuro Fuzzy Model in Recognition of Online Persian Isolated Character**, in Proceedings of IEEE Conference (ICACTE 2010), 20-22 August, Chengdu, China, DOI: 10.1109/ICACTE.2010.5579433.
- [7] A. Farahani, M. Khademi and A. Nikookar, **A new Approach in Persian Handwriting Recognition using Writing Path**, in Proceedings of IEEE Conference ICCEE 2009, 28-30 Dec, Dubai, UAE. DOI: 10.1109/ICCEE.2009.243.