

Govind Kishan

MACHINE LEARNING ENGINEER



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“Driven by a passion for uncovering insights from massive datasets, I specialize in applying advanced Machine Learning techniques and cutting-edge Data Analysis to tackle complex problems across various domains. With expertise in areas such as Predictive Modeling, Computer Vision, and Natural Language Processing, I aim to transform data into actionable intelligence, empowering businesses to make data-driven decisions and stay ahead in an ever-evolving landscape.”

Skills

Programming	Python, React, NodeJS
Databases	MySQL, SQL Server, mongoDB
Frameworks/Packages	Pandas, NLTK, Sklearn, PyTorch, Docker, TensorFlow, GIT
Computer Vision	Instance segmentation, Object detection, GANs, Stable diffusion
Natural Language Processing	Transformers, LLMs, BERT, RAG, AI agents, Langchain, Vector Database, Chatbots
Cloud Services	AWS Sagemaker, EC2, AWS services, CI/CD
API Development	FastAPI, Django, Flask

Work Experience

IAS-9, Forschungszentrum Juelich

Juelich, Germany

PHD RESEARCHER

Sep. 2019 - Dec. 2023

- Developed a parametric based synthetic data generation model to generate training data (Images, Masks).
- Developed novel deep learning-based methods to perform segmentation of dislocations (line-like structures) in TEM images using synthetic data.
- Developed an end-to-end machine learning pipeline to represent each dislocation as a spline to perform quantitative studies of experimental TEM data.

Max-Planck-Institute für Eisenforschung

Germany

STUDENT RESEARCH ASSISTANT

Dec. 2017 - June 2019

- Chemo-mechanical modeling of phase transformation in Ti-H system using crystal plasticity and phase field theory.
- Implemented chemo-mechanical models for homogenization schemes and phase transformation in the Ti-H system.
- Incorporated CALPHAD database to model α , β , and δ phases and their transformation mechanisms.

Interdisciplinary Center for Advanced Materials Simulation (ICAMS), Ruhr University Bochum

Bochum, Germany

STUDENT RESEARCH ASSISTANT

Dec. 2016 - April 2018

- Predicted fatigue behavior using micro-mechanical modeling and machine learning algorithms.
- Developed a CNN model to predict the life of a material.
- Conducted feature analysis of material microstructure based on the grain orientation and misorientation.

Education

RWTH Aachen University

Aachen, Germany

PHD IN MATERIAL SCIENCE AND ENGINEERING

Sep. 2019 - Dec. 2023

Interdisciplinary Center for Advanced Materials Simulation (ICAMS), Ruhr University Bochum

Bochum, Germany

MASTERS IN MATERIAL SCIENCE AND SIMULATION

Oct. 2016 - Aug. 2019

Indian Institute of Technology

Ropar, India

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

June. 2012 - August. 2016

Publications

- H. u. Hassan, K. Govind, and A. Hartmaier, (2019), “Micromechanical modelling of coupled crystal plasticity and hydrogen diffusion”.
- K. Ruzaeva, K. Govind, M. Legros and S. Sandfeld, (2023) “Instance Segmentation of Dislocations in TEM Images”.
- Nguyen, Binh Duong and Potapenko, Pavlo and Dermici, Aytekin and Govind, Kishan and Bompas, Sebastien and Sandfeld, Stefan, (2023) “Efficient Surrogate Models for Materials Science Simulations: Machine Learning-based Prediction of Microstructure Properties”
- Govind, Kishan and Oliveros, Daniela and Dlouhy, Antonin and Legros, Marc and Sandfeld, Stefan, (2023) ”Deep Learning of Crystalline Defects from TEM images: A Solution for the Problem of “Never Enough Training Data”

Projects

1. Perform data driven study for bubble formation in additive manufacturing.

- Developed deep learning and parametric based synthetic data generation methods to generate synthetic training data to study bubble formation in additive manufacturing.
- Developed AI/Machine Learning methods to study statistics of bubble formation.
- Gained understanding of bubble formation during the additive manufacturing process by controlling the laser power and velocity.

2. Generate synthetic images of microstructure using fine-tuned Stable Diffusion XL.

- Trained a dreambooth model using Stable Diffusion XL on microscopy images of dislocation microstructure obtained from TEM to generate synthetic images.
- The method does not provide ground truths but provides high-quality images which can be used as an unlabeled dataset.

3. Ranking medical blog sites using Llama2.

- Medical blogs provide information about diseases, treatment, causes, etc.
- Scraped data from websites and processed it to prepare a dataset to rank the quality of the information in the blogs.
- Fine-tuned Llama2 on the data to estimate the blogs’ content quality.

4. Document-Based Question-Answering (QA) AI Agent

- Developed an AI agent using langchain for document-based QA tasks, utilizing ChatGPT to build a system that efficiently processes documents and performs accurate QA based on the content.
- Created a pipeline for data ingestion, pre-processing, and deployment.

Languages

English, German