

# ISRAT JAHAN TULIN

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## MACHINE LEARNING ENGINEERING

Experienced in machine learning and scientific software development, I specialize in building high-performance and scalable solutions for research applications. Proficient in Python, GPU computing, and image analysis, I excel in tasks like classification and information extraction. With expertise in software development best practices, including version control, data management, CI/CD, and documentation, I collaborate effectively in interdisciplinary teams to deliver innovative, requirement-focused solutions, while ensuring ML model and pipeline advancement.

## SKILLS & TOOLS

- PyTorch, TensorFlow, Keras, Scikit-Learn, Pandas, Numpy
- Python, Java, C++, C#, OOP
- Git, CI/CD, MLOps, unittest, pytest
- PyCharm, JupyterLab, Visual Studio, Bash, CUDA
- GCP, GPU computing
- Agile Methodologies (Scrum)
- Machine Learning, Deep Learning, Computer Vision, Image Analysis, OpenCV

## PROFESSIONAL EXPERIENCE

### Technische Universität Dresden (CeTI)

*April 2021 - Present*

#### Research Assistant (WHK)

- Developed robotics simulation in Unreal Engine and Unity using C#, C++, VR/AR tools, leap motion, and haptics to replicate hand movements and generate haptic feedback based on collision forces.
- Worked on enhancing collaboration through intelligent interaction systems, contributing towards the Internet of Skills.
- Collaborated with interdisciplinary teams, ensuring the integration of quality benchmarks and data pipelines with researchers from Universität Bremen and Technische Universität München.

### Technische Universität Dresden (ABSOLUT project)

*January 2020 - June 2020*

#### Research Assistant (WHK)

- Researched, implemented, and integrated machine learning models for object detection into autonomous transport systems.
- Developed stochastic occupancy grids and RANSAC-based detection for improved vehicle safety.
- Cleaned, transformed, and integrated stereo image data for accurate model training.
- Focused on data preprocessing, data transformation, and model validation to ensure accurate object detection.
- Collaborated with cross-functional teams in an agile environment to deploy models and refine project goals.

### BUFT, SMUCT, Gono University

*January 2014 - September 2019*

#### Lecturer (Bangladesh)

- Delivered lectures on C, Python, operating systems, databases, and ML.
- Promoted interdisciplinary collaboration through cross-departmental projects.

## SOFT SKILLS

- Quickly adapts to new technologies.
- Strong problem-solving skills.
- Commitment to high-quality standards.
- Proactive in learning new tools.
- Agile mindset and adaptability in work.
- Effective team collaborator with a hands-on mentality.
- Proficient in English (C1) and German (B2.1).

## PUBLICATIONS

- [A Comparative Study of Gaussian Noise Removal Methodologies for Gray Scale Images.](#)
- [Automatic Detection for Healthy and Unhealthy Kidneys on Abdominal CT Images using Machine Learning.](#)
- [Computer-aided Kidney Segmentation on Abdominal CT Images Using Fuzzy Based Denoising Technique.](#)

## EDUCATION

<b>Master of Science in Computational Modeling and Simulation (Visual Computing)</b> <b>Focus:</b> Machine Learning, Computer Vision, Data Science, High-Performance Computing <i>Technische Universität Dresden</i>	<i>2019-2024</i>
<b>Master of Science in Computer Science and Engineering</b> <i>Jahangirnagar University (Bangladesh)</i>	<i>2012-2013</i>
<b>Bachelor of Science with Honors in Computer Science and Engineering</b> <i>Jahangirnagar University (Bangladesh)</i>	<i>2009-2012</i>

## PROJECTS

<b>Predict Baltic Sea Temperature and Salinity using two years of 6-hourly sampled data.</b>	<i>2024</i>
<ul style="list-style-type: none"><li>Enhance predictions using the Baltic Sea's real-life temporal and spatial data, improving upon naive baselines (e.g., persistence, linear regression) with a machine learning model (LSTM + CNN).</li><li><b>Technology Used:</b> Python, PyCharm, scikit-learn, TensorFlow.</li></ul>	
<b>Deep-learning-based quantification of pancreatic texture using IR-Spectroscopy data</b>	<i>2023/24</i>
<ul style="list-style-type: none"><li>Developed a deep learning system using IR spectroscopy, real-life data collected from 30 patients at a university hospital, to analyze pancreatic tissue textures and tumor grades, aiding surgeons in assessing pancreatic cancer and post-operative fistula risk.</li><li>Cleaned and integrated data from multiple sources to build robust classification datasets, using scratch-built and pre-trained ResNet18 models and MobileNetV1, achieving over 90% accuracy with ResNet18.</li><li>Addressed dataset limitations, data quality, and class imbalance, proposing further research to enhance model performance and predictive power.</li><li>Implemented MLOps best practices by using GitLab for version control and continuous integration, DVC for model versioning, and TensorBoard with PyTorch for drift analysis when introducing new datasets, ensuring seamless model management, reproducibility, and monitoring.</li><li><b>Technology used:</b> Python, NumPy, Pandas, Matplotlib, PyTorch, Captum, TensorFlow, Keras, PyCharm, ScikitLearn, CI/CD pipelines, and Git, applying both supervised and semi-supervised learning techniques.</li></ul>	
<b>Understanding Deep-Learning requires rethinking generalization</b>	<i>2020/21</i>
<ul style="list-style-type: none"><li>Explored deep neural network architectures' superior generalization compared to traditional regularization techniques, conducting experiments with AlexNet, VGG19, and ResNet.</li><li>Achieved near-zero training errors with noisy data but observed performance drops with shuffled training/testing data and random labels.</li><li>Demonstrated the impact of regularization (early stopping, batch normalization) and optimization techniques (quantization, pruning) on generalization, emphasizing the need for new strategies to manage generalization errors.</li><li><b>Technology used:</b> Python, TensorFlow, Keras, JupyterLab, ScikitLearn.</li></ul>	
<b>Exploring Medical Data with AR and Spatially Tracked Tablet</b>	<i>2020</i>
<ul style="list-style-type: none"><li>Developed a Unity3D simulation in C# for HoloLens and Tablet interaction with 3D liver CT images.</li><li>Enabled volumetric data creation, spatial navigation, and gesture-based interaction for enhanced organ visualization.</li><li>Enabled gesture-based interaction with the liver model through HoloLens, allowing selection of specific CT regions for operation planning.</li></ul>	
<b>Kidney Segmentation in Abdominal CT Images Using Fuzzy Logic and Region Growing</b>	<i>2017</i>
<ul style="list-style-type: none"><li>Developed a fuzzy logic-based filtering technique to enhance abdominal CT images and preserve edges.</li><li>Applied region-growing algorithm for kidney segmentation, refining with ROI identification, pixel filling, erosion, labeling, and dilation.</li><li>Achieved 73% accuracy and a PSNR of 26.09 dB, outperforming traditional methods in quality and speed.</li></ul>	
<b>Object-Oriented Programming with Java</b>	<i>2022</i>
<ul style="list-style-type: none"><li>Gained object-oriented programming skills through the SCPROG course at TU Dresden, focusing on Java.</li><li>Developed projects covering inheritance, polymorphism, dynamic binding, packages, abstract classes, interfaces, type casting, and generics.</li><li>Collaborated with peers to enhance problem-solving and debugging skills.</li><li>Utilized GitLab for version control, improving project management and teamwork.</li></ul>	