Shrishailya Chavan

Availability: Immediate ⋄ +1(774) 519-8251 ⋄ Boston, MA ⋄ Email ⋄ LinkedIn ⋄ GitHub ⋄ Portfolio

EDUCATION

Worcester Polytechnic Institute, Worcester, MA	Aug 2022 - May 2024
Masters in Mechatronics, Robotics and Automation Engineering	GPA 4.0/4.0
Vishwakarma Institute of Technology, Pune, India,	2018 - 2022
Bachelor of Technology in Mechanical Engineering	CGPA 8.65/10.0

TECHNICAL SKILLS

Programming languages	C++, Python, MATLAB, JavaScript
Core Courses	Machine Learning, Computer Vision, Deep Learning, Prompt Engineering, Generative AI
CAD Software	SOLIDWORKS, CATIA, 3DEXPERIENCE
Deep Learning Frameworks	TensorFlow, PyTorch, Keras
Vector Databases	ChromaDB, FAISS, Weaviate, Qdrant
Programming Libraries	Pandas, NumPy, Scikit-learn, CUDA, OpenCV, seaborn, GDAL, SciPy
Tools	PyTest, Jira, Atlassian, Confluence
Web Frameworks	Django, Flask, Angular, React
Databases	MongonDB, PostgreSQL, MySQL
Deep Learning Architecture	ResNET, ResNEXT, DenseNET, VGG16, HomographNET, Sfm Learner, U-Net
Platforms	Amazon Web Services (AWS), Microsoft Azure ML, Google Cloud Platform (GCP)

PROFESSIONAL EXPERIENCE

Machine Learning Research Engineer, Co-op at Dassault Systèmes, Johnston, RI   October 2023 - Ongoing
SIMULIA User Assistance AI Chatbot (**widgets, Generative AI, RAG, LLMs, Fine-Tuning & Research**)

- Pioneered the creation of **comprehensive "SIMULIA User Assistance AI Chatbot" for Support Team** using **MLOps,** integrating **advanced Generative AI, RAG (Retrieval-Augmented Generation), Langchain.**
- Orchestrated the development of AI Chatbot by seamlessly incorporating **automated tone adaptation** for engineering and customer interactions, **streamlined Q&A generation with keyword extraction**, efficient technical text summarization, and **multi-language translation capabilities.**
- Implementation of this chatbot **significantly enhanced team efficiency and customer engagement over 95%**, enabling rapid and accurate support in various languages.
- It reduced reliance on the User Success Team, leading to **substantial cost savings for the company** & **eliminating** the need for **additional staffing** in the **teams by 80%.**

Dassault Systemès Knowledge GPT (**CATIA AI Team, RAG, Prompt Engineering, MLOps, Vector Database**)

- Led the code **Development, Deployment and Testing of Knowledge GPT** into the company's ecosystem using **RAG** (Retrieval-Augmented Generation) system, revolutionizing **information retrieval** across various products by **eliminating the need for extensive manual documentation navigation.**
- **Architected and deployed a user-friendly GUI** utilizing LangChain, Chainlit, and Streamlit, enhancing accessibility and intuitiveness for users interacting with the knowledge base.
- Honored by leadership for Significantly **boosting employee efficiency by 20x** providing quick and exact access to a **comprehensive mix of images, text, and video documentation.**
- Engineered and rolled out a **99% precise and efficient user feedback system**, to continually **refine the LLM for increased accuracy and relevance of responses.**

Machine Learning Research Engineer, Co-op at Triple Ring Technologies, Boston, MA   June 2023 - Oct 2023
ChemGPT - Chemical Chat Generative Pre -Trained Transformers (**Data dictionary, Flask, BERT, MarkupLM**)

- Spearheaded the development of a real-time chemical query chatbot using **Bidirectional Encoder Representations from Transformers (BERT) and Large Language Models** for rapid response to inquiries about molecular densities, chemical names, formulas, and abbreviations.
- Managed a comprehensive chemical database with over **2 million entries**, employing APIs and web scraping for data collection, and advanced techniques like normalization and tokenization for data processing.
- Leveraged **MarkupLM (an LLM variant) for enhanced HTML data extraction**, complemented with NLP for proficient query handling.
- Innovated and rolled out an LLM-based AI chatbot, **reducing chemical data search times from 15 minutes to 10 seconds.** Achieved a **95% adoption rate among engineers,** ensuring efficient and precise molecular information retrieval.

Deep Learning Acceleration of CT Dosimetry Simulations for Medical Devices (**Multi-dimensional models**)

- Developed the MCDNet, a neural network to **accelerate Monte Carlo simulations for medical devices** CT dosimetry, addressing x-ray CT radiation concerns.
- Leveraged anatomical voxel phantoms and a **GPU-based** Monte Carlo code for data generation. **Assessed predicted dose maps** using the Gamma index passing rate (GIPR).
- **Achieved a 76× speed-up in simulations,** introducing a novel use of CNN for MC radiation simulations with 3D medical devices for x-ray CT. Future potential for broader radiation transport applications.

Predictive ML Modeling for Radiation Sterilization Dosimetry in Medical Devices
- Developed a **Machine Learning based predictive tool** for radiation dose mapping in medical device sterilization.
- Reviewed relevant sterilization literature. **Utilized CAD models** for initial dose predictions. Designed and **trained an ML model** using custom radiation simulations, data preprocessing techniques, including cleaning, normalization, and tokenization. **Streamlined the process** through documentation and application of best practices.
- Streamlined sterilization validation, reducing traditional inefficiencies. Facilitated early-stage design decisions for optimal sterilizability. **Enhanced simulation prediction speed, optimizing the product development cycle.**

Graduate Student Researcher, Medical Fusion Lab, WPI, Worcester, MA   Nov 2022 - April 2023
Tumor boundary extraction from Photo-acoustic prostate imaging (Data Visualization, Data Cleaning, Preprocessing)
- Processed tumor ultrasound data, **trained a U-Net model** for mask prediction, conducted 3D tumor reconstruction, and applied **advanced visualization and morphological techniques** to the predicted data.
- Extracted frames from tumor videos, performed **binary segmentation** in MATLAB, and trained a U-Net model on the resulting dataset. Utilized the **predicted masks for 3D tumor reconstruction in MATLAB** and employed FIJI visualization and morphological operations for refined analysis.
- Approach enhanced tumor morphology understanding, potentially **improving diagnosis and treatment planning.** Visualization and morphological operations provided **comprehensive tumor analysis,** supporting future oncology research and clinical applications.

Graduate Student Researcher, HERB Lab, WPI, Worcester, MA   Nov 2022 - April 2023
Classification of thermal anomalies using deep learning **Vision Transformers (ViT)** *to Convolutional neural networks (CNNs)* **(Data Extraction and Integration, Data Visualization, Data Analysis and Reporting)**
- **Web Scrapped** and collected the data for image facades and labelled them.
- Working on **Masked Image Modeling** to understand architecture age and style through Deep Learning.

PROJECTS

Einstein Vision
- Developed an innovative autonomous vehicle dashboard visualization system, integrating advanced features and cognitive abilities. Leveraged pre-trained computer vision models, depth and pose estimation, alongside creative color thresholding techniques in Blender, to enhance scene rendering.
- This system significantly improved human-robot interaction, trust-building, and decision-making, thereby elevating user experience and safety in autonomous vehicles.

Visual Intertial Odometry
- Implemented 'Robust Stereo Visual Inertial Odometry for Fast Autonomous Flight' on EuRoC's Machine Hall 01 dataset to develop a deep learning-based stereo SLAM system, enhancing pose estimation accuracy between image frames and IMU measurements.
- This approach significantly improved navigation capabilities in autonomous robotics, addressing challenges such as motion blur and drift, with broad applications in aerial robotics and autonomous vehicles.

Auto Pano
- Developed an advanced image stitching solution for panorama creation, employing both traditional computer vision techniques (including corner detection, ANMS, feature extraction and matching, RANSAC, and homography estimation) and deep learning methodologies using Homography Net in both supervised and unsupervised settings to accurately determine image homography.

Building built in Minutes -SfM and NeRF
- Directed 'Building Built in Minutes - SfM and NeRF' project, achieving 3D scene reconstruction and camera pose estimation using advanced computer vision and monocular camera techniques. Engineered a pipeline integrating Fundamental/Essential Matrix, Epipolar geometry, 3D-2D PnP, and Bundle Adjustment. Further enhanced by implementing Neural Radiance Fields (NeRF) for novel view synthesis in complex scenes through deep learning optimization.

Auto Calib : Implemented **Zhang's camera calibration** technique with non-linear optimization.

Factored Solution to the Simulation Localization and Mapping (SLAM) Problem with Unkown Data Association
- Engineered a cutting-edge solution to the SLAM problem with unknown data association, implementing FastSLAM and its advanced version, FastSLAM 2.0, to overcome EKF-based limitations, enhance sampling diversity, and improve accuracy, thereby achieving superior performance in large, dynamic environments for effective people tracking.