# Fiona Victoria Stanley Jothiraj

Github Linkedin Google Scholar fiona.victoria@gmail.com +1 425-283-7633

## Education

**University of Washington Bothell, Washington** September 2021 – Present
Master of Science in Computer Science and Software Engineering Graduation: June 2023
Coursework: Machine Learning, Internet of Things, High Performance Computing, Research Methods, AI for Social Good, and Software Architecture
GPA: 3.92/4

**PSG College of Technology, India** July 2015 – May 2019
Bachelor of Engineering in Robotics and Automation Engineering
Coursework: Machine Learning for Robotics, Artificial Intelligence for Robotics
GPA: 9.58/10

## Publications

*Personalized Emotion Detection using IoT and Machine Learning* ArXiv, 2022 [Pre-Print]
**Fiona Victoria Stanley Jothiraj** and Afra Mashhadi

*Time Series Prediction for Food sustainability* ArXiv, 2022 [Pre-Print]
**Fiona Victoria Stanley Jothiraj**

*Empirical Dynamic Modelling of the Multi-Source Park Visitation Data* Data for Policy, 2022
Vahid Shamsaddini, **Fiona Victoria Stanley Jothiraj**, Mandy Chen, and Afra Mashhadi [Conference Paper]

## On-Going Works

Natural Language Processing Classifier for Detecting Nostalgia in Twitter June 2022 - Present

Federated learning for Deep Generative Diffusion Model September 2022 - Present

## Research Experience

**Computation Behavioral Modeling (CBM) Research Lab** with Dr. Afra Mashhadi June 2022 - Present
*Lead Researcher (Graduate Research Assistant)*

- Inspired by societal communication and behavior in social media, defined the research around the area of studying nostalgia or reminiscent behavior on social media
- Built traditional Natural Language Processing (NLP) models for classifying nostalgic conversations on the Twitter platform
- Applied NLP feature strategies: Bag of Words (BoW), Parts of Speech (POS), Term Frequency-Inverse Document Frequency (TF-IDF) and Word Embeddings
- Implemented transformer models: RoBERTa, DistilBert, ensemble models and ensemble-feature models to improve detection accuracy
- Mentored two undergraduate students to prepare exhaustive amounts of Twitter data
- Co-authored the empirical research paper on "*Natural Language Processing Classifier for Detecting Nostalgia in Twitter"*

**Master's Thesis** under the guidance of Dr. Afra Mashhadi September 2022 - Present
*FedDM: Federated learning for Deep Generative Diffusion Model*

- Proposed a novel method for training a generative diffusion model across different data sources in a decentralized manner, keeping privacy constraints in mind
- Designed an algorithm, and architecture design that provides continual real-time learning and reduced communication between data sources

## Grad Course Projects

**CSS 581: Machine Learning** with Dr. Muhammad Aurangzeb Ahmad Fall 2021
*Time Series Prediction for Food Sustainability*

- Formulated a Statistical Regression Model that forecasts the productivity of over two-hundred food and crops in every country
- Performed data preparation and analysis with tests such as Granger Causality and Augmented Dickey–Fuller (ADF) to test causality and stationarity of the time-series data
- Research work led to a pre-print publication on September 2022

**CSS 532: Internet of Things** with Dr. Yang Peng Fall 2021

*Personalized Emotion Detection using IoT and Machine Learning*

- Worked on a research project to study how emotions could be detected in a person using physiological signals especially for individuals with Autism Spectrum Disorder (ASD)
- Designed a non-invasive emotion detection system using Machine learning modeling and Cloud Computing
- Research work led to a pre-print publication on September 2022

**CSS 535: High-Performance Computing** with Dr. Erika F. Parsons Winter 2022

*Accelerated Image Restoration using CUDA*

- Partnered with three graduate students and worked on project to accelerate the reconstruction of images using CUDA parallelization techniques
- Designed CUDA kernels from scratch for the following functions: Point-Spread Function, Wiener Filter, Discrete Fourier Transform, Inverse Discrete Fourier Transform and Calculate-PSNR (Peak Signal to Noise Ratio)
- Applied different strategies by varying Grid size, Block size and Image Dimension size to understand the change in performance speed
- Profiled the results using NVIDIA Nsight profiler and achieved a speedup of 10x when compared to the CPU OpenCV's implementation

**CSS 590: Artificial Intelligence for Social Good** with Dr. Afra Mashhadi Spring 2022

*Spatio-Temporal Forecast Modeling and Fairness of Traffic Fatality*

- Implemented forecasting and deep learning modeling techniques to estimate the hotspots for traffic fatality in the United States
- Analyzed the fairness of prediction in different counties of the United States based on the Social Vulnerability Index (SVI)
- Analyzed explainable AI system using SHapley Additive explanation (SHAP)
- Experimented with machine learning models such as Random Forest Classifier, Convolutional LSTM Network, and Prophet Forecasting model
- Handled Gigabytes of geospatial and multimedia data

## Industry Experience

**Multicoreware Inc, India** June 2019 – March 2020

Machine Learning Engineer

- Designed and developed an EV Quantization logic in TensorFlow GPU for quantization aware training and Tensorflow Lite inference of Deep Neural Networks
- Deployed the open-source product to production. The project is used for Synopsys Design Ware EV (Electric Vehicle) Processors
- Development using C++, Python, Intel Intrinsics and Git
- Mentored peers on the quantization concepts and workflow of EV TensorFlow

**Multicoreware Inc, India** December 2018 – May 2019

Machine Learning Intern

*Skin Cancer Detection*

- Developed a custom Convolutional Neural Network (CNN) model to detect moles for potential skin cancer by training with gigabytes of clinical image data

*Audio Video LipSync*

- Implemented the Audio Video LipSync™ API in Intels' OpenVino through a high-level C++ inference engine for 5x speedup
- Deployed the quality control tool for Over-the-top (OTT) streaming service providers, using deep learning technology
- Setup the LipSync™ technology demo for the National Association of Broadcasters Show (NAB 2019)
- Enhanced the user experience with a GUI to create out-of-sync videos using PHP and Python

Awards & Achievements

2022 Virtual scholarship to the **Grace Hopper Women in Computing Celebration**
2021 Amazon Web Services **(AWS)** Machine Learning Specialty - Certified
2019 **Academic Excellence** (Ranked 1/80) issued by the Robotics and Automation Engineering Association
2019 Awarded '**Monarch of the Month**' in August for individual contribution to TensorFlow quantization at Multicoreware Inc

Leadership

2018 Developed a website for the International Conference on Automation Robotics and Sensing (**ICAARS**)
2017 **Graphic Designer** for the College Magazine 'The Bridge'
2016 Coordinated the **IEEE SRiSHTi'16** Technical symposium held at PSG College of Technology

Skills

**Languages** Python, C, C++, CUDA, MATLAB, SQL

**A.I Tools** TensorFlow, PyTorch, Keras, Caffe, Scikit-learn, OpenCV, Kats, Pandas, NumPy, PySpark, Matplotlib, SciPy, Weights & Biases

**Other Tools** AWS (IoT Core, Sagemaker, Lambda, Kinesis, Glue, S3, SNS), Azure (IoT Hub, Stream Analytics, Function App), LaTeX, Git

| **Academic & Research** | **ML/DL** | **Leadership** | **Other skills** |
|---|---|---|---|
| Open-source contribution | Quantization of Neural Networks | Mentorship | Technical writing |
| In-depth literature review | Multimodal Neural Networks | Project management | Application development |
| | Ensemble Models | | Pointillism Art |
| | Transfer Learning | | Piano – Grade 6 |
| | Forecasting Models | | |