Aishwarya Venkataramanan

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Education

PhD, Computer Vision and Deep Learning — **Metz, France**
University of Lorraine and IRL GT-CNRS — *2020–Present (Expected to finish in Dec 2023)*

- Developed an end-to-end pipeline that employs deep learning to automatically detect and identify diatoms in microscopy images.
- Formulated innovative approaches to tackle challenges such as limited labeled datasets for training, fine-grained classification, and uncertainty quantification for decision-making.
- Advisors: Dr. Cédric Pradalier, Dr. Martin Laviale, Dr. Philippe Usseglio-Polatera

Master of Science in Electrical and Computer Engineering — **Atlanta, USA**
Georgia Institute of Technology — *2018–2020*

- Developed a methodology to create realistic 3D models of tree barks using a consumer-grade handheld camera.
- Utilized multi-view 3D reconstruction and Generative Adversarial Networks (GANs) to generate the geometry and colors of the barks.
- Advisor: Dr. Cédric Pradalier

Bachelor of Engineering in Electrical and Electronics — **Chennai, India**
Sri Sivasubramaniya Nadar College of Engineering (Anna University) — *2014–2018*

Publications

Journal

Usefulness of synthetic datasets for diatom automatic detection using a deep-learning approach, A. Venkataramanan, P. Faure-Giovagnoli, C. Regan, D. Heudre, C. Figus, P. Usseglio-Polatera, C. Pradalier, M. Laviale, *Engineering Applications of Artificial Intelligence*, 2023

A data-driven approach to generate realistic 3D tree barks, A. Venkataramanan, A. Richard, C. Pradalier, *Graphical Models*, 2022

Conference

Gaussian Latent Representations for Uncertainty Estimation using Mahalanobis Distance in Deep Classifiers, A. Venkataramanan, A. Benbihi, M. Laviale, C. Pradalier, *ICCV Workshop on Uncertainty Quantification for Computer Vision*, 2023

Integrating Visual and Semantic Similarity Using Hierarchies for Image Retrieval, A. Venkataramanan, M. Laviale, C. Pradalier, *ICVS*, 2023

Tackling Inter-class Similarity and Intra-class Variance for Microscopic Image-based Classification, A. Venkataramanan, M. Laviale, C. Figus, P. Usseglio-Polatera, C. Pradalier, *ICVS*, 2021

Supervision

Supervised Bachelor and Master-level semester projects on Object Detection, Semantic Segmentation, Vision Transformers, Self-Supervised Learning, Uncertainty Quantification, and Conformal Prediction for Image Classification.
Developed skills: Teaching, Communication, and Research.
Number of students supervised: 9

Teaching

Georgia Tech Europe
Teaching Assistant *2018–2020*
Responsible for conducting lab sessions, designing and correcting quizzes, and conducting office hours. Courses included Digital Design Lab and Instrumentation and Electronics Lab.

Work Experience

Georgia Tech-CNRS IRL2958 **France**
Research Engineer in DREAM Lab (6 months) *2020*
Worked on ANR funded project WoodSeer. Developed a CNN-based regression network to predict knots on tree bark from the external structure. Framework used: PyTorch

Internship

Indian Institute of Technology Madras **India**
Research Intern in Robotics Lab (3 months) *2016*
Designed and developed a prototype of a portable and user-friendly page-flipping machine. Software used: Autodesk Inventor.

Skills

Libraries & Tools: PyTorch, OpenCV, Dask, Scikit-learn, Pandas, ROS
Programming Languages: Python, C++, R, LaTeX, C
OS: Linux, Windows
Software: Matlab/Simulink, Autodesk Inventor, MS Office

Open Source Software (Available in: https://github.com/vaishwarya96)

Hierarchy-image-retrieval (**Python**) – Research code for image retrieval using visual hierarchy.
MAPLE (**Python**) – Research code for uncertainty quantification in deep classifiers.
Synthetic data generator (**Python**) – Code for generating synthetic data for object detection in microscopy images.
Tree Bark Generator (**Python, C++**) – Code for generating 3D tree barks from camera images.

Dissemination and Services

Presented a poster on "Uncertainty Quantification for Reliable Diatom Classification" at AI Day, Nancy, 2023.
Presented a talk on "Usefulness of Synthetic Datasets for Automatic Diatom Detection" at ZAM Scientific Day, Gerardmer, 2022.
Presented a poster on "Tackling Inter-class Similarity and Intra-class Variance for Diatom Classification" at LIEC Doc Day 2021 and Sirena Scientific Day, Metz, 2021.
Reviewer for ECML-PKDD 2022, ICVS 2023, ICCV UNCV Workshop 2023

References

Dr. Cédric Pradalier cedric.pradalier@georgiatech-metz.fr
Head of DREAM Lab at IRL2958 GT-CNRS

Dr. Martin Laviale martin.laviale@univ-lorraine.fr
Associate Professor at LIEC, Université de Lorraine