MADAN RAVI GANESH

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Summary

Ph.D. candidate trained in computer vision and machine learning, with strong communication skills developed from involvement with interdisciplinary projects and ability to work independently or in a team.

Expertise: video-based modeling, empirical analysis, framework development, application of information theoretic measures.

EDUCATION

University of Michigan   Ann Arbor, MI
Ph.D., Computer Vision   April 2022
Courses: Advanced Computer Vision, Machine Learning, and Image Processing

M.S.R. Institute of Technology   Bangalore, IND
B.Sc., Electronics and Communications   June 2013
Courses: Data Structures, Signal Processing, and Embedding Software Coding

PROFESSIONAL EXPERIENCE

National Instruments   Bangalore, IND
Intern   January 2013 - June 2013

· Mastered the use of ActiveX modules in LabVIEW to develop a custom XML format parser.
· Created a system to analyze product quality and highlight features more susceptible to bugs.

National Instruments   Bangalore, IND
Software Engineer   2013-2014

· Built and presented the first prototype tool-kit in LabVIEW targeted towards creation of automated tests for GUIs built in LabVIEW to senior board members.
· Detected more than 50% of total reported issues on RFSA-GUI and provided key inputs in overcoming critical bugs which had a direct impact on the quality of the product.
· Led a 3 member team for testing RFSA GUIs, which involved planning, scheduling, execution and communication across three teams and two time-zones.

RESEARCH EXPERIENCE

M.S.R. Institute of Technology   Bangalore, IND
Undergraduate Researcher   2012-2013

· Studied the impact of particle swarm optimization (PSO) on feature selection in images.
· Developed a novel optimization and detection algorithm to identify ears under unconstrained environments in profile images.

University of Michigan   Ann Arbor, MI
Ph.D. Student   2014 - Present

· Proposed a novel label-based curriculum learning algorithm called Learning with Incremental Labels and Adaptive Compensation. It emphasizes sample equality while incrementally learning labels and regularizes learning by adaptively modifying the target label vector. It performs label-based curriculum learning while surpassing performance of from standard batch learning techniques.
Code: https://github.com/MichiganCOG/LILAC
Paper: https://openreview.net/pdf?id=H1lTUCVYvH

· Designed a state-of-the-art online streaming feature selection algorithm called Geometric Online Approach which is fully functional when both features and samples are simultaneously streaming.
Code: https://github.com/MichiganCOG/GOA.git
Paper: https://arxiv.org/abs/1910.01182

· Empirically analyzed the temporal modeling capabilities of C3D, CNN + LSTM, I3D and TSN using synthetic and real-world datasets. We highlighted the core functionalities and deficiencies of each deep network model by testing for direction of time, spatiotemporal motion, memory decay and dataset bias.

· Formulated a temporal preprocessing scheme that introduced robustness to input video speed variations, previously lacking, in artificial neural networks. The work includes the analysis and classification of existing state-of-the-art models based on their response to extreme variations in speed of input videos.
Code: https://github.com/MichiganCOG/T-RECS.git
Paper: https://arxiv.org/abs/1803.08094

SOFTWARE DEVELOPMENT

University of Michigan   Ann Arbor, MI
Ph.D. Student   2014 - Present

· Deployed a tensorflow-based activity recognition framework to aid reproducible research, quick prototyping and reduce time consumed by unnecessary pipeline development.
Code: https://github.com/MichiganCOG/M-PACT
Paper: https://arxiv.org/abs/1804.05879

· Developed a pytorch-based video platform that can handle any image- or video-based problem domain with minimal changes. It includes strong bookkeeping, mimics large mini-batch computations on low memory systems while including a large suite of video-specific preprocessing functions.
Code: https://github.com/MichiganCOG/ViP.git
Paper: https://arxiv.org/abs/1910.02793

TECHNICAL STRENGTHS

Computer Languages	C++ (basics), MATLAB, LabVIEW and Python
Deep Learning	Caffe, Tensorflow, PyTorch and Theano
Software & Tools	LaTeX, Excel and Arduino

EXTRA-CIRRUCULAR

Winner of 1st prize for implementation and presentation of paper titled: 'Decoupled Active Contours for Boundary Extraction' and its extension to color images.

Volunteer at "Xplore Engineering summer camp", National Instruments Cultural Fest "Niwali Diwali" and technical symposium "NIBTech".

Produced a custom cost effective IMU and control system for quadcopters as part of 4 man team.

Studied the accuracy of SLAM implementations in ROS on the Husky A200.

Analyzed financial data and prediction modeling using a LASSO based approach.