Chethan M. Parameshwara

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Research Interests

Motion Segmentation and Tracking, Simultaneous localization and mapping (SLAM) and Visual Odometry for autonomous vehicles in uncertain and dynamic real-world environments using Neuromorphic Event-based cameras

Education

- **University of Maryland** — **College Park, MD**
  Doctor of Philosophy, Neuroscience and Cognitive Science, — *Aug 2017 – May 2022 (Expected)*
  Research Interest - Machine Vision and Learning for Robotics
  Relevant Courses - Computational Neuroscience, Cognitive Neuroscience, Introduction to Neuroscience
- **University of Maryland** — **College Park, MD**
  Master of Engineering, Robotics, — *Aug 2015 – May 2017*
  Relevant Courses - Image Understanding, Perception, Machine Learning, Planning Algorithms, Numerical Optimization
- **Visvesvaraya Technological University** — **Mysore, India**
  Bachelor of Engineering, Electronics & Communication, — *Sep 2010 – Jun 2014*
  Relevant Courses - Data Structures and Algorithms in C++, Embedded Systems, Image Processing

Professional and Research Experience

- **Perception & Robotics Group, University of Maryland** — **College Park, MD**
  Graduate Research Assistant — *Aug 2017 – Present*
  - Working under the guidance of Prof. Yiannis Aloimonos and Dr. Cornelia Fermüller on visual navigation problems such as Motion segmentation and tracking, Simultaneous localization and mapping (SLAM) and Visual odometry for autonomous vehicles using Neuromorphic Event-based camera
- **Neurala** — **Boston, MA**
  Research Intern — *Jun 2019 – Aug 2019*
  - Worked on Lifelong Deep Neural Networks (L-DNN) for solving Catastrophic Forgetting problem in object detection and recognition tasks
  - Implemented custom neural network layers in C++ for Neurala's BrainBuilder software framework
- **Robot Training Academy (RTA)** — **College Park, MD**
  Intern — *Sep 2016 – Dec 2016*
  - RTA was a spin-off company founded by the University of Maryland Computer Science professor and researchers to train robots for kitchen automation
  - Implemented a hand gesture tracking software package for Baxter robot in C++ ROS architecture using 3D point cloud data and assisted in integration and testing activities
- **Bosch Engineering and Business Solutions** — **Bangalore, India**
  Software Engineer (AUTOSAR Developer) — *Aug 2014 — Aug 2015*
  - Designated as an AUTOSAR (AUTomotive Open System ARchitecture) application software developer for the integration of OEM software modules into Bosch Engine Control Unit (ECU)
  - Analyzed specifications of a Powertrain system in ASCET (design tool), validated auto-generated C code through Perl scripts and performed unit testing of software modules in LABCAR (Hardware-in-the-loop testing bench)
- **Indian Institute of Science** — **Bangalore, India**
  Summer Research Fellow — *Jul 2013 – Aug 2013*
  - Worked under the supervision of Prof. Vinod Sharma, Department of Electrical and Communication Engineering,

Indian Institute of Sciences (IISc), Bangalore
- Surveyed research papers on Information theory in the context of the energy harvesting source and analyzed mathematical models for finding the capacity of a channel with the energy harvesting source

Teaching and Volunteering Experience

- **Department of Computer Science, University of Maryland** — **College Park, MD**
  Graduate Teaching Assistant — *Aug 2018 – Present*
  - CMSC733 : Classical and Deep Learning Approaches for Geometric Computer Vision (Spring 2020)
  - CMSC426 : Computer Vision (Fall 2019, Fall 2018)
  - CMSC434 : Human Computer Interaction (Spring 2019)
- **University of Maryland Graduate Student Government** — **College Park, MD**
  Representative — *Jul 2020 – Present*
  - Representive of Neuroscience and Cognitive Science (NACS) Program in Graduate Student Government
- **University of Maryland NACS Grant Review Committee** — **College Park, MD**
  Co-Chair — *Aug 2019 – Present*
  - Review grant applications and coordinate between applicants and committee members/previous year recipients
- **Telluride Neuromorphic Cognition Engineering Workshop** — **Telluride, CO**
  Workshop Staff — *Jun 2018 – Jul 2018*
  - Volunteered as a staff member in 3-weeks hands-on workshop on neuromorphic engineering with top researchers in neuroscience, electronic engineering, machine learning, signal processing, cognition, and robotics

Skills

- Programming Languages: C++, Python, MATLAB
- Software and Frameworks: TensorFlow, Pytorch, Caffe, ROS, OpenCV, PCL

Publications

- **Parameshwara, C. M.**, Sanket, N. J., Gupta, A., Fermüller, C., & Aloimonos, Y. MOMS with Events: Multi-Object Motion Segmentation With Monocular Event Cameras. arXiv preprint arXiv:2006.06158
- **Parameshwara, C. M.***, Sanket, N. J.*, , Singh, C. D., Kuruttukulam, A. V., Fermüller, C., Scaramuzza, D., & Aloimonos, Y. EVDodgeNet: Deep Dynamic Obstacle Dodging with Event Cameras. IEEE International Conference on Robotics and Automation(ICRA), 2020 (* equal contribution)
- Mitrokhin, A., Fermuller, C., **Parameshwara, C.**, & Aloimonos, Y. Event-based moving object detection and tracking. IEEE/RSJ Int. Conf. Intelligent Robots and Systems (IROS), 2018
- Kramida, G., Aloimonos, Y., **Parameshwara, C.**, Fermuller, C., Francis, N. A., & Kanold, P. Automated Mouse Behavior Recognition using VGG Features and LSTM Networks. In Visual Observation and Analysis of Vertebrate And Insect Behavior Workshop (VAIB)

Awards

- Graduate School Summer Research Fellowship (University of Maryland), May 2020
- Ministry of Human Resources Development Scholarship (Government of India), 2010-2014
- Summer Research Fellowship (Indian Science Academies), Aug 2013
- Third place in Collaborative Innovation Challenge (CIC) at 2013 PACE Global Annual Forum, Pasadena, CA, Jul 2013