Chahat Deep Singh

Email : chahat@terpmail.umd.edu
Personal Website: http://chahatdeep.github.io/
Mobile : +1-984-377-9594

Research Interests: Computer Vision, Artificial Intelligence and Aerial Robotics.

Current Research

- **FlyNet:** Deep Learning driven Structure-less Gap Detection for Quadrotor Flight through Unknown Window. **(arXiv pre-print coming soon)**; *Advisor: Prof. Yiannis Aloimonos and Cornelia Fermüller*
- **Transfer of Motion Primitives:** A Technique to Transfer the Human Motion Model to a Kinematic Chain Cooperatively Manipulated by a Swarm of Quadrotors. *Advisor: Prof. Yiannis Aloimonos and Cornelia Fermüller*

Education

- **University of Maryland** — College Park, MD
  Master of Engineering in Robotics: GPA: 3.67 Expected — *2016–Present*
- **Guru Gobind Singh Indraprastha University** — New Delhi, India
  Bachelor in Electronics and Communication Engineering — *2011–2015*

Research Experience

- **Research Assistant:** *with Prof. Yiannis Aloimonos and Cornelia Fermüller*
  Computer Vision Lab, University of Maryland — *Jan 2017 – Present*
  Gap Detection using Optical Flow: Worked on deep learning framework to obtain optical flow between two consecutive frames from RGB images followed by Gap Detection in the Presence of a Strong Parallax.
- **Project Assistant:** *with Scientist Vijayant Bhardwaj*
  Defence Research & Development Orgranization, India — *May 2014 – July 2014*
  Computer Vision driven Laser Wander Correction: Developed an adaptive optic system at *Laser Science and Technology Centre* that uses a very high frame rate monochrome camera and automatically corrects for light distortions in the medium of transmission.
- **Research Assistant:** *with Prof. Arvind Rehalia*
  Senior Year Project — *October 2014 – May 2015*
  REDIPS, a Quadruped Robot: Developed an adaptive optic system at *Laser Science and Technology Centre* that uses a very high frame rate monochrome camera and automatically corrects for light distortions in the medium of transmission.

Publications

- **Mobile Surveillance Spheroid Robot with Static Equilibrium Camera, Leaping Mechanism and KLT algorithm based Detection with Tracking**: Shamsheer Verma, **Chahat Deep Singh**, Sarthak Mittal, Prateek Arora and Arvind Rehalia. International Journal of Control Theory and Applications, 09(41) 2016, 473-488. ISSN: 0974-5572. (goo.gl/4VAdtW)
- **Fully Autonomous and Manually Controlled Quadraped with Object Detection and Tracking**: Shamsheer Verma, **Chahat Deep Singh**, Arvind Rehalia. International Journal of Engineering and Technical Research (IJETR). Volume-2, Issue-9, 09-2014. ISSN: 2321-0869. (goo.gl/eAhTDV)

Course Projects

- **Segmenting Objects in a 3D Point Cloud**: Segmented a concave reconstructed point cloud into n–convex clouds.
- **Structure from Motion**: Created a sparse structure of the scene from a sequence of RGB images.
- **Collision-free Optimal Trajectory Planning in a Multi-Robot System**: Solved the problem of cooperative planning in order to simulate the algorithm for concurrent assignment and planning of trajectories (CAPT).
- **3D Pose Estimation**: Localization using Perspective-n-Point and optimizing it using GTSAM factor graphs.

Relevant Courses

- **CMSC 726 - Machine Learning**: Fall 2017 — *by Prof. Jordan Boyd-Graber*
- **CMSC 828T - Vision, Planning and Control in Aerial Robotics** : Fall 2017 — *by Prof. Yiannis Aloimonos*
- **CMSC 733 - Computer Processing of Pictorial Information**: Spring 2017 — *by Prof. Yiannis Aloimonos*
- **ENPM661 - Planning for Autonomous Robots**: Spring 2017 — *by Dr. Michael Otte*
- **CMSC 828G - Image Understanding**: Fall 2016 — *by Prof. Rama Chellappa*

Skills

Computer Languages: C, C++, Python, MATLAB, HTML5, Bash, LaTeX
Operating System: Arch Linux, Debian-based Linux (ARM and x86-64), Windows XP/7/8/10
Tools: Tensorflow, PyTorch, Git, Autodesk Inventor, Arduino

References

Yiannis Aloimonos	Cornelia Fermüller	Waseem A. Malik
Professor	Associate Research Scientist	Adjunct Faculty
Department of Computer Science	Department of Computer Science	University of Maryland