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Hemang Chawla

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Experience

Computer Vision Research Engineer   **NavInfo Europe, Netherlands**   **December 2018 – Present**
- Built robust monocular depth and ego-motion estimation models, for automatic change-detection and road-maintenance.
- Designed crowd-sourced 3D positioning of semantic objects with sub-meter accuracy for cost-effective HD map-updates.
- Created computationally efficient self-calibration approaches for global- and rolling-shutter dashboard cameras.
- Developed human-in-the-loop sensor-fusion approach for fixing noisy GPS measurements through monocular visual data.
- Analyzed, compared & integrated LiDAR Odometry and Mapping approaches for highway driving scenarios.
- Implemented prototype of visual semantic SLAM system for indoor navigation scenarios.
- Reviewed latest scientific developments at international journals and conferences (IROS, WACV, BMVC, IMAVIS, ICRA)

Robotics Engineer   **Aziobot, Netherlands**   **March 2018 – November 2018**
- Designed novel non-holonomic mobile robot motion planning algorithms for complete & efficient cleaning of indoor spaces.
- Coordinated development of task architecture integrating UI and ROS nodes with state-machines.

Research Intern   **Robot Care Systems, Netherlands**   **Jul 2016 – November 2017**
- Developed a vision-based collision aware system for autonomous docking of robots to charging stations
- Implemented path planning techniques for custom-built robot arm on an elderly assistance robot.

Education

M.Sc. Bio-Robotics   **Delft University of Technology**   **Aug 2015 – November, 2017**
- Thesis: Designed a modular algorithm for robot placement of non-holonomic mobile manipulators in domestic environments, accounting for sensing and actuation errors.
- Projects: Simulated a pair of six legged robots collaboratively traversing a varied terrain for a search and rescue operation; Implemented machine learning models for rain and weather classifier in images
- Coursework: Intelligent Vehicles; 3D-Robot Vision; Pattern Recognition; Neural Networks; Optimization in Systems and Control; System Identification & Parameter Estimation; Control Methods for Robotics; Humanoid Robots; Man-machine systems

B.E.(hons.) Manufacturing   **Birla Inst. of Tech. & Science, Pilani**   **Aug 2011 – May 2015**
- Projects: Developed visual hand-gesture based manipulation of ABB IRB 1410 industrial robot in pick and place tasks; Developed a dual player LAN game with GUI inspired by Miniclip's Anagrammatic.
- Coursework: Robotics(Industrial); Mechatronics and Automation; Fuzzy Logic and Applications

Publications

- Continual Unsupervised Depth Estimation. (submitted)
- Transformers in Unsupervised Structure-from-Motion. (submitted)
- Image Masking for Robust Self-Supervised Monocular Depth Estimation. (ICRA 2023)
- AI-Driven Road Maintenance Inspection v2: Reducing Data Dependency & Quantifying Road Damage. (IRF R2T 2022)
- (Nominated for Best Paper Award) Transformers in Self-Supervised Monocular Depth Estimation with Unknown Camera Intrinsics. (VISAPP 2022)
- Adversarial attacks on monocular pose estimation. (IROS 2022)
- Multimodal scale consistency and awareness for monocular self-supervised depth estimation. (ICRA 2021)
- (Nominated for Best Paper Award) Practical Auto-Calibration for Spatial Scene-Understanding from Crowdsourced Dashcamera Videos. (VISAPP 2021)
- Crowdsourced 3D Mapping: A Combined Multi-View Geometry and Self-Supervised Learning Approach. (IROS 2020)
- Monocular vision based crowdsourced 3d traffic sign positioning with unknown camera intrinsics and distortion coefficients. (ITSC 2020)

Patents

- Method of self-supervised learning in neural network for robust and unified estimation of monocular camera ego-motion and intrinsics (pending)
- Computer-implemented method to improve scale consistency and/or scale awareness in a model of self-supervised depth and ego-motion prediction neural networks (published)
- System and method for computing the 3d position of a semantic landmark in images from the real world (granted)

Skills and Technologies

- C++; Python; PyTorch; Colmap; ROS; PCL; OpenCV; g2o; Numpy; Pandas; scikit-learn; CoppeliaSim; MoveIt; LaTeX