Ankil Patel

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EDUCATION

UNIVERSITY OF WATERLOO
COMPUTER ENGINEERING
Expected May 2022
Societies
2018 | IEEE Student Member

PROJECTS

HACKATHONS
Hack the Six
• Built a novel system that used security footage to fuse 2d poses from multiple image sensors to make composite 3d poses in order to make VR technology more portable
• Implemented unscented kalman filter using MEAN stack with PoseNet using Tensorflow
• Won 2nd place for the Workshop Wizard prize
AquaHacking
• Built a forecasting tool to predict week-by-week levels of algae on Lake Erie
• Used an ensemble model that combined a CRF, LSTM+CNN, and HMM

PERSONAL PROJECTS
Cluster
HTTPS://GOO.GL/5YFE5L
• Independently built a 4-node cluster and developed statistical models to run physics simulations
Pommerman
• Currently training an agent to play Bomberman

SKILLS

PROGRAMMING LANGUAGES
Java • C++ • Python • Linux Shell • JavaScript • Matlab • SQL • CSS • Assembly • VHDL

TECHNOLOGIES
OpenCL • CUDA • ARM • GIS • Hadoop • MEAN stack • Tensorflow

COURSEWORK

Machine Learning
Operating Systems
Linear Programming
Hadoop
Heterogenous Parallel Computing

EXPERIENCE

WATONOMOUS
| SELF DRIVING CAR TEAM | PATH PLANNING FORMERLY SENSOR FUSION
June 2017 - Present
- Signal Processing:
- Implemented sketch sampling module to efficiently determine Euclidean distances between filtered sparse LIDAR data points with OpenCL/C++
- Implemented variation of Fast Resampling of 3D Point Clouds via Graphs to aid with determining features in point clouds for SLAM team
- Implemented variation of Adaptive Manifolds for Real-Time High-Dimensional Filtering to preprocess image streams with edge-aware smoothing in C++
    - Improved lane classification by 20%
- Implemented image preprocessing pipeline that included modules for awb gain control, color correction, luma and chroma filters, and lens shading correction
- Sensor Fusion framework:
    - Implemented a lidar/camera fusion ROS node with sparse GP regression for interpolation between the sparse lidar points in C++
    - Implemented a disparity map using stereo image streams to aid in the creation of a depth field, which was later fused with the previous points' results in C++
    - Designed a hybrid hardware/software PTP time syncing system to fuse multiple sensor streams
    - Optimized Camera Driver to improve speed from 4 fps to 14 fps
- Feature-level fusion:
- Implemented lidar and radar fusion node in C++ to be used with ROS
- Implemented extended kalman filtering module for tracking occluded objects
- Implemented majority voting scheme for false positives in detections

INTELLINE CRYOGENICS | SOFTWARE TECHNICAL LEAD
June 2017 – March 2018
- Developed synthesis and mapping tool to generate schematic for cryocoolers in C++ (accelerated with CUDA)
- Employed nvGraph's shortest path algorithms to aid in generating schematic

IGEM SYNTHETIC BIOLOGY | MATH AND MODELLING
May 2017 - October 2017
- Implemented a Naïve Bayesian data transform to extrapolate effectiveness of experimental data in Python
- 3D Modelling of proteins using anisotropic network models in Python

UNIVERSITY OF WATERLOO | COMPUTER VISION ENGINEER
May 2016 - August 2016
- Implemented a published image processing technique using python and OpenCV to quantitatively assess nanomaterials for defects
- Employed kNN template matching with shapelet functions to identify defects

RESEARCH

DEFLECTION ROUTING ON XILINX FPGA
University of Waterloo
• Working with Prof. Nachiket Kapre on a multiple I/O switch for efficient Network on Chip architecture on Xilinx FPGAs using Verilog