Ge Shi

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Education

University of Massachusetts–Amherst — Amherst, MA
Master of Science in Computer Science; GPA: 3.90/4.00 — *May. 2019*

Zhejiang University — Hangzhou, China
Bachelor of Engineering in Automation; GPA: 3.65/4.00 — *Sept. 2013 – July. 2017*

Programming Skills

Languages: Python, C/C++, Java, Matlab, SQL, Javascript, R, D3, Node.js.
Courses: Advanced Algorithm, Data Base, Distributed System, Statistics and Probability, Uncertainty Inference, Networks.
Abilities: Machine Learning, Computer Vision, TensorFlow, Database, Image Processing, Robotics(ROS), Deep learning, Data Visualization, Programming Principles.

Internship Experiences

NetEase Huyu Incorporation, Limited — Hangzhou, China
Game AI Software Engineer — *Nov. 2016 - Feb. 2017*

- **Classification**: Engineered supreme supervised classification theory using Python, SQL and database technology; Classified the preferences of the game players for roles' careers, equipments, ornaments and game modes to optimize recommendation system.
- **Behavior Trees**: Took part in the design of game AI behavior trees of a 'guardian', which based on the habits of player to patrol and track enemies; fixed bugs to make AI robot behave normally.
- **Internet worm**: Created and Exerted internet worms on the online interest sharing communities like Baidu Post Bar, Weibo etc. to get the information of interested potential customers, which facilitated the propagation and market department.

Huiying Medical Technology (Beijing) Incorporation, Limited — Beijing, China
Image Processing Software Engineer — *Jul. 2016 - Aug. 2016*

- **Machine learning**: Applied machine learning theory onto the auto-diagnosis systems of medical images to decide the focal position of DICOM image collected from the server via WADO, and outlined target area with the image cloud PACS system.
- **Image Processing**: Developed the machine learning framework in C++ as a member of algorithm team which pertains to system development and mining algorithms for image segmentation and image registration.

Academic Projects

Camera Rotation Estimation — Amherst, MA
Supervisor: Prof. Learned-Miller — *March. 2018 - Present*

- **Image Registration with Auto-tracker**: The inspiration of the project is the sensibility of pixels in a video frames formed by a fixed focal length camera is mono-scaled with respect to camera rotation while it is proportional to camera translation. The purpose of the project is to register the background of the images leaving out of the foreground. First, key points such as corners and edges are extracted by the state-of-art auto-tracker and least square method is used to compute appropriate rotation parameters.
- **Pixel Congealing**: Congealing is a way of aligning a group of objects simultaneously , using an entropy minimization procedure. I implemented the algorithm in python and matlab based on passive motion recovering theory and negative log-likelihoods minimization to tweak optimal camera rotations, translations and depths parameters.

Moving Object Segmentation — Amherst, MA
Supervisor: Prof. Learned-Miller — *March. 2018 - May. 2018*

- **Deep Neural Network**: Adopted encoder-decoder model to preserve spatial information of pooled deep features. Based on the initialization of optical flow net to transfer learning segmentation boundaries.

- **Unsupervised Learning**: Leveraged well designed loss function to train Neural Networks with unsupervised learning. Based on recent papers, improved the architecture to train a more general model to well fit optical flow and reduce overfitting.

Semantic Image Segmentation Amherst, MA
Supervisor: Prof. Maji *Oct. 2017 - Jan. 2018*

- **Convolutional Neural Network**: Applied Deep FCNs method in semantic image segmentation tasks. Adopting proposed pyramid scene parsing network (PSPNet) to learn features and working on PASCAL VOC 2012 and Cityscapes datasets.
- **Conditional Random Field**: Utilized CRF (conditional random field) algorithm to refine the boundary of segmentation. Adapted the classical algorithm with heuristic pairwise potential to avoid miss classification. The loss function is trained on SVM.

Model Inference Processes Amherst, MA
Supervisor: Prof. Brun *Oct. 2017 - Jan. 2018*

- **Model Inference Techniques**: Collected log files with multiple traces of human-driven process descriptions for the same process, then managed them into Node.js network type using JavaScript and customized model inference techniques (Synoptic) to infer an FSM (finite state machine) model that captures all the variations in the process.
- **High Level Goal**: Evaluated the generative properties of the model with JAVA code snippets. Performed sensitivity analysis on the inclusion of more or fewer traces. The high level goal is to build self-monitor system which is conducive to the stability of self-adaptive systems in dynamic environments. The result is visualized with Data-Driven Documents (D3) based on JavaScript online.

Multi Source Information Based SLAM Design Hangzhou, China
Supervisor: Prof. Yu Zhang *Oct. 2016 - May. 2017*

- **Optical Flow**: Applied optical flow theory to establish a fully direct probabilistic model minimizing photometric error. Generated dense 3D points cloud by utilizing lie group algebra in computer vision to estimate the pose of camera and position of features
- **Robot Operating System**: Based on ROS (Robot Operating System), Linux and toolbox/library (OpenSLAM & OpenCV) to develop an offline SLAM (simultaneous localization and mapping) system.
- **Improvement of DSO**: Used DUO MLX stereo camera to fit in the Direct Sparse Odometry algorithm; Improved the performance of DSO in weak light environment using binocular camera, infrared filter and IMU (Inertial Measurement Unit)

Humanoid RoboCup Soccer Competetion Hangzhou, China
Supervisor: Prof. Rong Xiong *Sept. 2015 - Jul. 2016*

- **Prize**: Won 2nd Place in this world-renowned competition.
- **Court Recognition with OpenCV**: With the aid of OpenCV toolboxes, mended the codes for soccer court features recognition such as the goal, rivals, soccer ball, sideline from single camera vision.
- **Robot Pace Motion**: Simulated robot pace motion on matlab rvctools and developed real time direction self-correction system with the help of IMU (Inertial Measurement Unit) using C++; final robot linear walking correction deviation is about 15cm/3m.

Supcon Robotic Competition Hangzhou, China
Team Leader *May. 2014 - May. 2015*

- **PC Controlled Mobile Robot**: Designed an entire mobile robot using host computer and STM32; personal computer was in charge of processing images using OpenCV and making decision based on decision tree methods; STM32 was responsible for multi-motor control.
- **OpenCV**: Integrated visual functions to identify blocks and cans with different colors and shapes using OpenCV in C++; the goal of the mobile robot was to clean up a messed-up room, classified and arranged blocks and cans in matching locations.