

Resume

Ge Shi

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EDUCATION

University of Massachusetts–Amherst

Master of Science in Computer Science; GPA: 3.90/4.00

Amherst, MA

May. 2019

Zhejiang University

Bachelor of Engineering in Automation; GPA: 3.65/4.00

Hangzhou, China

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, Networks.

Abilities: Machine Learning, Computer Vision, TensorFlow, Database, Image Processing, Robotics(ROS), Deep learning, Data Visualization, Programming Principles.

ACADEMIC PROJECTS

Super Congealing

Supervisor: Prof. Learned-Miller

Amherst, MA

March. 2018 - Present

- **Primary Goal:** The inspiration is the effect of camera rotation on the photograph is invariant to the depth of scene while the effect of camera translation is proportional to the inverse of depth. The purpose of the project is to get the estimations of camera motion, relative depth map of the scene and stitching video frames to form a panorama.
- **Image Registration with Auto-tracker:** 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 set of images simultaneously, using an entropy minimization procedure. I implemented the algorithm in python based on negative log-likelihoods minimization and gradient descent to tweak optimal camera rotations, translations and depths parameters.

Moving Object Segmentation

Supervisor: Prof. Learned-Miller

Amherst, MA

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 penalizing both image gradients and motion smoothness to train Neural Networks with unsupervised learning. Based on UnFlow, Fine-tuned the pre-trained optical flow model on the DAVIS Dataset.

Semantic Image Segmentation

Supervisor: Prof. Maji

Amherst, MA

Oct. 2017 - Jan. 2018

- **Convolutional Neural Network:** Applied Deep FCNs methods 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 segmentation of boundary. Adapted the classical algorithm with heuristic pairwise potential to avoid miss classification. The loss function is trained on structured SVM layer.

Model Inference Processes

Supervisor: Prof. Brun

Amherst, MA

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

Supervisor: Prof. Yu Zhang

Hangzhou, China
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:** Using ROS (Robot Operating System), Linux and toolbox/library (OpenSLAM & OpenCV), developed an offline SLAM (simultaneous localization and mapping) system.
- **Improvement of DSO:** Used stereo camera and infrared filter to fit in the Direct Sparse Odometry algorithm; Improved the performance of DSO of long term tasks with Kalman filter and IMU (Inertial Measurement Unit).

Humanoid RoboCup Soccer Competition

Supervisor: Prof. Rong Xiong

Hangzhou, China
Sept. 2015 - Jul. 2016

- **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

Team Leader

Hangzhou, China
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.

INTERNSHIP EXPERIENCES

NetEase Huyu Incorporation, Limited

Game AI Software Engineer

Hangzhou, China
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

Image Processing Software Engineer

Beijing, China
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.

AWARDS

2nd Place in Robocup Kidsize Humanoid League
Zhejiang University Excellent Academic Scholarship 15/100
Zhejiang University Outstanding Student Leadership Award 2/100
Shanxi Province Outstanding students Award 3/1000

VOLUNTEER WORKS

Museum of Hangzhou

Interpreter in Palaeontology region

Hangzhou, China
Jun. 2014 - May. 2016