Zhiming Ruan

2180 Medford Rd Apt 29, Ann Arbor, 48104, U.S.A.
(+1)734-272-6332 ruanzhim@umich.edu https://github.com/BarryRuan

Education

University of Michigan -- Shanghai Jiao Tong University(SJTU) Joint Institute Sep 2015 - May 2019
B.S.E. in Electrical and Computer Engineering, Overall GPA: 3.70/4.0
University of Michigan -- Ann Arbor Aug 2017 - May 2019
B.S.E. in Computer Science (Joint Program), Overall GPA: 3.76/4.0
- ❏ Course Highlight: Intro. to Machine Learning, Computer Vision, Natural Language Processing, Autonomous Robotics, Reinforcement Learning, Information Retrieval, Operating System, Web System

Research Experiences

SMC inference in tracking large articulated models | University of Michigan | Research Assistant Mar 2019 - Sep 2019
Advisor: Chad Jenkins, Associate Professor in Computer Science and Engineering, University of Michigan
- ❏ Researched and applied faster-rcnn on tool detection and tool parts detection
- ❏ Built infrastructure for human-robot interaction and a Rviz interface for demonstration and testing
- ❏ Designed a user-friendly user interface for robot manipulation on tools
- ❏ Formulating and designing Sequential Monte Carlo factor graph message passing in objects pose estimation and tracking
- ❏ Implemented Particles Filter pose estimation for baseline comparison on RBO dataset
- ❏ Submitted research paper to **ICRA 2020**

Deep Learning on Velocity Flow Field Prediction | UM-SJTU Joint Institute | Research Assistant May 2018 - Sept 2019
Advisor: David Hung, Associate Dean and Professor at the University of Michigan -- Shanghai Jiaotong University Joint Institute
- ❏ Researched and applied deep learning models based on LSTM-RNN on velocity flow field prediction in real engines
- ❏ Managed to provide real-time prediction on patterns of upcoming flow fields with small errors
- ❏ Proposed a novel way of studying traditional in-cylinder air flow structure based on deep learning models

Working Experiences

UM-SJTU Joint Institute | Teaching Assistant for Probabilistic Method in Eng. | Shanghai May 2018 - Aug 2018
- ❏ Provided recitation or review class every week
- ❏ Graded homework assignments and exam papers
- ❏ Held office hours every week
- ❏ Provided students feedbacks to course instructor to improve overall course quality

Project Experiences

The Botanist -- an Autonomous Plant Caring Robot | University of Michigan Jan 2019 - Apr 2019
- ❏ Implemented 2D SLAM on robots for navigation in unknown environment
- ❏ Built a communication system between robot and plant pots
- ❏ Designed an algorithm based on Deep Q-learning for light source searching using encoded sensor measurements as states
- ❏ Implemented a Spanning-Tree based algorithm for coverage of continuous areas by a mobile robot
- ❏ Designed and implemented a robust state machine for the autonomous system

Automatic Timeline Builder for Social Events | University of Michigan Feb 2019 - Apr 2019
- ❏ Designed an efficient recursive searching pipeline for social event timeline builder
- ❏ Researched and applied a rapid automatic keyword extraction algorithm for search result summary
- ❏ Researched and applied *GloVe* model for word embedding
- ❏ Implemented a tool to filter out irrelevant information and build timeline for social events

Customized region replacement tool on RGB images | University of Michigan Oct 2018 - Dec 2018
- ❏ Implemented a tool to remove undesirable elements in an image and fill in with meaningful global texture in its background
- ❏ Applied YOLOv3 to provide object bounding boxes for customized object selection
- ❏ Designed an algorithm to calculate region patch size for inpainting using *Potts Energy* and *Gaussian Kernel*
- ❏ Implemented Exemplar-Based Inpainting for content selection and improved it for higher computational efficiency

Genre Prediction | University of Michigan Oct 2018 - Dec 2018
- ❏ Implemented seven different methods for genre prediction including *Gradient Boosted Decision Tree*, *SVM*, *Naive Bayes*, *Random Forest*, *Neural Network*, *Logistic Regression* and etc.
- ❏ Implemented different word representation models including *Binary Features*, *Bag of Words*, *Tf-idf*
- ❏ Provided meaningful evaluation on each word representation model and genre prediction model

Dynamic pages for photo sharing application | University of Michigan Jan 2018 - Feb 2018
- ❏ Implemented a dynamic pages photo sharing application similar to Instagram
- ❏ Applied React framework for front end user interface
- ❏ Built a database of user information with SQL and applied Rest API to realize dynamic pages

Skills

Programming: C/C++, Matlab, Python, Html, Java Script, Mathematica, Latex, Shell, Linux, ROS, PyTorch, TensorFlow
Modelling: Blender, AutoCAD
Language: GRE: Verbal - 154 (45% percentile) Quantitative - 170 (94%) Analytical Writing - 3.5
TOEFL: Total 105 (Reading 27, Listening 28, Speaking 22, Writing 28)