ZHIHAO ZHANG

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EDUCATION

Renmin University, China *September 2016 - Present*
B.S. in Computer Science Overall GPA: 3.74/4.0 (3%)

- Courses: Higher Algebra, Probability Theory, Data Structure, Introduction to Machine Learning, Principle of Computer Organization, Operation Research, Mathematical Statistics

University of Edinburgh, UK *September 2018 - June 2019*
Full year visiting student, major in computer science Overall GPA: 4.0/4.0

- Courses: Algorithm Design and Analysis, Compiling Techniques, Computer Networks, Advanced Machine Learning, Reinforcement learning(graduate level), Computer Security

RESEARCH EXPERIENCES

University of California Berkeley, Mechanical Systems Control Lab *Berkeley, U.S*
Research Intern, advised by Prof. Masayoshi Tomizuka *2019.10-now*

- "Unsupervised Distance Learning of Dynamic Model in Latent Space", a model based goal conditioned unsupervised reinforcement learning algorithm. This paper is aiming at replacing the hand-crafted reward function by the shortest distance in a learned latent space. We use variational auto-encoder to encode both state space and state-action space to the shared latent space. The bridge between state and state-action pairs is connected by the transition tuple (s, a, s'). We could then use this latent distance to either be a reward function or directly derive the policy.

Carnegie Mellon University, Intelligent Control Lab *Pittsburgh, U.S*
Research Intern, advised by Prof. Changliu Liu *2019.6-2019.10*

- AutoEnv, an integrated platform for autonomous driving related tasks. Components include preprocessing, algorithm implementation(TRPO, PS-GAIL, RLS), simulation and evaluation. Now published as an open source code base v1.0 on GitHub. Link `https://github.com/JackFram/Autoenv`
- AGen, an online adaptive generative trajectory prediction algorithm. Using Recursive Least Square algorithm to optimize policy network's final layer weights, the initial policy weights are given by offline PS-GAIL algorithm. We have mathematically proven that by using online RLS, the prediction error lower bound could have a better performance compared with offline PS-GAIL.

RUC Multimedia and Intelligence Lab *Beijing, China*
Research Assistant, advised by Prof. Qin Jin *2018.6-2019.3*

- Visual-dialog challenge 2018, design an encoder-decoder framework incorporate attention mechanism to achieve multiple round of Q&A. Encoder is consisted of a ResNet50 for image feature extraction and LSTM for question encoding, decoder is a LSTM for answering questions.

RUC Big Data Analytics and Intelligence Lab *Beijing, China*
Research Assistant, advised by Prof. Jiajun Liu *2017.1-2018.3*

- Human re-identification across Multi-channel camera, implementing YOLO2 as human figure localization algorithm and ResNet with semantic segmentation for figure embedding. We get our final ranking list by doing the trick of re-ranking, averaging the top 10 figures' feature and calculating the L2 distance as the ranking score.

PUBLICATION

- **Social-WaGDAT: Interaction-aware Trajectory Prediction via Wasserstein Graph Double-Attention Network**, on submitted to CVPR 2020
  Jiachen Li, Hengbo Ma, **Zhihao Zhang**, Masayoshi Tomizuka

PROJECT

VioTrace – A system for violence detection and tracking June 2018

We design a system named VioTrace to assist people in detecting violence behavior and tracking criminals in a multi-channel camera scenario. This system is consisted of two parts, violence detection and human re-identification. For the first part, we use a C3D network to detect the violence scene from a stream of video. During the second phase, we first implement YOLO v2 to give the bounding box of the person in the scene, then do human re-identification for multi-channel camera to track the person involved in the violence incident.

RealU – A web application for entrepreneurs preparing for their career Oct 2017

An independent developed web application using flask. This app includes both the front-end and back-end design. The front-end design is assisted by Jinja2 and Bootstrap and the back-end database is designed on top of PostgreSQL. The motivation for this project is completely out of personal interest and want to practise for large scale programming as well. The source code for this web application is published online, link: `https://github.com/JackFram/RealU`. Application's link: `https://realu.herokuapp.com`

Tencent data analysis competition – Ads Conversion Rate prediction Jan 2017

Independently developing the whole pipeline for advertisements conversion rate prediction competition. From data preprocessing to model selection, hyper-parameter fine-tuning. Data preprocessing include data cleaning, statistical analysis and feature selection using PCA/GBDT. In order to balance between bias and variance and provide a robust model, I choose to use the ensemble model which incorporates the prediction result from Logistic Regression, XgBoost, Random Forest and LightGBM.

TECHNICAL STRENGTHS

Research background	Machine Learning, Computer Vision, Reinforcement Learning, Meta-Learning
Software & Tools	Python, C, C++, Java, Pytorch, Tensorflow
Language	TOEFL overall 112, speaking 25 GRE Best Score Verbal 158, Quant 170, writing 4.0

ACADEMIC ACHIEVEMENTS

Annually Academic Achievement Scholarship 2016-2018
Dean's Scholarship of RUC 2018
National Undergraduate Training Programs Scholarship for Innovation and Entrepreneurship