Hao Xu

4th Building, East Campus, Sun Yat-sen University, Guangzhou, China, 511400
Email: xuhao57@mail2.sysu.edu.cn | Phone: (+86) 159-7202-4637 | Github: I-Paradox-I

Education

The School of Computing Sun Yat-sen University Sep 2020 - Jun 2024

Bachelor of Computer Engineering, B. CE Guangzhou, Guangdong, CN (mainland)

- GPA: **3.52/4.0** IELTS: **7.5/9.0** (Listening 8, Speaking 7, Reading 8, Writing 6.5)
- Core Courses: Computer Programming I (**Honor, 100**), Computer Programming II (95), Discrete Mathematics(96), Artificial Intelligence Practice(91), Software Engineering(94), Computer Networking Lab (94), and Database Systems Lab (90)。
- Awards:
    - **National Inspirational Scholarship**
    - Academic Second Prize Scholarship

The School of Computing National University of Singapore Jul 2023 - Aug 2023

- Summer Workshop Internship Singapore
- Course Project: Traffic Sign Recognition(**A- Prize**)

Research Experience

Visual Question Answering based on Visual Programming Framework | Oct 2023 -- present Lab Thesis | Individual

- Aim to develop a new Visual Question Answering system based on the framework from 2023 best paper of CVPR "Visual Programming: Compositional Visual Reasoning without Training." For more information, please refer to my **Research Proposal(link).**
- The Official Website of **Our Lab(link)**.

Traffic Sign Recognition | July 2023 Traffic Sign Recognition | Team (Team Leader)

- Aimed to develop AI models for recognizing traffic signs on the GTSRB dataset, which consists of 43 classes and 39,209 images, with main challenges of (a) Occlusion (b) High Similarity (c) Blurriness (d) Underexposure (e) Glare Effect (f) Interference and etc.
- Traditional CV: Explored different combinations of traditional feature extraction methods(HOG, LBP, FFT and etc) and classifiers(SVC, Random Forest, KNN , Decision Tree, MLP).
- Neural networks: Designed and trained a 11 layers network(My-Net11), which achieves 97.36% accuracy.
- Integrated our model with 5 others like AlexNet, VGGNet, and etc. Eventually achieved a remarkable 99.58% accuracy by Voting.

Chinese-to-English Machine Translation | June 2023 **Simple Implementation of NMT | Individual**

- Aimed to design a neural machine translation model that translates Chinese to English on a dataset sampled from WMT Competition(10, 000 sentences).
- Employed a sequence-to-sequence (seq2seq) framework, whose encoder and decoder are both single-layer bidirectional LSTM.
- Implemented the beam search algorithm, which considers multiple possibilities when generating translation candidates.

Project Experience

Face Classification | May 2023 **Linear Classification | Individual**

- Aimed to train a face recognition model to classify 500 people's face photos into their unique IDs on a dataset which has more than 10,000 224x224 pictures. (Restriction: Self designed & trained models.)
- Picked Cross Entropy as the loss function, adopted tricks like Batch Normalization, Data augmentation, different initialization methods and more to improve performance.
- Depending on different devices, I constructed different networks from 3 layers CNN on my own desktop, to 11 layers Resnet on a remote server, respectively achieving 49.6% and 81.0% accuracies. (Pretrained Resnet 18's accuracy is around 73%).

SYsU-lang | April 2023 **Compiler Component for SYsU Language | Individual**

- SYsU is an instructional language used in the teaching of the Compiler Principles course at Sun Yat-sen University. Using LLVM, I developed components such as a lexer, parser, and IR generator for the SYsU language, eventually compiling SYsU into LLVM IR.

Skills and Abilities

- Platforms: Git, Github, Pytorch, Tensorflow, Keras, Hugging face and etc.
- Programming languages: C/C++, Python, LaTeX, HTML, CSS, Javascript, Matlab, Sql and etc.
- Tools: Visual Studio Code, Pycharm, Docker, Anaconda, Jupyter Notebook, Colaboratory, and etc.