Haoyu Wei

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Education

- **Northwestern University** — Evanston, IL
  M.S. in Computer Science; GPA: 4.0/4.0 — *Sep. 2019 – Jun. 2021 (Expected)*
- **Sichuan University** — Chengdu, China
  B.Eng. in Software Engineering; GPA: 86.7/100 — *Sep. 2015 – Jun. 2019*
- **National University of Singapore** — Singapore
  Summer Workshop in School of Computing: Cloud Computing & Big Data; Grading: A — *Jul. 2018 – Aug. 2018*

Research Experiences

- **Graduate Research Assistant** — Evanston, IL
  Northwestern Comp Photo Lab — *Oct. 2019 - Present*
  - Advised by Prof. Oliver Cossairt, Prof. Aggelos K. Katsaggelos, and Prof. Daniel Kim.
  - **Undersampled Medical Image Reconstruction using Adversarial Inpainting Networks.**
    • Primary research on inverse problems in Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) using highly undersampled data (less than 1/10 of data available).
    • Developed novel research in improving CT & MRI reconstruction in radial-encoded k-space using deep learning methods and currently moving to temporal domain image reconstruction.
  - **Uncalibrated Deflectometry with Mobile Devices on Extended Specular Surfaces.**
    • To identify the origin of Kokomo glasses in churches and museums, we developed ways to examine the texture patterns of the glasses using a portable device.
    • Assisted in experiment setup and normal map feature extraction and matching of glasses.
  - **Light Field Rendering of Holograms on 3D Glass Display.**
    • Developed an end-to-end light field display system, which generates a continous video of 30 frames with only 6 photos using a deep learning based light field depth estimation system. And connected a 3D holographic display device to show a 3D version of the object taken.
    • The system is robust especially for non-lambertian surfaces such as holograms due to the nature of Multiplane Images (MPI).
    • Mentored an undergrad student to do extended experiments on this project.
- **Undergraduate Research Intern** — Chengdu, China
  SCU DICA Lab — *Mar. 2018 - Jun. 2019*
  - Advised by Prof. Jiancheng Lv.
  - **Lab Homepage Full Stack Development.**
    • Developed a website for the lab using Java Springboot. Functionalities include lab information display and a management system for internal use.
  - **A Comparative Study of Pheumonia Classification Algorithms based on CNN.**
    • Advised by Hao Yin.
    • Developed and compared results of 5 machine learning models for both binary and multiclass classifications of X-Ray images. The models include a 11-layer handcrafted CNN model and 4 transfer learning CNN models with different classifiers and structures. The result of the best performing model achieved over 95% accuracy.
- **Undergraduate Research Intern** — Shenzhen, China
  Harbin Institute of Technology Shenzhen Graduate School — *Jan. 2018 - Mar. 2018*
  - Advised by Prof. Chunkai Zhang.
  - Assisted in research of *Over-Sampling Algorithm Based on VAE in Imbalanced Classification*, which aims to solve the imbalanced classification problem by using variational auto-encoder to fit the probability function of the minority samples without prior assumption, and reasonably expand the minority set.

Selected Projects

- **Leader in project "Probe Data Analysis for Road Slopes"** *Apr. 2020*
  - Matching 3 million GPS points to 0.2 million road link industry raw data and calculating road slopes using matched data.
  - Applied hidden Markov model in the map matching part. By adapting Viterbi algorithm and some tricks, the processing time is improved by thousands of times compared to brute force.
- **Leader in project "Lane Marking Detection from 3D Point Cloud"** *May. 2020*
  - Detected the boundaries of Lane Markings from 430 thousand real industry data.
- **Personal project "Ray Tracing and Physically-based Graphics Modeling"** *Jan. 2020 - Mar. 2020*
  - Two 3D WebGL-based projects written from scratch without libraries: 1. Physically based animation and modeling. Simulated tornatos, boid flocking behavior, spring mass system, and different ODE solvers; 2. Ray Tracing and Ray Marching. Reflection and shadow effects of 3D objects.
- **Leader in project "Android Mirror Painting Application"** *Mar. 2017 - Jun. 2017*
  - Developed an Android app where users can draw on either side of the phone screen while automatically generating symmetrical paintings on the other side in real time, with all painting tools supported.
  - Responsible for Android front-end development and database design.

Industrial Experiences

- **HUAWEI Technologies Co., Ltd** Chengdu, China
  Big Data Engineer Intern, 2020 Research Lab *Sep. 2018 - Dec. 2018*
  - **Data Analysis**: Console performance analysis and optimizing of Flow Tracing and Diagnosing System (FTDS) using Java and statistical analysis of FTDS manager.
  - **Document Compilation**: Compilation of FTDS user manual and development documents.
- **TOSIT Technologies Co., Ltd** Chengdu, China
  Big Data Engineer Intern *Mar. 2018 - Apr. 2018*
  - Research in Big Data pipelines in industries.
  - Led a team to develope a streaming data pipeline which integrates Hadoop, Spark Streaming, Flume, Kafka, Zookeeper and Hbase.

Activities & Services

- **Summer Reading Group on Approximation Algorithms** Evanston, IL
  Northwestern University, Led by Prof. Samir Khuller *Jun. 2020 - Present*
- **Talk on Undersampled Image Reconstruction in CT & MRI** Evanston, IL
  Comp Photo Lab, Northwestern University *Jun. 2020*
- **Department Leader** Chengdu, China
  Alibaba Club, Sichuan University *Oct. 2016 - Jun. 2019*

Awards & Honors

- ***Outstanding Graduate*** *Jun. 2019*
- ***Nomination of Star of School of Software*** *May. 2019*
- ***National English Competition for College Students(NECCS) - Second Price*** *2017, 2018*
- ***The First Class Individual Scholarship*** *2017 - 2018*
- ***The Second Class Scholarship (Top 10%)*** *2016 - 2017*
- ***The Second Class Individual Scholarship*** *2015 - 2016*

Programming Skills

- **Languages**: *Python, Java, Javascript, C, MATLAB*

Personal Links

- **GitHub:** https://github.com/whywww
  Personal Website: https://whywww.github.io/