

# YUNFAN SHI

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L77ES

## EDUCATION BACKGROUND

### University College London

Sep. 2021-Jun. 2023

**Major:** Robotics and Computation **Degree:** Master of Science

### University of Liverpool

**Major:** Computer Science **Degree:** Bachelor of Science

**GPA:** 86/100 (First Class Honours)

Sep. 2019-Jun. 2021

### Xi'an Jiaotong-Liverpool University (XJTLU)

**Major:** Information and Computing Science **Degree:** Bachelor of Science

Top 5%

## RESEARCH PROJECTS & PAPERS

### UoL Honours Year Computer Science Project (In Progress)

Sep. 2022-May 2023

#### Individual FYP

Supervisor: Xiaowei Huang (Professor)

- Developed novel attention mask proposal network architecture and specific learning mechanism
- Studied state-of-the-art XAI metrics to develop a general trainable XAI kernel for the novel network to approximate XAI mixtures, and Heuristics to develop appropriate activation and loss functions of the novel network to find attention mask to guide PGD attack
- Explored the stealth, explanation ability and efficiency of the attack and the future generalization prospects of XAI-guided image classification attack mask proposal
- Projected to write a paper on this research project:

[1] Yunfan Shi. End-to-end mask proposal network towards stealthy, explainable and query-efficient image classification attack

### XJTLU Surf Kitchen Mask/Fire/Uniform Anomaly Detection

Jun. 2022-Present

#### Project Co-leader

Supervisor: Xiaohui Zhu (Assistant Professor), Yong Yue (Professor)

- Custom trained and fine tuned YOLOv5s model (6.5X cheaper), as well as model pruning and ensembling for over 700 images processing to output more accurate and stable detection results, with a precision of 97%
- Wrote a paper on this research project and planned to publish:

[1] Yunfan Shi. Realtime mask detection of kitchen staff using YOLOv5 and edge computing

### UoL Department of Civil Engineering and Industrial Design

Sep. 2021-Present

#### Project Leader

Supervisor: Hyung-Joon Seo (Doctor)

- Adopted the deep convolutional network Matlab Darknet19 (14-minute training for 99% accuracy) and PyTorch YOLOv5s (3-minute training for 97% accuracy) to classify 9 road damage types and compared these 2 popular models' performance under SS, WS, WR, WC (weather) in DC, IR, MSX images
- Wrote two papers on this research project, which have been accepted by *Remote Sensing* (Earth and Planetary Science Q1) and are projected to be published:

[1] Yunfan Shi. Comparing summer and winter deep learning-based thermal image analysis of complex pavement defect conditions

[2] Yunfan Shi. Automatic road pavement damage detection using DarkNet19 and YOLOv5

### AI-Based BI Website Development

Jan. 2022-May. 2022

#### Project Leader

Supervisor: Michele Zito (Doctor)

- Used Django, TensorFlow, Vue, LSTM model, demand curve model and customer segmentation model to develop and deploy an industrial standard website providing visualized Business Intelligence

### Optimization on YOLOv5n Hyperparameter in Face Detection of the Low-Resolution Images via DOE

Dec. 2021-Mar. 2022

#### Project Leader

Supervisor: Jens Rittscher (Professor of the University of Oxford)

- Trained Yolov5n models on Yale Face, Wider Face, FFHQ and Casual Conversation datasets for Low-Resolution Face detection
- Employed Design of Experiments techniques to optimize a large number of hyperparameters of YOLOv5n object detection model

### AI UAV Water Quality Analysis

Oct. 2020-Mar. 2022

#### Project Member

Supervisor: Xiaohui Zhu (Assistant Professor), Yong Yue (Professor)

- Responsible for backup safe landing procedure development
- Trained a Monodepth2 model using UAV 2D camera images (37X cheaper and 9X faster), instead of expensive Depth camera or LiDAR

## INTERNSHIP & WORKING EXPERIENCES

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**Ivy**  
*Contract Developer*  
**Duty:**

**London, GB**  
*Jul. 2022-Present*

- Contributed to ivy.all method: JAX, PyTorch, TensorFlow, Numpy, MXNet implementation & wrapping, document maintenance
- Contributed to ivy.frontend.tensorflow.hard\_sigmoid activation function: code implementation, debugging, testing on all backends

**Shenzhen Montnets Technology Co., Ltd.**  
*Text-To-Image Research Intern*

**Shenzhen, CN**  
*Jun. 2022-Sep. 2022*

**Duty:**

- Optimized running time and aesthetic effect balance based on off-the-shelf libraries integration, algorithm improvement and mathematics (up to 50X faster)
- Tuned Disco diffusion parameters for inference speedup (1.6X faster) and hardware acceleration (up to 8.4X faster) API deployment into company NFT metaverse
- Investigated and analyzed several novel text-to-image deep learning models such as GauGAN, DALL-E 1-2, Imagen, Parti, and presented an analysis report to the supervisor
- Selected StyleGAN3 and Parti to train prototype models for company service and conducted a commercial service scale up cost feasibility report

## AI Competitions

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Kaggle NLP 21/727

*Jul. 2022*

Kaggle Petals to the Metal - Flower Classification on TPU 9/123

*Jul. 2022*

Kaggle Petfinder (Ranked 464 among 3537)

*Jan. 2022*

## SKILLS

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**Languages:** English (proficient), Mandarin (native)

**Kaggle Certificate:** Computer Vision, Feature Engineering, Machine Learning and Explainability, Data Visualization, Data Cleaning, Python and Pandas

**Computer Programming Language\*:** Python, MATLAB, Excel, Tableau, Java/C/C++/C#, PyCharm/iDea, VS/VSCode

\*GitHub Repositories: <https://github.com/FrankShi9?tab=repositories&q=&type=public&language=&sort=stargazers>