

Xin Cai

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Education

Ulster University

Belfast, UK

PhD Candidate, Cancelled, Computer Science & Technology

Sept. 2021 - Dec. 2023

Recipient of Department for the Economy (DfE) International Studentship

PhD Project: Large-Scale Crop Type Mapping from Satellite Image Time Series

In the initial phase of my PhD, I delved into the possibilities of constructing deep generative classifiers for the analysis of SITS. In the subsequent stage, I attempted to reformulate the representation of SITS to bridge the gap between SITS analysis and more widely recognized research domains, such as time series analysis and computer vision.

Sichuan University (Project 985 & 211)

Chengdu, China

M.Sc. (Degree Type: equivalent to MPhil), Computer Science & Technology

Sept. 2017 - Jun. 2020

Overall GPA: 3.58/4.0

Master Thesis: On Deep Learning-Based Dense Pixel-wise Prediction.

Supervisor: Prof. Yi-Fei Pu

The thesis aims at studying a wide range of computer vision tasks, such as semantic segmentation, human pose estimation, depth estimation, and optical flow, in a unified framework, referred to as dense pixel-wise predictions. Besides, a novel method was proposed to efficiently generate high-resolution predictions, which has been considered as one of the greatest challenges for dense pixel-wise predictions.

Shanghai Normal University

Shanghai, China

B.Eng., Telecommunications Engineering

Sept. 2011 - Jun. 2015

Overall GPA: 3.61/4.0

Bachelor Thesis: On HEVC-Based Video Coding Technology.

Thesis Advisor: Assoc. Prof. Qian Zhang

The main contributions of the thesis: (1) A fast Coding Unit (CU) partition algorithm based on depth levels predicted from spatially adjacent CUs was proposed; (2) An intra-frame candidate mode selection algorithm was proposed to reduce redundant information in the spatial domain, thereby improving the coding efficiency.

Extracurricular Research Experience:

Research Advisor: Prof. Yan-Hua Long

Building an automatic speaker verification system based on Gaussian Mixture Models (GMMs).

Employment

Sunrise Asset Management Co., Ltd

Shanghai, China

Broker

Jul. 2015 - Jun. 2017

Stupid, but can't sweep it under the rug

Career Breaks

PhD Application & Covid-19 Pandemic

Taiyuan, China

Jul. 2020 - Aug. 2021

Publications

Cai, X., Bi, Y., Nicholl, P. and Sterritt, R., 2023. Revisiting the Encoding of Satellite Image Time Series. *BMVC Oral* [Work done at Ulster University] [[Paper Link](#)], [[Code Link](#)]

Cai, X., Bi, Y. and Nicholl, P., 2022. Tampered VAE for Improved Satellite Image Time Series Classification. arXiv preprint arXiv:2203.16149. [Work done at Ulster University] [[Paper Link](#)]

Cai, X. and Pu, Y.F., 2019. FlatteNet: a simple and versatile framework for dense pixelwise prediction. *IEEE Access*, 7, pp.179985-179996. [[Paper Link](#)], [[Code Link](#)]

Competitions

- FLAIR#2 Challenge by IGN 2023 [[Link:TotalVariation](#)]
Semantic segmentation and domain adaptation challenge proposed by the French National Institute of Geographical and Forest Information (IGN) aims to harness the textural information from single date Very High Resolution (VHR) aerial imagery and temporal information from Sentinel-2 satellite time series.
- AI4Food Security Challenge by ESA [[South Africa Track](#)] [[Germany Track](#)]
The goal of this challenge is to classify crop types based on time series data from Sentinel-1, Sentinel-2 & Planet Fusion Monitoring Data. My submissions (completed all by myself) marked as [AIRC_Ulster](#) are ranked 8th and 7th on the South Africa and Germany Track, respectively.
- PASCAL VOC 2012 Challenge Competition "comp5" Leaderboard ([[Link:XC-FLATTENET](#)])
PASCAL VOC 2012 Challenge is one of the most widely used datasets for benchmarking visual recognition algorithms. There are three main object recognition competitions: classification, detection, and segmentation. My submissions (completed all by myself) are currently ranked 1st and 3rd out of a total of 32 submissions that have been marked as public on the segmentation leaderboard. (Up to 00:00 24th Apr. 2021)

Honours & Awards

The Recipient of Department for the Economy (DfE) International Studentship

Artificial Intelligence Research Centre, Ulster University, Belfast, UK, Oct. 2021 - Nov. 2023

The Star of Shanghai Normal University

Shanghai Normal University, Jan. 2013

The highest honour awarded to students at Shanghai Normal University annually.

Shanghai Municipal Government Scholarship

Shanghai Normal University, Nov. 2012

The First Prize Scholarship

Shanghai Normal University, Nov. 2012

Skills

Research Interests: Computer Vision, Deep Generative Models, Multimodal Learning, Time Series Analysis, Remote Sensing, and Medical Image Analysis

Programming Languages: Python, C/C++, Matlab, Shell Scripting

Deep Learning Libraries: PyTorch, TensorFlow

Systems: LINUX, SLURM

Writing Tools: L^AT_EX

Languages: Native Chinese, Fluent English