

Zhang Boxuan

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RESEARCH INTEREST

Computer Vision
Machine Learning
Programming

Object Detection/Classification in Natural&Remote-Sensing Scenes
Self&Semi-supervised Learning, Active Learning, Reliable Machine Learning
LaTex, Python, Pytorch, JavaScript

EDUCATION

Wuhan University
M.E. in Artificial Intelligence
– GPA: 3.74/4.00(92.08)
– IELTS: 7.0

Wuhan, CHN
September 2022 - June 2024 (expected)

Wuhan University
B.E. in Computer Science and Technology
– GPA: 3.60/4.00(88.81)

Wuhan, CHN
September 2018 - June 2022

RESEARCH AND PROJECT

Object Detection in Remote-Sensing Images

2022.11-2023.07

- It focuses on **Semi-Supervised Object Detection(SSOD)** and **Active Learning(AL)**.
- It proposes a novel AL method to boost SSOD for remote sensing images with a teacher-student network, called SSOD-AT, which can achieve high detection accuracy **only with limited labeled samples**. This helps to solve the problem that the available labeled images for object detection are very limited in remote-sensing scenes.
- Experiments on two popular datasets, DOTA and DIOR, show that SSOD-AT can achieve comparable detection capability to the **fully supervised model** only with the label proportion of **50.0%** on DOTA and **30.0%** on DIOR.
- The code is publicly available at: github.com/ZBox1005/SSOD-AT

Machine Learning on Tunnel Boring Machines(TBMs) Excavation

2023.10

- This project was carried out in collaboration with the **School of Civil Engineering, Wuhan University**.
- This is a study of **rock mass accurate classification based on multi-algorithm cross multi-feature optimization selection** and **TBM parameter efficient prediction using low-dimensional inputs**. It helps TBMs to perceive geological conditions in advance and study the optimal operational parameters under geological variations.
- For rock mass classification, we conducted extensive experiments on **different models**, reaching the classification performance with an F1 score of **0.88** for the four-class classification and **0.90** for the binary classification.
- For parameter prediction, in comparison to the reference prediction accuracy provided by the proposition group, the **GANDALF-based models** improve the average goodness of fit (R2) for single-cutter torque from 0.7171 to **0.7615** and for single-cutter thrust from 0.5895 to **0.6691**.
- The code is publicly available at: github.com/ZBox1005/TBM-Competition

Self-Supervised Techniques for Intelligent Image Annotation

2023.04

- This project is applying for the **Hubei Provincial Technology Innovation Program** in collaboration with Hubei People's Hospital and Wuhan Zhongzhi Digital Technology Company, which is led by my master's advisor, Dr. Zengmao Wang.
- It is aimed at "smart city" and "smart healthcare", and is committed to achieving or even surpassing the performance of a large number of labeled images by using only image-level annotations or unlabeled images.
- In this project, I am responsible for the **research of self-supervised learning models**.

Semantic Segmentation for Open Set Domain Adaptation

2022.01-2022.05

- It focuses on unsupervised domain adaptation and feature alignment.
- It performs **feature alignment** by means of a cross bilateral filter and depth-based warping, which allows the segmentation model to **better migrate between open domains** (eg. daytime to nighttime).
- It is the feature alignment that plays a significant role in semantic segmentation field, especially in open set domain scenes.

PUBLICATIONS (Under Review)

- **Boosting Semi-Supervised Object Detection in Remote Sensing Images with Active Teaching**
Boxuan, Zhang and Zengmao, Wang and Bo, Du
submitted to *IEEE Geoscience and Remote Sensing Letters*, 2023. **Rank: Q1**.

AWARDS

- The third place in The Second TBM Excavation Parameter Data Sharing and Machine Learning Competition.