Ziao Yang

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EDUCATION

Sun Yat-Sen University Sep 2018 - Jul 2022
Bachelor of Science in Computer Science Guangzhou, China
Main Courses: Data Structure and Algorithms, Natural Language Processing, Artificial Intelligence, Graph Theory.

RESEARCH EXPERIENCE

The First Spatiotemporal Foundation Models for Extreme Weather Nowcasting May 2022 - Present
International Digital Economy Academy, Research Intern ShenZhen, China
Directed by Jiaxing Zhang

- Built and trained large-scale spatiotemporal foundation models based on patch option in the field of weather nowcasting using 16 A100 GPUs.
- These models will be open resource soon in IDEA-Fengshenbang (IDEA Research strives to build a universal infrastructure for cognitive intelligence).

Supervised Pre-Training for Text Classification based on Meta-Learning Mar 2022 - Present
International Digital Economy Academy, Research Intern ShenZhen, China
Directed by Jiaxing Zhang

- Constructed Supervised pre-training datasets (27million) for multi-classification tasks using existing datasets and performed sub-task sampling.
- Performed supervised pre-training on BERT using Meta-Learning algorithms (e,g., MAML, Reptile) to enlighten it with prior classification knowledge.
- Used variational information bottleneck and sharpness-aware minimization to ease the model's memorization of the training task labels and improve the generalization of the model.

Precipitation Nowcasting based on Transformer with Patches Sep 2021 - Mar 2022
Sun Yat-Sen University & National Meteorological Administration Guangzhou, China
Directed by Qing Ling and Qifeng Lin

- Proposed a paper "PTCT: Patches with 3D-Temporal Convolutional Transformer Network for Precipitation Nowcasting".
  - Introduced a patch option to TCTN, where original radar echo frames are split into multiple patches to remove the constraint of inductive bias of CNN (i.e., translation invariance and locality).
  - Mask random patches of original frames and reconstruct them in the loss function which is helpful to avoid overfitting.
- Assist to set up a real-time radar echo extrapolation system in National Super Computer Center in Guangzhou. This system is used to assist the National Meteorological Administration in Precipitation Nowcasting.

Spatiotemporal Predictive Learning based on Transformer Sep 2020 - Sep 2021
Sun Yat-Sen University Guangzhou, China
Directed by Qing Ling and Qifeng Lin

- Proposed a paper "TCTN: A 3D-Temporal Convolutional Transformer Network for Spatiotemporal Predictive Learning".
  - Proposed a Transformer-based encoder with 3D temporal convolutional layers employed to capture better short-term and long-term dependencies than plain Transformer.
  - Used a Sequence Mask in attention score to prevent leftward information flow to preserve the auto-regressive property.
  - TCTN is the first auto-regressive model in spatiotemporal predictive learning which can be trained in parallel, and the code of TCTN got **50+** star in github.
- This work was recommended by the national level of the “College student innovation competition of Sun Yat-Sen University” (**Top1**).

PAPERS

- **Ziao Yang**, Xiangrui Yang, Qifeng Lin. "PTCT: Patches with 3D-Temporal Convolutional Transformer Network for Precipitation Nowcasting", submitted to Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**), 2022, Under Review. [pdf]
- **Ziao Yang**, Xiangrui Yang, Qifeng Lin. "TCTN: A 3D-Temporal Convolutional Transformer Network for Spatiotemporal Predictive Learning", arXiv preprint arXiv:2112.01085, 2021. [pdf] [code]

SKILLS

- **Deep Learning Software:** Pytorch, PyTorch Lightning
- **Programing Language:** Python, Matlab, C/C++, LATEX

OTHERS

Sports

- Captain of the volleyball team of the School of Computer Science and Engineering, Sun Yat-Sen University.
- National first-class athletes in swimming.