JIAYI ZHOU

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Education

Hiroshima University

Master of Informatics and Data Science Major: Advanced Science and Engineering, social computing lab. Graduation Thesis: Image captioning via Masked Conditional Diffusion. Thesis Advisor: Prof. Yasuhiko Morimoto & Prof. Sayaka Kamei & Prof. Koji Eguchi

Beijing University of Chemical Technology

Bachelor of ScienceGPA: 3.11/4.33Major: Information and Computing Science, College of Mathematics and Physics.Graduation thesis: Research on System of Automatic Solving Elementary Mathematics Problem.Thesis Advisor: Prof. Yongli Xu

Research Interests

• Diffusion Model

Projects

Image Captioning via Masked Conditional Diffusion | Python

• In order to mitigate the drawbacks of deep-rooted autoregressive methods, we develop an image captioning framework with discrete diffusion model. Our proposed MC-Diffusion contains a VQ-VAE image encoder to extract image features and a discrete diffusion model to predict text.

• Optimization

- Propose Masked condition strategy as better substitution of classifier-free guidance without hurting p(image|text) to guide the diffusion model to generate text related to the input image.
- Deploy proposed model on server with $4 \times$ nvidia RTX 3090 24GB graphics card. Results show that the model performs better compared with the baseline method on other metrics on the CUB-200 dataset.

The National College Student Mathematical Modeling Competition | Matlab

• Deep learning

- Find the optimal numerical solution for the heat conduction equation (PDE) through linear programming. Discovered and theoretically proved that the sequence of thermal exchange calculations for swapping clothing materials does not affect the final result.
- Complete the paper: Research on the design of high-temperature work clothing based on the heat conduction equation.
- Win the 1st prize in Beijing as leader of the team.

Experience

China Aerospace Science and Industry Corporation, the 6th Academy Network Engineer Intern

- Assisting in constructing network infrastructure: configuring network ports and IP addresses.
- Compiling and entering network information from various government agencies into the Bureau of Confidentiality's database.

Hiroshima University

 $Research\ student$

- Taking the course: Convex Optimization
- Following senior members of the laboratory to learn about and research Federated Learning.

Awards

First-class of People's Scholarship, China. (2021)Third-class of People's Scholarship, China. (2018, 2019)The Science and Innovation Scholarship, Beijing University of Chemical Technology, China. (2019)

Technical Skills

Languages: Python, C, SQL, Matlab Developer Tools: Pycharm, proxmox visual environment Technologies/Frameworks: Linux, GitHub, Pytorch October. 2022 – August 2024 Hiroshima, Japan

September 2017 – June 2021

Beijing, China

April 2022 – August 2022

July 2018 – August 2018

Hohhot, Inner Mongolia, China

Hiroshima, Japan

Now

September 2018