Yan Ma

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Education

- **Fudan University** — Shanghai, China
  M.S. in Computer Application Technology ***(postgraduate recommendation)*** — *Sep 2020 – Present*
- **Dalian University of Technology** — Dalian, China
  B.Eng. in Computer Science and Technology; GPA: 4.076/5; Rank: 12/123 — *Sep 2016 – Jun 2020*

Research Interests

- **RL Application in Animation**: Control the character to act like a humanoid in virtual physical world.
- **Quality-Diversity Solution Discovery**: Search high-performing solutions with diverse characteristics to resolve tasks flexibly via Reinforcement Learning (RL), Evolutionary Algorithm (EA), Generative Models (GM).

Projects (Selected)

- **Soccer AI imitation learning for specific goal scoring styles** — *Jul 2022 - Sep 2022*
  - Imitate AI policies with specific goal-scoring styles in *COG 2022 Football AI Competition.*
  - Leverage Generative Adversarial IL to imitate each player on the court with only 30+ game dumps.
  - Design the state representation of "Goal via Pass" goal-scoring style and achieve efficient imitation.
- **Diverse open loop control based on latent space of action sequence** — *Jun 2022 - Jul 2022*
  - Treat Diversity-driven Locomotion Control as generative tasks and learn the latent space of controllers.
  - Construct the prior distribution of action sequence (open loop controller) and capture the latent space via VAE.
  - Generate open loop controllers with diverse core features (e.g. direction and speed) and enable controlled diversity.

Publications

- **Quality-Diversity Reinforcement Learning for Locomotion Control Tasks** [Website]
  Master Thesis, Fudan University 2023
  - Due to the limited prior knowledge, RL may struggle to quickly and fully extract useful information from tasks.
  - This paper introduces two RL methods that leverage the concept of Quality-Diversity as prior knowledge. The first method focuses on action quality, while the second emphasizes action diversity. By combining these two methods, the final Quality-Diversity RL approach is formed.
  - Experiments on dense/sparse reward, and uneven terrain tasks demonstrate that the proposed method enhances learning efficiency and final performance across a range of tasks, with reliable evaluation supporting these findings.
  - The zero-shot adaptation experiments demonstrate that the policy trained by proposed method exhibits superior transfer and generalization capabilities.
- **Open-Ended Diverse Solution Discovery with Regulated Behavior Patterns for Cross-Domain Adaptation** [PDF]
  Association for the Advancement of Artificial Intelligence (AAAI) 2023
  Kang Xu, Yan Ma, Wei Li, Bingsheng Wei
  - Focus on regulated diverse behavior pattern discovery in Diversity-driven Reinforcement Learning, which can facilitate cross-domain adaptation.
- **Evolutionary Action Selection for Gradient based Policy Learning** [PDF]
  International Conference on Neural Information Processing (ICONIP) 2022 (Oral)
  Yan Ma, Tianxing Liu, Bingsheng Wei, Yi Liu, Kang Xu, Wei Li
  - Focus on inefficiency and brittleness in Evolutionary Reinforcement Learning (ERL) due to the utilization of Evolutionary Algorithms (EA) to optimize high-dimensional parameter space of policy network.

Honors and Awards

- Fudan University Master's Scholarship — *2022, 2021*
- Dalian University of Technology Outstanding Graduates — *2020*

Programming Skills

- **Languages**: Python, C/C++, Bash **Technologies**: Pytorch, Numpy, Mujoco, NeoVim, Tmux, Ray, Git