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.
- **Diverse Solution Discovery**: Search high-performing policies with diverse characteristics to resolve tasks flexibly via Reinforcement Learning (RL), Evolutionary Algorithm (EA), Imitation Learning (IL).
- **Evolutionary RL**: Develop RL+EA algorithms to resolve specific challenging problems (e.g., sparse rewards).

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.
- **reRLs: a collection of RL algorithms implementation** — *Feb 2022 - Feb 2022*
  - Implemented algorithms: VPG, A2C, NPG, TRPO, PPO.
  - Support for Ray-based parallel sampling, EnvPool-based vector environments, and Aim-based log recording.

Publications

- **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.
  - Propose *Evolutinoary Action Selection* (EAS), the key insight of which is to shift the evolutionary target from high-dimensional parameter space to low-dimensional action space that is easy to optimize.
  - Combine EAS and RL as EAS-RL, which performs well in dense and sparse reward locomotion control tasks.
- **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.
  - Propose *Diversity in Regulation* (DiR), which leverages the inverse dynamics with masked state input as the intrinsic diversity motivation to discover strategies with regulated local diversity.
  - Extrapolate to various test conditions (e.g. motor and sensor failure, dynamics shift) and outperform prior diversity-driven approaches.

Honors and Awards

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

Programming Skills

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