Matthew Thomas Pisano

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Research Objective: To create novel alignment strategies for artificially intelligent agents.

GitHub: matthew-pisano, which details my many open-source projects and contributions.
Portfolio Website: matthewpisano.com, for a more detailed look at my notable research, projects, and experience.

Skills and Experience

- **Research (3 Years):** Multiple conference acceptances, academic talk invitations, work in research labs.
- **Machine Learning (3 Years):** Transformer models, prompt engineering, RL, NLP, ASR, PyTorch, CUDA.
- **Python Programming (5 Years):** PyTorch, HuggingFace, data analysis, LLM fine-tuning, distributed systems.
- **Software Development (4 Years):** DevOps in a professional, team setting, CI/CD, project leadership and planning.
- **Web Development (5 Years):** React.js, Node.js, responsive design, DB management.
- **Awards and Certifications:** Eagle Scout, SUNY NP outstanding graduate, 1^{st} place at Mega-Ace.

Education

- **Rensselaer Polytechnic Institute** (*2023-2024*), Troy, NY. Master of Science in Computer Science, published thesis on artificial intelligence alignment. 4.0 GPA, awarded TA position and scholarship. Classes in Cognitive Science, Informatics, Learning Theory, Information Retrieval, Low-Level Parallel Computing, and Program Analysis.
- **SUNY New Paltz** (*2021-2022*), New Paltz, NY. Bachelor of Science in Computer Science (Minor in Applied Mathematics), undergraduate research. 4.0 GPA, *Outstanding Graduate honor*, and published undergraduate research.

Research and Publications

- **Bergeron: Combating Adversarial Attacks through a Conscience-Based Alignment Framework**. A weak-to-strong generalization framework for alignment. Involves an LLM acting as the "conscience" of a larger, more capable LLM. Accepted at the RPI Graduate Research Symposium. Published to *ProQuest*. ArXiv: 2312.00029
- **Moral High Ground: A Text-Based Games Benchmark for Moral Evaluation**, under *IBM*. A novel benchmark for evaluating the moral reasoning abilities of LLMs through conversational text-based games.
- **PredictChain: Empowering Collaboration and Data Accessibility for AI in an Algorand Blockchain-based Marketplace**. Research article on the development of *PredictChain*, a decentralized machine learning marketplace. 1^{st} place global hackathon winner. Presented at *ChainScience* 2023. ArXiv: 2307.15168
- **LLM Acoustic Modeling for ASR**, under the *RPI AIRC Lab*. Research into improving the performance of modern *automatic speech recognition* models by using a variety of techniques such as *LoRA* fine-tuning and corrector LLMs.
- **On Picard Groups and Jacobians of Directed Graphs**. Linear algebra and combinatorics study of *Chip-Firing games* and how graph edge manipulations affect game state evolution. Accepted into *JMM* 2023. ArXiv: 2302.10327

Work Experience

- **IBM Research** (*Research Extern, 2023*), Yorktown Heights, NY. Research into LLM alignment using moral principles through fine-tuning on text-based games. Generated a diverse conversational dataset of moral situations and trained LLMs to extract the embedded ethical principals.
- **Rensselaer Polytechnic Institute** (*Computer Science Teaching Assistant, 2023-2024*), Troy, NY. Assist students, grade assignments for *Principles of Software* and *Data Structures*. Created grading rubrics and mini-lesson plans.
- **Cyber Guardian Consulting Group / FileScience** (*Software Developer, 2020-2024*), Kingston, NY. Extensive use of AWS, custom SaaS solutions, full stack web development, cloud-to-cloud backup and restoration software.