ML@PSU: Advancing Machine Learning at Penn State

ML@PSU Organizing Committee

1 Executive Summary

This proposal outlines the establishment of ML@PSU, a student-led organization dedicated to advancing machine learning (ML) and deep learning at Penn State. ML@PSU will serve as a hub for collaborative learning, cutting-edge research, and personal development in these rapidly evolving fields. Additionally, ML@PSU aims to collaborate with local high schools and external institutions to promote interest in ML and research at the secondary education level.

2 Vision and Mission

Vision: To position Penn State at the forefront of machine learning innovation and education.

Mission: ML@PSU empowers students to excel in machine learning and deep learning through workshops, research discussions, and collaborative learning. The organization fosters a community that drives innovation, encourages interdisciplinary applications, and prepares members for impactful careers in ML.

3 Key Objectives

ML@PSU will focus on the following objectives to create a thriving ML community:

1. **Personalized Learning:** Facilitate small, focused workshops that provide hands-on experience in ML and deep learning, allowing for more direct interaction and personalized guidance.

2. **Research Engagement:** Hold regular meetings to discuss current research in ML, where members can present and discuss papers, articles, or blogs they find interesting. This encourages the development of critical skills in reading and explaining research papers, while keeping everyone updated on the latest developments in the field.

3. **Professional Connection:** Instead of inviting companies to give talks, ML@PSU will connect with experienced professionals working in ML through virtual meetings. These

informal discussions will allow members to learn about the real-world applications of ML and gain insights from those actively working in the field.

4. **High School Outreach:** Collaborate with local high schools to offer introductory lectures and workshops on ML, with the goal of sparking interest in machine learning and research at an early stage. This will also include initiatives to mentor high school students and involve them in basic ML research projects.

4 Flagship Programs

- **Focused ML Workshops:** Small-group workshops (with fewer than 20 participants) designed to provide in-depth, hands-on training in specific ML and deep learning techniques, ensuring personalized learning experiences.
- **Research Discussion Forums:** Regular meetings where members select and present research papers, articles, or blogs, followed by group discussions. This encourages continuous learning and helps members develop the skill of critically evaluating and communicating research findings.
- **Collaborative Research Incubation:** Based on ideas generated in discussion forums, members can form groups to pursue collaborative research projects, with the possibility of contributing to the academic body of knowledge through publications.
- **Virtual Professional Connections:** Periodic virtual sessions with ML professionals, where members can engage in informal discussions about current industry practices, challenges, and opportunities, broadening their understanding of ML applications in various sectors.
- **ML Ethics Roundtable:** Monthly discussions on the ethical implications of ML, focusing on real-world case studies and emerging ethical dilemmas in the field.
- **High School Lectures and Mentorship:** Develop a series of introductory ML lectures for local high school students, similar to programs like the "MIT Missing Semester," to help them understand the importance of ML in modern research and technology. Engage interested students in mentorship programs where they can participate in introductory research activities.

5 Organization Structure

- **President:** Vanisha Gupta
- **Vice President:** Pranav Karra
- **Technical Lead:** Krishna Pagrut
- **Treasurer:** Ian Yee

- **Event Coordinator :** Manit Garg
- **Secretary :** Pihu Agarwal
- **Discussion Facilitators:** To be appointed for specific research forums and ethics roundtables
- **Outreach Team:** To be formed to handle marketing, events, and external professional connections, as well as outreach to local schools for ML lecture series.

6 Meeting Schedule

- Weekly general meetings for research discussions, idea generation, and skill-sharing sessions
- Bi-weekly workshops on specific ML techniques or tools
- Monthly virtual meetings with ML professionals and ethics roundtables
- Quarterly outreach events at local high schools to introduce ML concepts and inspire early interest in the field

7 Resources and Support

- **Funding:** Apply for grants from Penn State's student organization fund
- **Compute Resources:** Partner with the university's IT department for access to GPU clusters and cloud computing credits
- **Datasets:** Collaborate with various Penn State departments to access and create diverse, real-world datasets
- **Software:** Leverage educational licenses for popular ML tools and platforms

8 Semester Roadmap

- **Weeks 1-2:** Organization launch, member recruitment, and ML skills assessment
- **Weeks 3-4:** Start the first series of research discussion forums and focused workshops
- **Weeks 5-6:** Continue research discussions, virtual professional connection sessions begin
- **Weeks 7-8:** First ML ethics roundtable, initial collaborative research projects form
- **Weeks 9-10:** Mid-semester progress check on research discussions and collaborative projects

- **Weeks 11-12:** Advanced ML workshops and research discussion forums
- **Weeks 13-14:** Preparation for end-of-semester presentations of research and learning outcomes
- **Weeks 15-16:** End-of-semester reflection, future planning, and identification of research projects to pursue in the following semester
- **Quarterly:** Hold outreach events and introductory ML lectures at local high schools

9 Success Metrics

ML@PSU will measure its impact through:

- Number of research discussions held and the diversity of topics covered
- Development of members' skills in presenting and discussing research
- Formation of collaborative research projects and potential academic outputs
- Member engagement in workshops and learning outcomes
- Quality of insights gained from virtual professional connections
- Outreach impact: number of high school students engaged and feedback from lectures and mentorship programs

10 Future Growth

As ML@PSU evolves, the organization envisions:

- Expanding the range of topics covered in research discussion forums
- Increasing the number and diversity of collaborative research projects
- Establishing a mentorship network connecting experienced members with new members
- Creating open-source ML resources or projects that benefit the wider community
- Expanding outreach efforts to reach more high schools and provide more resources for high school students interested in ML and research

11 Faculty Mentorship

ML@PSU seeks faculty mentorship to guide its academic initiatives, provide research direction, and ensure the organization's activities align with Penn State's educational goals. The ideal faculty mentor would:

- Advise on research projects and potential collaborations
- Provide guidance on curriculum development for workshops and forums
- Offer insights on emerging trends and opportunities in ML research
- Support the organization's efforts to promote ethical ML practices
- Guide the outreach efforts to ensure they are pedagogically sound and beneficial for high school students

12 Conclusion

ML@PSU is positioned to become a catalyst for machine learning excellence at Penn State. By fostering a vibrant community of learners, researchers, and future ML leaders, the organization will contribute significantly to Penn State's standing in the field of machine learning and prepare its members for impactful careers in this transformative domain. With the support and guidance of dedicated faculty mentors, ML@PSU aims to create a lasting positive impact on the university's ML ecosystem and on the local high school communities through its outreach programs.