Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Excellent

Explanation to Applicant
Strengths: The applicant explains in detailed and eloquent terms how the applicant became interested in research and how the applicant moved from the topic of neural nets and machine learning to programming languages and software engineering. The applicant has already carved out a sound research plan for the PhD program and obtained significant results in the automatic translation from Javascript to Rust. This translation is quite difficult because the two programming languages are quite different from each other. The applicant already presented her research as the result of an accepted conference paper and submitted an additional paper. Weaknesses: The undergraduate transcript is somewhat mixed, although this does not seem to reflect in the applicant's research abilities.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Very Good

Explanation to Applicant
Strengths: The applicant appears to have a sincere devotion to teaching and helping others. The applicant's research in serverless computing can benefit people unfamiliar with cloud computing platforms and help them share their software. Weaknesses: The field of server less computing is relatively new; it is unclear from the applicant's materials whether this approach to cloud computing will catch on or not.

Summary Comments
This is a strong applicant with a well-defined research plan for the PhD program. The applicant has already obtained substantial research results and appears poised to make fundamental and ground-breaking contributions to the field of server less computing.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Very Good

Explanation to Applicant
The applicant has built a strong foundation in programming languages, and worked to develop her knowledge related to serverless computing. The applicant aims to focus on code development reducing the amount of memory required by serverless computing and reducing some of the challenges associated with JavaScript programming in this space. There are numerous challenges associated with the outlined plan for translating JavaScript to safe Rust functions. Initial work on this has been completed, but there is much to be done with regards to memory optimization and prototype development. A plan is outlined and clear steps are detailed. The project plan is thorough; one notable weakness is that It is unclear what the applicant's individual contribution to the research is within the scope of the broader research project.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Fair

Explanation to Applicant

The applicant has a passion for mentoring and working with younger scholars. The applicant notes that Rust is a relatively limited use programming language; with regards to broader impact, it is unclear how findings from this work will extend to the broader computing community. Beyond that, the broader impacts of the overall research plan are not clearly specified.

Summary Comments

Broadly, the applicant is focused on machine learning research with a focus on simulations of neural networks, with a specific interest and focus on severless computing. The applicant aims to develop code and programming language that enables programmers to deploy source code without managing server side functions. The application outlines a plan for developing JavaScript code with a compiler that will translate the code to safe Rust functions; the challenges associated with this are significant.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Good

Explanation to Applicant

The applicant already has some research experience, as evidenced by several papers, posters, and talks. Moreover, the applicant has experience in multiple domains, including machine learning and programming languages. The applicant seems to have made significant implementation strides in these areas by augmenting PyTorch and building an initial compiler to translate JavaScript programs to Rust using traces. This shows the promise of a good research initiative. While the research proposal tackles a relevant and timely problem (i.e., serverless computing), there are some critical aspects of the work and motivation that seem missing. If dynamic languages are such a big problem for serverless computing, why are they not also a problem for server computing? For example, Node.js (server-side JavaScript) is a prevalent server-side technology. Why do applications written in Node.js running on servers (virtual machines) not incur the described problems? I feel that there are more pieces to puzzle that need to be made explicit here. Furthermore, the applicant mentions that there are significant differences between JavaScript and Rust but does not delve too much into those fundamental details. The solution of traces is put forth immediately without a proper motivation oof using such a solution. Doing so w demonstrate that the applicant has a command and depth of the fundamental issues behind the problem, as well as enlighten those that may not be thoroughly familiar with these specific technologies. While serverless computing is an exciting and trending area, I was most enticed by the applicant's desire to use their prowess of machine learning and programming languages to improve on ML models are constructed. Given the applicant's background in both areas, this would seem to be a "sweet spot" research area where the applicant can thrive. I was a bit disappointed to only see a small amount of discussion on this topic (i.e., ML safety).

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Very Good

Explanation to Applicant

The applicant has teaching experience as an undergraduate student. Teaching experience as an undergraduate is impressive and shows that the applicant has potential to positively impact society. Also, the applicant has been active in the community, attending a top conference and a summer school. Making explicit links to how the proposed research will directly benefit society is important.

Summary Comments

It is clear that this applicant has potential, and I impressed on how the applicant can work effectively in the two very different domains of ML and serverless computing. Putting these two areas together can be of great value. Unfortunately, some connections were missing from the research proposal that would properly motivate the proposed approach.