Dear Recruiter,

I am a final year undergraduate student from India. I have been passionately following CERN's work in fundamental physics and various software engineering projects. I believe CERN to be the perfect place for me to explore interdisciplinary applications of my current expertise, Machine Learning. The vast amounts of data generated from CERN's experiments are perfect to test the utility of ML algorithms in fields like HEP. Delivering tools to facilitate ML in such experiments would help me understand other important aspects of computer science and software engineering like design patterns, efficient programming.

Going through CERN's projects in the Google Summer of Code gave me the motivation to apply to this program. Specifically, I was fascinated by the description and workings of CMS Tracker software and the petabytes of data collected in each experiment. This is a perfect opportunity to employ Machine Learning algorithms to leverage large scale data and heterogeneous computing. I am highly interested in writing optimized code to utilize accelerators to their full extent. I have worked on a project to simulate the reverse Boltzmann transport equations to locate radiation sources using CUDA/C++. I would love to explore more in writing fast parallel programs that are of production quality to leverage the scale.

I am also extremely fascinated by the MadGraph5 project and the compute-intensive nature of the event generation. I notice the parallels in using computational graphs to port compute-heavy parts to GPUs and ML frameworks like TensorFlow. I have been working on ML for the past three years and would love to explore the underpinnings of graph computation and automatic differentiation frameworks. While these are mostly Google Summer of Code projects, I am very happy to work on anything related to GPU programming, improving the performance of algorithms either through heterogeneous computing or Machine Learning.

To tell you about myself, I am currently working as an ML engineer intern at Aixplain, where I am responsible for deploying large scale ML models. I have experience in working with tools like Docker, Kubernetes, TerraForm for infrastructure management. I have worked with AWS and deployed models like BERT on serverless infrastructure, and have used EC2, S3, Elasticache.

I also work as a research intern at the University of Oxford's Applied and Theoretical Machine Learning Group. I research reducing GPU memory consumption of neural networks and sparse neural networks. My bachelor's thesis is on improved training efficiency and fast uncertainty estimation using modified Monte Carlo approaches. Previously, I have worked with DFKI Bremen, on fast uncertainty estimation. I was a Machine Learning intern at IBM Research, where I designed quality metrics to quantify the quality of datasets. I had also implemented algorithms to detect distribution shifts in ML algorithms to immediately detect a drop in performance or dataset poisoning. I have published my research work in top conferences like ISWC, AAAI and a NeurIPS workshop.

I am thrilled about working at CERN and being a part of the extremely exciting work happening there. I believe this would help me greatly in improving as an engineer and would be a tremendous start for my career. I really hope I get a chance to contribute to CERN and am eagerly waiting to hear from you.

Thank you very much for your time and consideration :)

Yours sincerely,
Dwaraknath