**To The Selection Committee**
CERN Summer Student Program,

I am applying to the CERN Summer Student Program 2026 because I see it as a unique opportunity to learn how large scale scientific computing is carried out at the highest level. As a computer science student with a growing interest in AI and high-performance computing, I am deeply motivated by the chance to learn directly from the engineers and physicists at CERN who operate at the intersection of computation, data, and fundamental science. My academic journey has consistently been driven by curiosity and a desire to understand how complex technical systems function in real-world, high impact settings.

During my sixth semester at Tribhuvan University, where I currently hold a CGPA of 3.77, I participated in an academic research collaboration with Bhadrapur Municipality. This project exposed me to the challenges of working with large, unstructured administrative datasets and taught me how theoretical concepts translate into practical systems. I learned how to clean and preprocess real-world data using NumPy and Pandas, visualize patterns using Seaborn and Matplotlib, and apply regression and clustering techniques to identify trends and service bottlenecks affecting a population of over 70,000. More importantly, this experience helped me understand the importance of data quality, interpretability, and scalability, lessons I am eager to deepen in a scientific research environment like CERN.

I have spent the last year refining my skills in modern AI architectures. As an intern at Huncha Digital, I engineered a LangGraph React Agent capable of handling autonomous workflows, which successfully resolved over hundreds of daily user queries with 93% accuracy. I enjoyed the challenge of integrating multi-modal inputs (voice and text) and optimizing backend logic to ensure the system was robust enough for production. Outside of work, I challenged myself to build "Cogni-chat," a RAG system utilizing FAISS vector stores and deployed on Hugging Face Spaces that allows users to converse with their complex technical documents. I am eager to apply these efficient information retrieval techniques to the knowledge management challenges at CERN.

I believe my specific technical skillset aligns perfectly with CERN's needs. In addition to my expertise in Python, I possess a strong foundation in scientific computing languages such as Julia and C++. I see the Summer Student Program as an opportunity to strengthen these skills by learning how they are applied in real world experimental contexts. I am particularly fascinated by the potential of applying computer vision to interpret the colossal datasets generated by CERN's experiments while leveraging Retrieval Augmented Generation (RAG) to streamline the complex knowledge management workflows that support this massive research.

For me, the CERN Summer Student Program represents a critical learning step between my background in software engineering and my long term goal of pursuing graduate studies in machine learning. I chose CERN specifically because I want to challenge my skills in C++, Julia, and deep learning against data at a scale that simply doesn't exist elsewhere. I am motivated to absorb as much as possible from the lecture series, from mentors, and from collaborative work, and to develop the research discipline and technical rigor required for scientific computing.

Thank you for considering my application. I would be honored to have the opportunity to learn and grow as part of the CERN Summer Student Program.

Sincerely,

**Ritesh Raut**
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