Contribution ID: **3** Type: **not specified**

AI on HPC: Revolutionizing Machine Learning Applications

● Introduction to AI & HPC. Discuss the synergy of AI and High-Performance Computing (HPC), focusing on their combined role in accelerating data processing and enabling complex computations.
● Benefits of AI and HPC Integration. Highlight advantages such as faster processing of large datasets and enhanced innovation in sectors like healthcare, finance, and environmental science through precise simulations and data analysis.
● Overcoming Challenges in AI & HPC. Address key issues like energy consumption, data management, and security. Discuss how integrated solutions are fostering more sustainable and secure computing practices.
● Future Advancements. Explore anticipated developments in AI algorithms and HPC infrastructure, predicting their impact on scientific research, engineering, and business analytics, and the potential for new computational possibilities.
● Stochastic Gradient Descent (SGD). Explain the concept of SGD, its benefits in optimization for AI, and how the stochastic nature aids in escaping local minima for better results in non-convex problems.
● Parallel Processing and Scalability in HPC. Discuss the role of parallel computing in enhancing AI training efficiency, especially through technologies like Parallel Stochastic Gradient Descent (PSGD) across distributed GPU and CPU resources.
● Challenges in Hyperparameter Tuning. Address the complexity of hyperparameter tuning in machine learning within HPC environments and strategies to optimize this process efficiently.
● Real-World Applications of AI & HPC. Provide examples of practical implementations such as generative AI, large language models, time-series analysis, and optimization, demonstrating the transformative potential across different industries.
● The Infinite Possibilities. Conclude with a discussion on the endless applications of AI and HPC—from predictive analytics to autonomous vehicles—underlining the role of this integration in shaping future technologies and societal advancements.

Presenter: Mr BAKAS, Nikolaos (GRNET)