



GreenAI Comparometer: A Web-Based Tool for Measuring and Comparing the Carbon Footprint of Machine Learning Models

Prianghu Paul(2448384), Utkarsh Misra(2448370),Puspita Biswas(2448348)

Department of Computer Science (M.Sc Data Science), Christ University(Deemed to be University) Yeswanthpur Campus

Abstract:

With the exponential growth of deep learning and machine learning applications, the energy demands and carbon emissions associated with training and deploying these models have become a critical environmental concern. While tools like CodeCarbon, CarbonTracker, and eco2AI allow for carbon footprint estimation, they often operate in isolation with varying formats and usage complexities. In this context, we propose **GreenAI Comparometer** — a unified, web-based platform that enables researchers and developers to measure, monitor, and compare the energy consumption and carbon emissions of ML models in a simplified and interactive environment.

GreenAI Comparometer integrates leading carbon tracking libraries into a single dashboard. Users can upload their ML/DL training code, select one or more trackers, and receive detailed analytics including total energy consumed (kWh), estimated CO₂ emissions (grams/kg), and efficiency ratings. The system visualizes this information through interactive charts, comparison tables, and model ranking mechanisms. Additionally, it provides downloadable reports and eco-friendly optimization tips, empowering users to make greener decisions when designing or selecting models.

Our platform aims to fill the gap between awareness and actionable insight in sustainable AI. By providing a comparative and accessible tool, GreenAI Compare facilitates more transparent, reproducible, and environmentally conscious ML research. It also opens up new opportunities for integrating green metrics into standard ML evaluation frameworks.

Keywords: Sustainable AI, Carbon Footprint, Green Machine Learning, CodeCarbon, eco2AI, Energy Efficiency, ML Dashboard