

International Conference on **Artificial Intelligence and Cloud Computing (ICAICC-2025)**

Conference Proceedings

May 08, 2025 - Florida, USA

Real-Time Analytics and Machine Learning in Agriculture for Biodiversity Conservation

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In recent years, the agriculture industry has embraced artificial intelligence (AI) to maximize crop yields. While this has led to improved productivity, it often comes at a cost—local biodiversity. Our research focuses on a novel approach to bridge this gap by developing a comprehensive framework that uses machine learning (ML) and real-time data analytics to balance agricultural productivity with biodiversity conservation. This study integrates insights from three robust datasets—AgData Commons, NOAA Climate Data, and the Global Biodiversity Information Facility (GBIF)—to create a decision-making tool designed for farmers. By leveraging these diverse datasets, we analyze key parameters like soil health, climate conditions, and biodiversity metrics. The result is a system that not only enhances crop yield but also promotes the health of surrounding ecosystems. Our findings demonstrate the significant potential of this approach to reshape agricultural practices by fostering harmony between productivity and conservation. This research has implications that go beyond farming, influencing agricultural management policies and offering a new perspective on sustainable development.