9 EcoMeow

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Introduction

The rising levels of CO2 due to human activities are accelerating climate change, leading to more frequent natural disasters and environmental degradation. In response, we propose "EcoMeow", a software system designed to predict CO2 emissions and energy consumption using advanced machine learning techniques and real-time cloud computing. Additionally, the system features an interactive cat mascot to engage and educate users on global warming and sustainability. Combining prediction models, real-time data, and educational content through an interactive mascot into one platform makes EcoMeow different from others.

Methodology

1. Software operations and Machine Learning Predictions

- Data Sources: EcoMeow will use Python scripts to scrape and clean data from sources like Worldometer, NASA, and IPCC reports, focusing on CO2 levels, energy consumption, population growth, deforestation rates, and other environmental indicators.
- Machine Learning Models: The software will employ Polynomial Regression and Random Forest Regression, chosen for their computational efficiency and ability to balance underfitting and overfitting, making them suitable for predicting CO2 emissions and energy consumption.
- Environment: The model is deployed on Oracle Cloud Infrastructure, using a virtual machine with 4 ARM cores and 24 GB RAM. Testing will be done in a controlled cloud environment, running continuously to capture various environmental data patterns over a 24-hour period.
- Technical Innovations: Containerization will ensure a modular, scalable, and efficient software stack, with real-time data analysis and predictive modeling displayed for future planning (e.g., 2030, 2050).

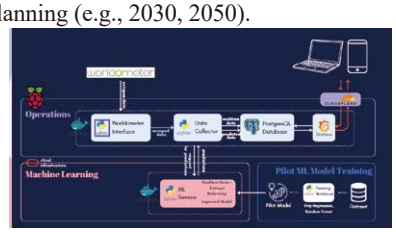

Figure 1, A simplified flowchart of the software stack.

2. Character Design

- Eko Eko Chan: A user-friendly cat mascot designed to engage the public and make the software more accessible.
- UX/UI Design: The design focuses on creating a seamless user experience, with intuitive interfaces and visually appealing elements.
- User Interaction: The mascot's role in interacting with the data and guiding users through the platform enhances the system's educational impact and ease of use.

Figure 2 & 3, Eko Eko Chan and Logo for EcoMeow.

3. Real-Time Monitoring

- Docker for containerization, PostgreSQL for database management, and d3.js for dashboard visualization (Grafana is used as a temporary visualization tool for demonstration).
- The software will predict and display critical parameters, including total and real-time CO2 emissions, population growth, fossil and renewable energy consumption, deforestation rates, and projected global temperatures for set future dates.
- A user-friendly dashboard will present these predictions, making them accessible to the public and organizations. The dashboard will allow users to interact with the data and understand the implications of different environmental trends.

Figure 4, The prototype of the dashboard using Grafana.

Expected Outcomes

- Monitoring and Accuracy: Continuous monitoring compares predictions with actual data, showing over 90% accuracy for CO2 emissions, global warming, and energy consumption.
- Informed Decision-Making: Supports organizations and governments in creating effective climate strategies based on reliable data.
- Public Engagement: Enhances awareness and promotes sustainability through interactions with a mascot chatbot, encouraging active public participation.

Conclusion

"EcoMeow" leverages machine learning and real-time data to deliver accurate environmental predictions, supporting sustainability planning and CO2 management. Its interactive mascot engages the public, promoting sustainability. Designed for governments, organizations, and the public, EcoMeow plays a crucial role in global efforts against climate change.