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AI in Climate Action

Using AI to actively combat climate change

This document highlights the significant potential of AI in addressing climate change challenges, drawn from insights across three key sources. While AI offers transformative solutions, achieving its full impact demands responsible management, careful deployment, and the implementation of proactive policy measures.

Document 1 : Ways AI is Helping in tackling Climate Change

Source : World Economic Forum

AI for Climate Monitoring and Management

1. **Weather Prediction and Iceberg Tracking:** AI tools predict weather patterns and track icebergs with remarkable efficiency, processing data 10,000 times faster than humans.
2. **Pollution and Waste Management:** AI technologies identify pollution hotspots and help optimize waste processing and recycling systems, reducing methane emissions—a significant contributor to greenhouse gases.
3. **Deforestation Mapping:** AI combines satellite imagery and ecological expertise to measure deforestation and carbon storage in forests.
4. **Community Support in Africa:** The IKI project uses AI to predict weather patterns, helping communities adapt to climate changes by improving clean energy access, reforestation, and waste management.
5. **Ocean Cleanup:** AI detects plastic pollution and maps waste in remote ocean areas for efficient removal.
6. **Climate Disaster Prediction:** Platforms like Sipremo forecast the location and types of climate disasters, aiding businesses and governments in preparation.
7. **Decarbonization in Industry:** AI analyzes emissions using satellite imagery and data from machines, helping reduce industrial emissions by 20-30%.

8. **GraphCast by Google:** This tool provides medium-range weather forecasts with unprecedented accuracy, predicting weather up to 10 days in advance.

Document 2 : How can AI help tackle Climate Change

Source : Leaf by Greenly

AI Contributions to Climate Solutions

1. **Renewable Energy Optimization**: AI aids in grid integration, ensuring a stable supply of clean energy.
2. **Environmental Monitoring**: Through satellite imagery and sensor data, AI monitors environmental changes.
3. **Climate Modeling and Prediction**: With its ability to process complex data, AI provides accurate and detailed climate models.
4. **Resource Management**: AI-powered smart agriculture optimizes water usage and crop yields. In manufacturing, AI-driven maintenance reduces waste and energy consumption.
5. **Carbon Footprint Reduction**: Across industries, AI helps lower emissions and promotes sustainability.

Real-Life Examples

1. **Google's DeepMind AI**: Achieved a 40% reduction in cooling energy consumption at data centers.
2. **IBM's Deep Thunder System**: Provides hyper-localized weather forecasts for better decision-making.

AI Limitations

1. **Carbon Footprint of AI**: Training AI models requires significant energy, contributing to emissions.
2. **Ethical Considerations**: Issues such as data privacy, security, and potential biases in AI models.

3. **Balanced Approach**: Continuous assessment, government policies, and equitable solutions are necessary.

Document 3: Accelerating Climate Action with AI

Source: Boston Consulting Group (BCG) x Google

Analytical Challenge

Climate action requires a deeper analytical understanding of complex, interconnected systems influenced by human activities. AI's ability to process vast data sets reveals patterns and valuable insights, accelerating decision-making and scenario development.

Key Areas of AI Contribution

1. **Mitigation**:
    - Macro and Micro-Level Measurement: Calculating carbon footprints at both country and product levels.
    - Emission Reduction: Supporting the integration of renewable energy and nature-based carbon removal solutions.
2. **Adaptation and Resilience**:
    - **Hazard Prediction**: Building early warning systems for extreme events.
    - **Vulnerability Management**: Monitoring droughts and wildfires, building resilient infrastructure.
3. **Foundational Capabilities**:
    - Climate Modeling
    - Climate Economics
    - Educational and Behavioral Change
    - Supporting Research on Climate Innovation

Applications of AI

1. **Information Curation**: Shaping climate strategies and responding to emergencies.
2. **Prediction**: Advanced warning systems for floods.
3. **Optimization**: Reducing carbon footprints.

Risks of AI

1. **Greenhouse Gas Emissions**: Data centers contribute significantly to emissions.
2. **Water Usage**: Cooling systems for data centers can strain water resources.
3. **E-Waste**: Waste from data centers poses environmental challenges.

Policy Recommendations

1. **Data Sharing and Technology Access**: Encourage collaboration and affordable AI deployment.
2. **Defining Priorities**: Accelerate AI deployment for climate solutions.
3. **Responsible Deployment**: Ensure environmentally and socially responsible AI usage.

Carbon Credits

Carbon Credit is a form of incentive that is given to companies or organisation that invest in projects that avoid, reduce or remove emission. One Carbon Credit is equivalent to avoidance, reduction or removal of one metric tonne of Carbon Dioxide or its equivalent GHGs (Global Greenhouse Gases).
Carbon Credits are available in 2 forms:

1. **Certified Emission Reduction (CER) :** Issued by a registered organisation or Institution.
2. **Voluntary Emission Reduction (VER) :** Traded in Voluntary Markets free of Third-Party Regulations

Steps for Calculating Carbon Credits:
1. Figure out the emission caused by the company.
2. Compare the level by Normal Level.
3. Calculate Difference between Normal Level and emission caused by company.
4. Convert the value into credits using:

No of Credits = No. of Tonnes Emission Saved

Example:

- A factory used *to* release 100 tons of pollution (normal level).
- They installed new equipment and now release only 70 tons.
- They reduced their pollution by 30 tons (100 - 70 = 30).
- Therefore, they get 30 carbon credits.

References:

1. 9 ways AI is helping tackle climate change
2. How can artificial intelligence help tackle climate change?
3. Accelerating Climate Action with AI