# Team UDUPI

Space Apps Challenge 2024

## Project Title:

Mapping Human-caused and Natural Greenhouse Gas Emissions Using Satellite and Model-Based Datasets

(Insert Team Logo here)

# Introduction

## Problem Statement:

Human-caused (anthropogenic) greenhouse gas emissions and natural systems that produce and absorb greenhouse gases (sources and sinks) interplay in a complicated manner, contributing significantly to global climate change. This project aims to create a map of both human-caused and natural greenhouse gas emissions using satellite and model-based datasets, facilitating a better understanding of their role in contributing to a warmer world.

## Objective:

The objective of this project is to gather and analyze data to differentiate between human-made and natural greenhouse gas emissions, helping policymakers and citizens make informed decisions to combat climate change.

# Data Collection and Methodology

- CanSat Deployment: Team UDUPI will use a CanSat equipped with sensors to collect atmospheric data, focusing on greenhouse gases such as CO₂ and CH₄.

- Data Segregation: The collected data will be categorized into human-caused and natural sources.

- AI Integration: The AI model will be trained on satellite and CanSat data to identify unusual patterns or abnormalities in greenhouse gas concentrations.

- Leakage Detection: Regions with abnormal spikes will be flagged for investigation, especially for industrial emissions.

# Solution Overview

Our solution involves using satellite data combined with on-ground CanSat readings to create an AI-driven model. The AI system will analyze the concentration and pattern of greenhouse gases, distinguishing between human activities (industrial emissions, vehicular exhaust) and natural occurrences (forest fires, volcanic activity). The project will notify authorities if it detects abnormal spikes in emissions, allowing for timely intervention.

# Feasibility and Viability

- Technical Feasibility: CanSats are widely used for educational and research purposes, and integrating sensors for greenhouse gas detection is viable.

- Manual Segregation: While manually categorizing sources can be time-consuming, clear criteria will be developed.

- Financial Viability: Using cost-effective CanSat sensors and open-source AI models ensures the project's financial feasibility.

# Challenges and Mitigations

1. Data Accuracy and Calibration: Ensuring sensor accuracy with proper calibration methods.

2. Emission Source Segregation: Automating segregation with advanced AI algorithms.

3. Environmental Variables: Incorporating long-term data for better baselines.

4. AI Model Training: Periodic updates and high-quality datasets will improve AI performance.

# Conclusion

By creating a detailed map of both natural and human-caused greenhouse gas emissions, this project will provide valuable insights to policymakers and environmental organizations. With the potential to scale, it will contribute significantly to the global effort to combat climate change.