### GHG Emission from Agriculture and Forest Land\_Analysis



Global warming is one of the biggest problems we are facing now. Not only industrialized emission, agriculture and forest land emissions also play a big role in contributing to global warming by releasing greenhouse gases (GHG) such as CO2, CH4, N2O.

In this project, we will use Python, AWS, Postgress, and Excell to get the data cleaned and stored and subsequently create graphs and charts using pivot table .Then we’ll use Machine learning to analyze the emission data , and finally, visualize through Tableau. We’ll try to create a dashboard with JavaScript and use interactive buttons to see the change in emission in different location comparing with the population.

### Python

* Most popular programming Language
* Code easy to write
* Performs complex calculations quickly
* Handles large Data Files
* Help to access, process, and manipulate data

### ETL

* To get consistent Data
* Reduce the time to do analysis with a robust data

### AWS

* Easily accessible data for all team members with updated version.
* The four basic functions of persistent data storage are **Create, Read, Update,** and **Delete (CRUD)**

### Postgress

* Import and export csv files, create tables with SQL

### Excell

* Interactive charts and graph with pivot chart
* Filters and conditional formatting
* Organize and visualize for trends

### Machine Learning

Machine learning (ML) models are increasingly used to study complex environmental phenomena with high variability in time and space. In this study, the potential of exploiting three categories of ML regression models, including classical regression, shallow learning, and deep learning for predicting greenhouse gas (GHG) emissions from an agricultural field was explored. Carbon dioxide (CO2) and nitrous oxide (N2O) fluxes, as well as various environmental, agronomic and soil data were measured at the site over a five-year period in Quebec, Canada. The rigorous analysis, which included statistical comparison and cross-validation for the prediction of CO2 and N2O fluxes, confirmed that the LSTM(Long -Short Term Memory) model performed the best among the considered ML models with the highest R coefficient and the lowest root mean squared error (RMSE) values.

#### Tableau

* Powerful analytic dashboard to tell a story which is visually appealing and easy for anyone to understand.

### Javascript

* Create attractive, accessible, and interactive data with the help of button- and drop-down menus.
* Visualize the data to communicate findings to the audience

**QUESTIONS**

Top 100 Country's Lifetime CO2 Contributions (1750-2017)  
Trying to find how every decade value differs ((1990-2009) Vs (2009-2019))  
Comparison of emission value with population value  
Distribution of the dataset  
Correlation between the increase in year and the emission amount  
Machine learning algorithm to predict for the future years  
Model comparison and selection

1. Top low countries contributing emission - are those countries underdeveloped?  
2. If not underdeveloped, any precaution they take? (Not necessarily we can conclude)  
3. Any direct relationship between emission vs population (or population density) or GDP? (may not conclude unless we have data)  
4. Categorize any range of emission among countries – are they competing countries in certain aspect(s)?

* Who are the top ten countries responsible for contributing highest emission?
* Topmost continents
* Are we able to control the emission over the years/decade?
* What are the top ten items that contributing to the most emission?
* 1.Element wise emission display
* 2. How agricultural emissions look like in the future?
* 3. The least 10 emission countries

**All the Abbreviations Used:**

***UNFCCC***: United Nations Framework Convention on Climate Change

***FAO***: Food and Agricultural Organization () of United Nation

***N2O***: Nitrous Oxide

***CH4***: Methane

***CO2***: Carbon di Oxide

***AFOLU***: Agriculture, Forestry and Other Land Use

***Fc***: Calculated figure

**Reason for removing the columns**

1. Fc: Calculated value. It’s not adding any information or data.
2. Source ***UNFCCC***: United Nations Framework Convention on Climate Change has negligible data to compare and account for.
3. All units are in Kilotons, hence removed the column.

**Negative Value**

Some amount of released CO2 is again used in photosynthesis and some countries forestation or reduce in deforestation helps in removal of excessive CO2 in atmosphere.

### TABLEAU Pages

|  |
| --- |
| Emission In USA  Emission Worldwide |

CO2 Emission CH4 Emission

N2O Emission Emission through the Decades

Emission Vs Population Emission Vs Temperature

**Interactive Dashboard**

Emission Frequency

Top 10 countries

**DESCRIPTION**

Id( country code/item code)

1

2

3

4

5

6

7

8

9

10