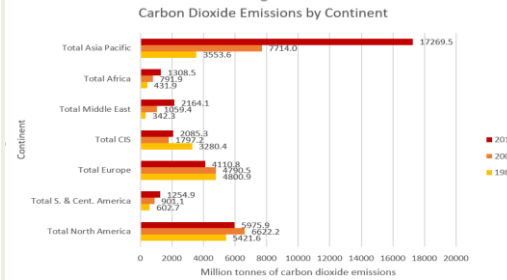


The Increase of Carbon Dioxide Emissions and the Contributing Factors



BACKGROUND

Net zero carbon emissions indicates that carbon emissions and its removals from the atmosphere should equalize. Net Zero CO₂ emissions became the new ambition of oil and gas industries to be achieved by 2050.



This poster presents the data pre-processing in preparation for the CO₂ emissions analysis.

METHODOLOGY

Literature study is done to provide deeper understanding of using machine learning models for CO₂ emissions. Table 1 shows the summary of literature review for this research.

Table 1: Past papers summary

Model	Past papers
Support Vector Machine	<ul style="list-style-type: none"> Daryayehsalameh et al (2021) Chen et al (2021) Saleh et al (2016) Li et al (2018) Sun & Liu (2016)
Neural Network	<ul style="list-style-type: none"> Daryayehsalameh et al (2021) Benalcazar (2017) Wen et al (2020) Khairalla et al (2018) Sun & Liu (2016) Zhang et al (2021) Chiroma et al (2015) Li et al (2017) Shallaby et al (2021) Mardani et al (2020)
Extreme Machine Learning	<ul style="list-style-type: none"> Li et al (2018) Li et al (2017) Sun & Sun (2017)
Random Forest	<ul style="list-style-type: none"> Wen et al (2020) Aniceto et al (2021) Shallaby et al (2021)
K-Nearest Neighbour	<ul style="list-style-type: none"> Aniceto et al (2021)

12th Malaysia Plan

12MP: Malaysia committed to becoming carbon-neutral nation by 2050, says PM

FINDINGS

The data pre-processing starts with data cleaning

Step 1: Remove unnecessary columns and rows

Step 2: Combine same country

Step 3: Combine 4 datasets as 1 dataset.

Table 2: Features description

Variable	Description	Data Type
Country	Country and geographical groupings	Categorical
Carbon Dioxide Emissions	Million tonnes of CO ₂ emissions only those through consumption of oil, gas and coal for combustion related activities and natural gas flaring (from 1975 onwards) by country and year.	Continuous Numerical
Oil consumption	Consumption of bio-gasoline (such as ethanol) and biodiesel are excluded while derivatives of coal and natural gas by country and year.	Continuous Numerical
Gas consumption	Consumption of gas that are not converted to liquid fuels but includes derivatives of coal as well as natural gas consumed in Gas-to-Liquids transformation by country and year.	Continuous Numerical
Coal consumption	Consumption of Commercial solid fuels such as bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels by country and year.	Continuous Numerical

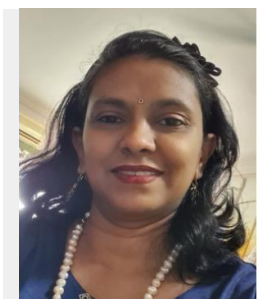
SIGNIFICANT

This study can benefit oil and gas industries and countries worldwide in achieving net zero by 2050. A research model will be developed based on analyzed data.

CONCLUSION



This study is to identify the strength of the contributing factors of CO₂ emissions using machine learning models for evaluation.



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