



UNIVERSITÀ “GUGLIELMO MARCONI”

Facoltà di Ingegneria

Corso di Laurea Magistrale in Ingegneria Informatica

Tesi di Laurea

Analysis of Correlations between Environmental Data and Public Health: Development and Evaluation of Predictive Models. A Data Science Approach

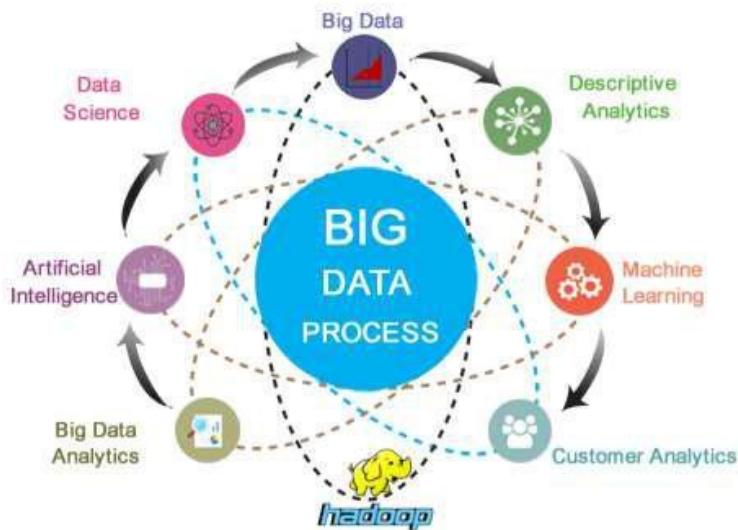
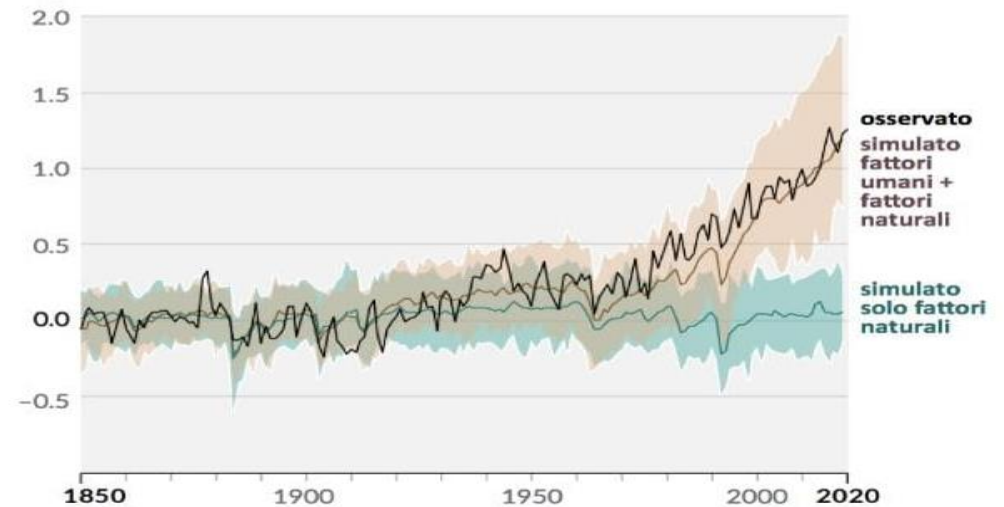
Relatrice

Chiar.ma Prof.ssa Francesca Fallucchi

Candidato

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Mat. 22579

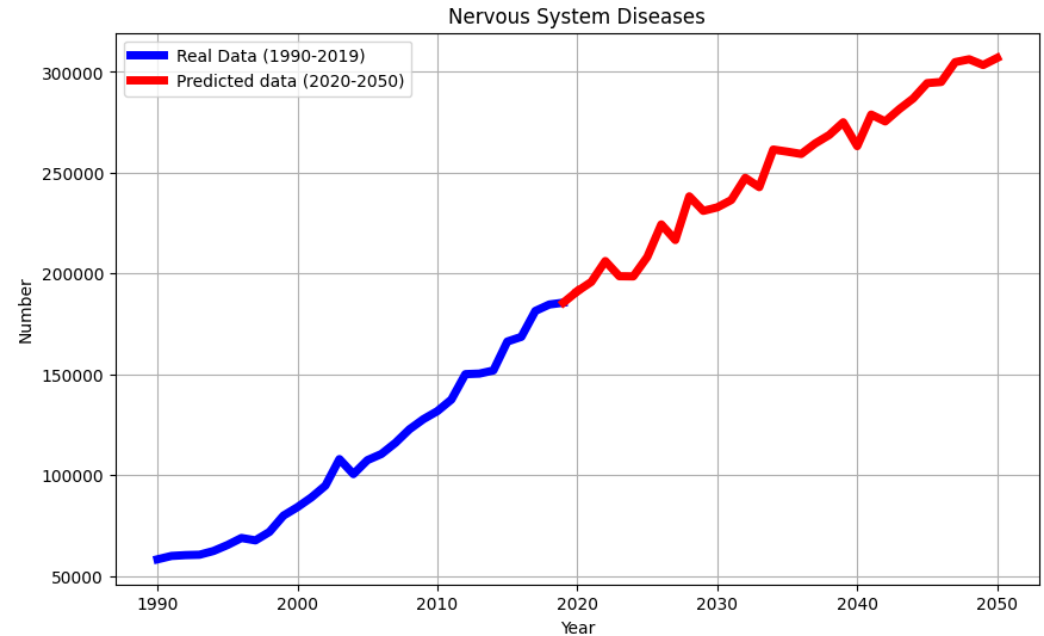
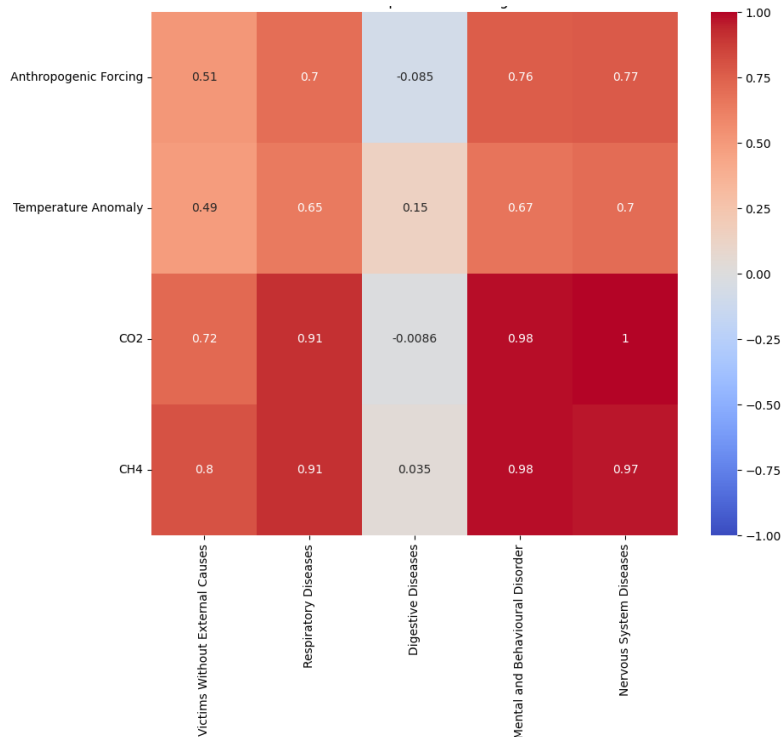
**Le evidenze nei
cambiamenti climatici
consentono lo sviluppo di
politiche di mitigazione**



**Il machine learning permette di
analizzare grandi volumi di dati
complessi, identificando pattern e
correlazioni non visibili con
metodi tradizionali**

Obiettivo

Proiezione delle tendenze nella mortalità indotta dai cambiamenti climatici in Europa

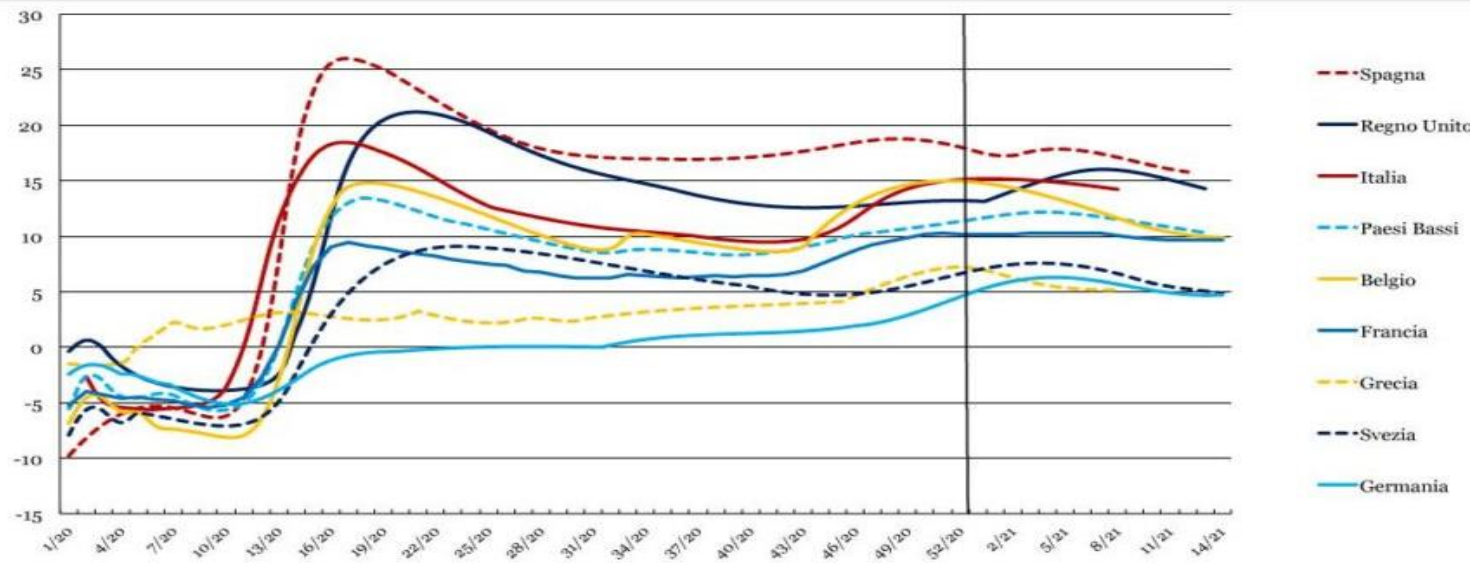


**Utilizzo del machine
learning per analizzare i dati
e stabilire collegamenti
causali**

Materiali e Metodi

Fonti dei Dati:

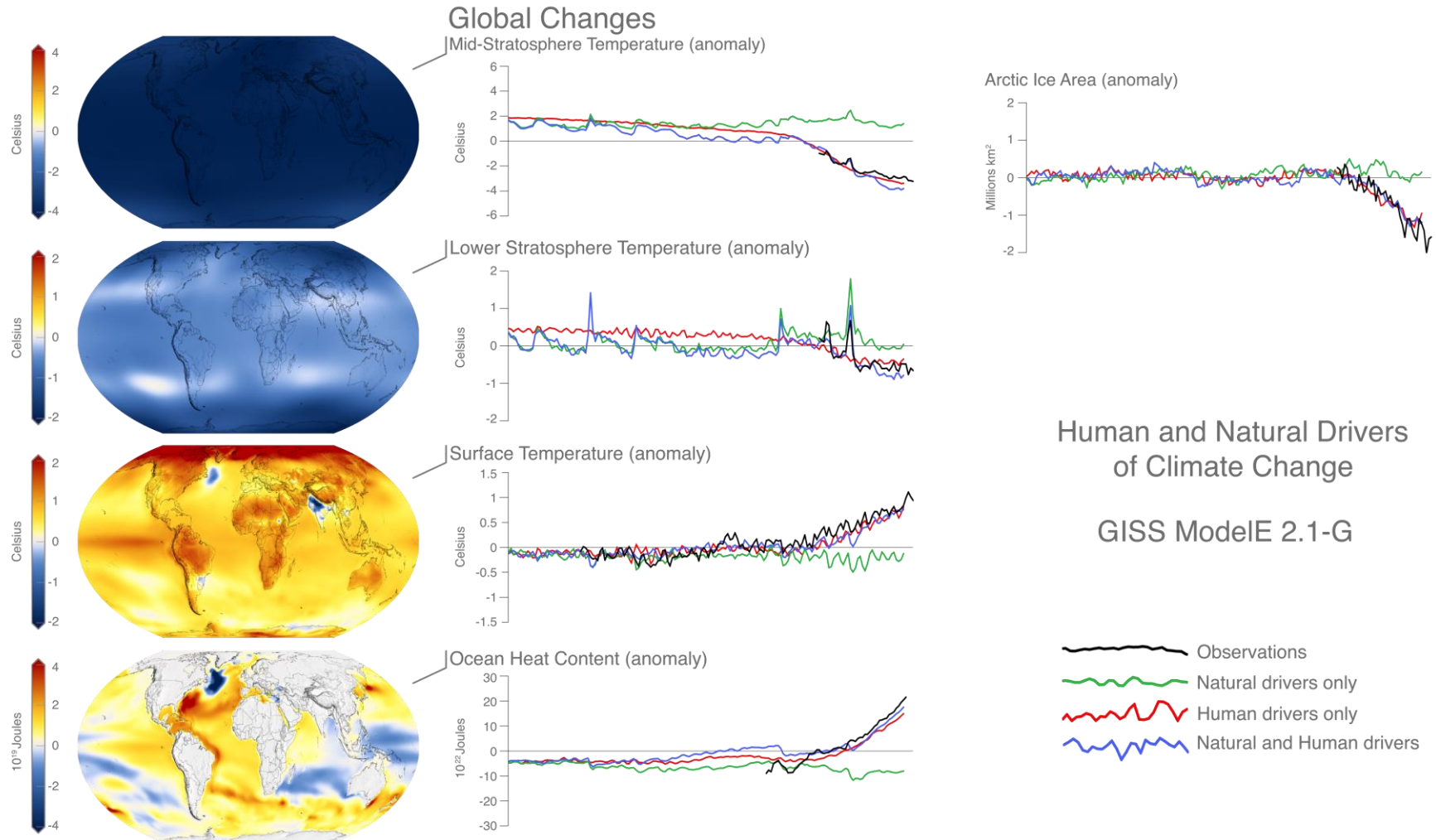
Dati sulla mortalità da WHO



Materiali e Metodi

Fonti dei Dati:

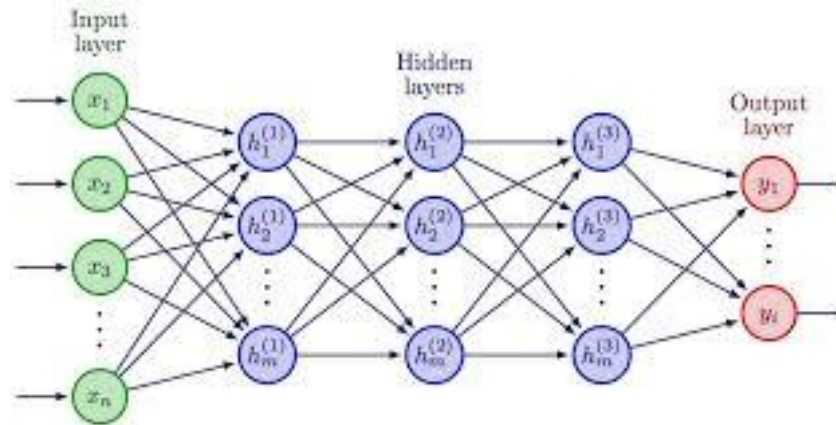
Dati climatici da NASA GISS E2-1-H



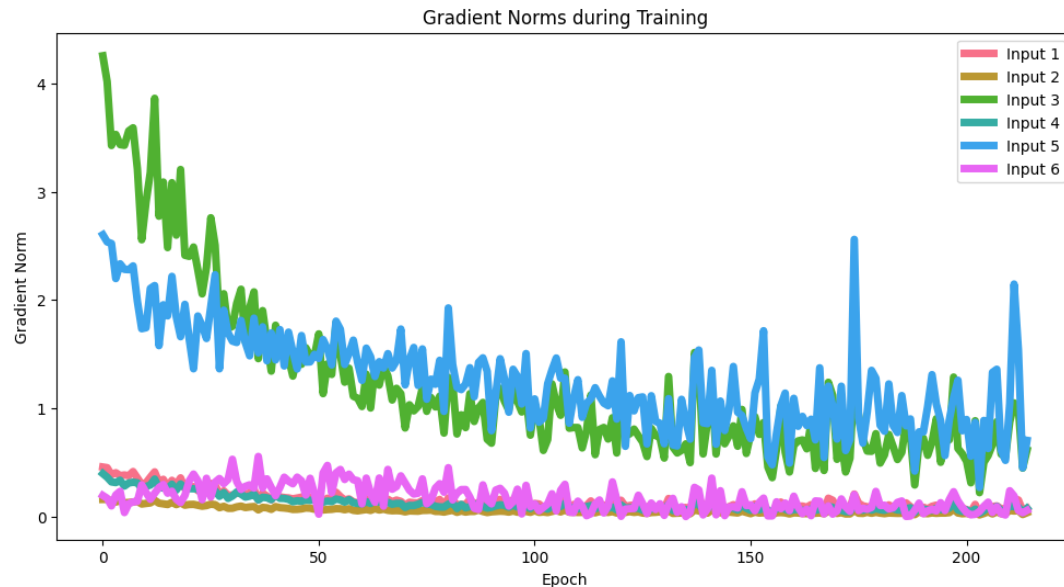
Materiali e Metodi

Modelli di Machine Learning:

Uso di reti neurali



Approccio di apprendimento supervisionato



Materiali e Metodi

Quadro Metodologico:

- Pre-elaborazione e normalizzazione dei dati
- Processo di addestramento e validazione

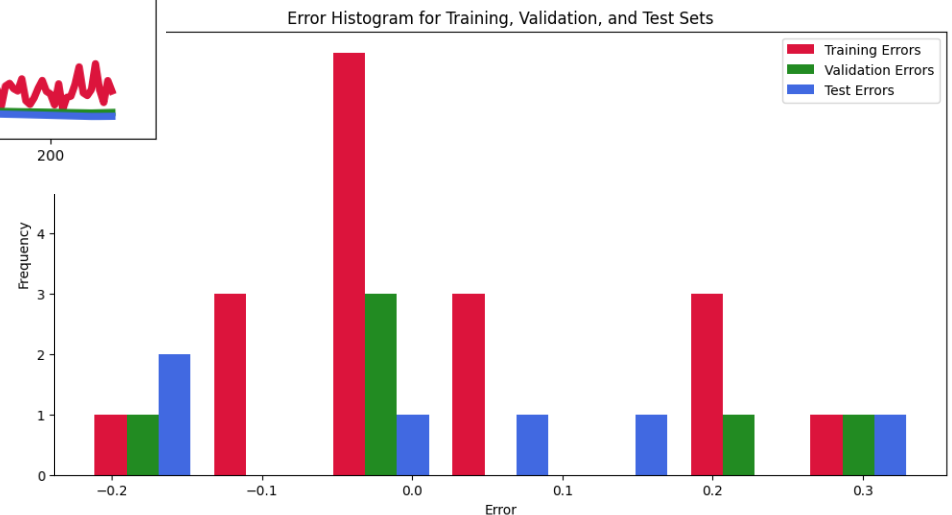
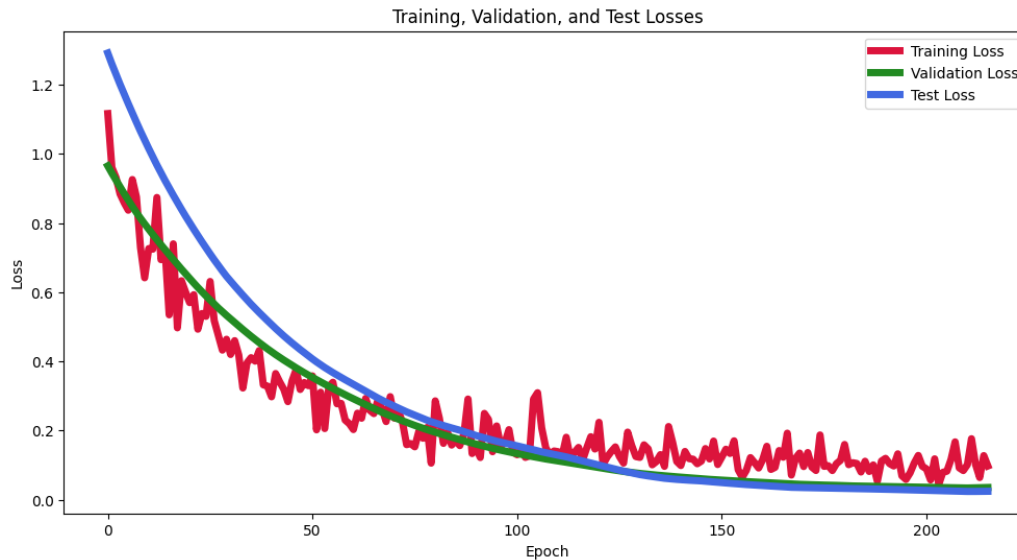
```
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

# Impostazione della palette di colori
sns.set_palette("husl")

# Lettura del dataset da CSV
df = pd.read_csv('/content/drive/MyDrive/Colab Notebooks/data.csv')

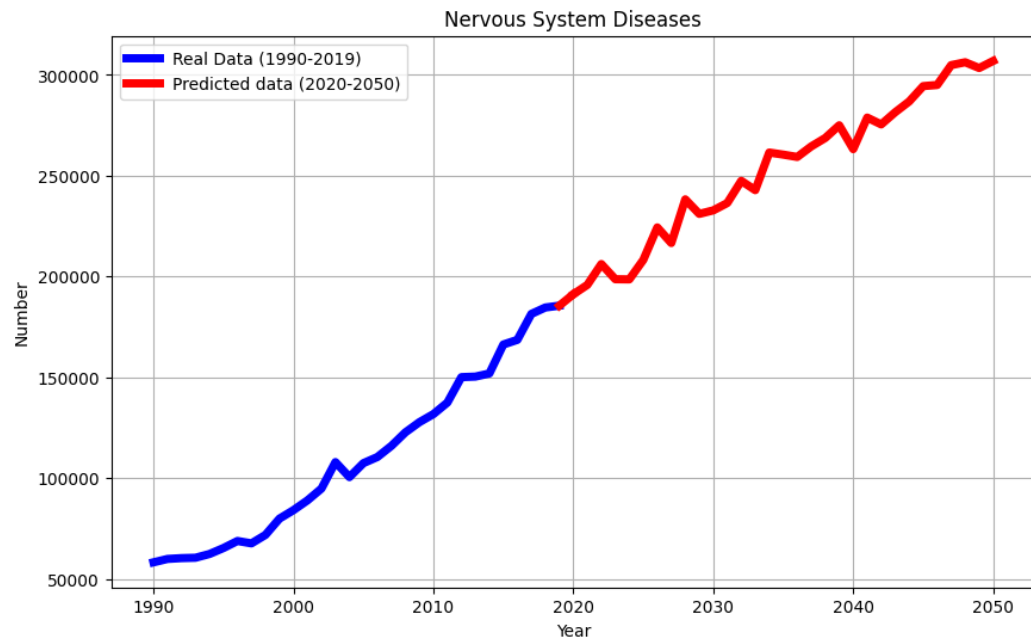
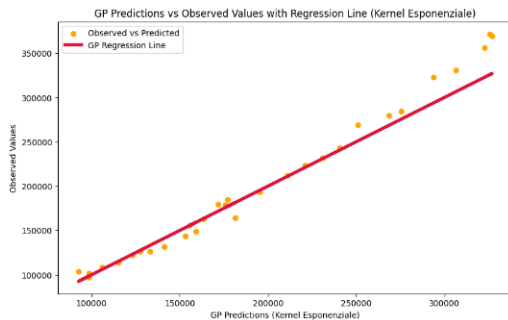
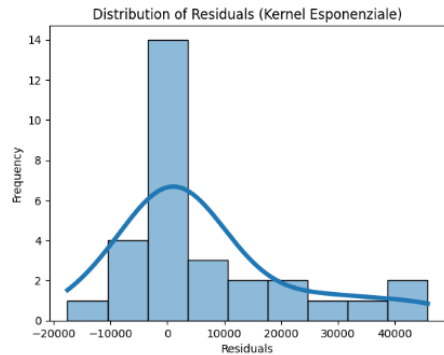
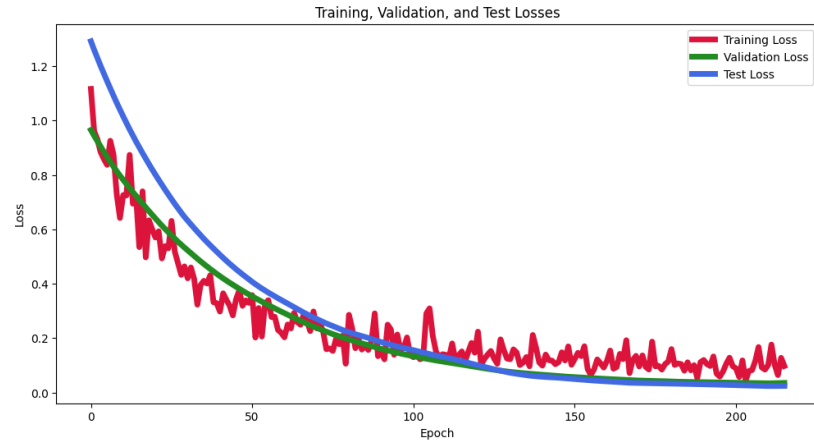
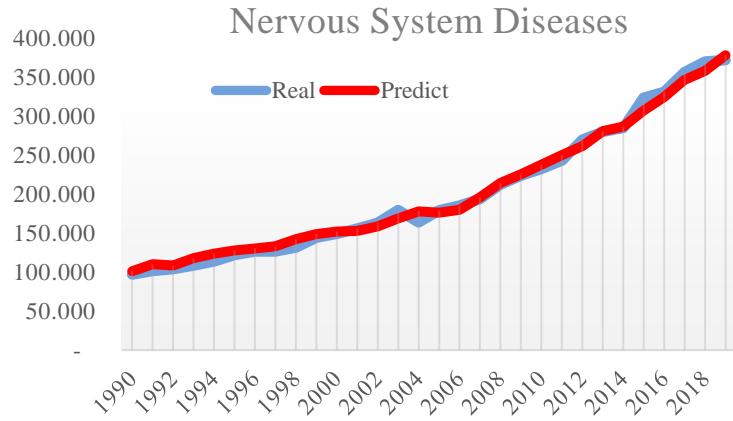
# Nomi delle colonne
input_columns = ['CO2', 'CH4'] # 3ª e 4ª colonna
output_columns = ['Respiratory Diseases', 'Mental and Behavioural Disorder', 'Nervous System Diseases']

# Stampa dei valori minimi e massimi per ogni variabile
print("Valori minimi per ogni variabile:")
print(df.min())
```



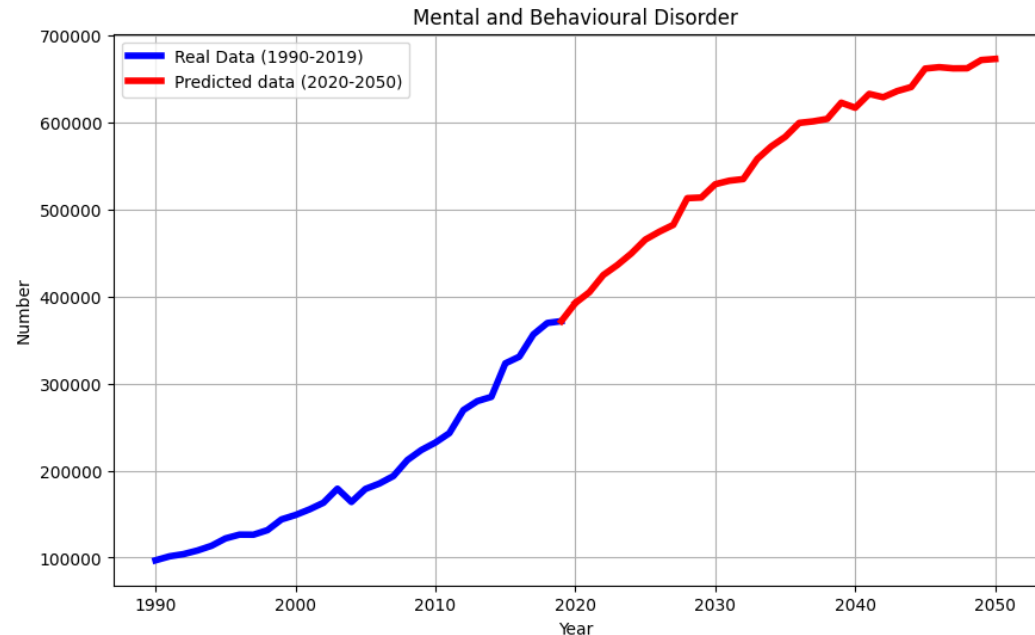
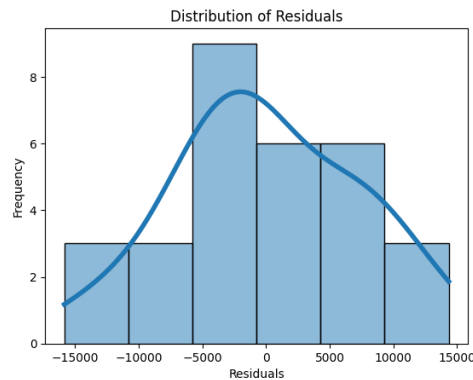
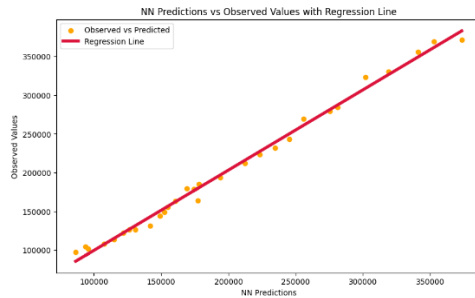
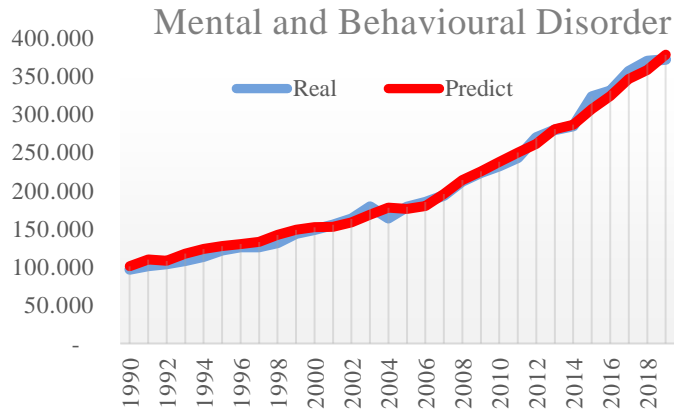
Risultati

Output del Modello: Malattie del sistema nervoso



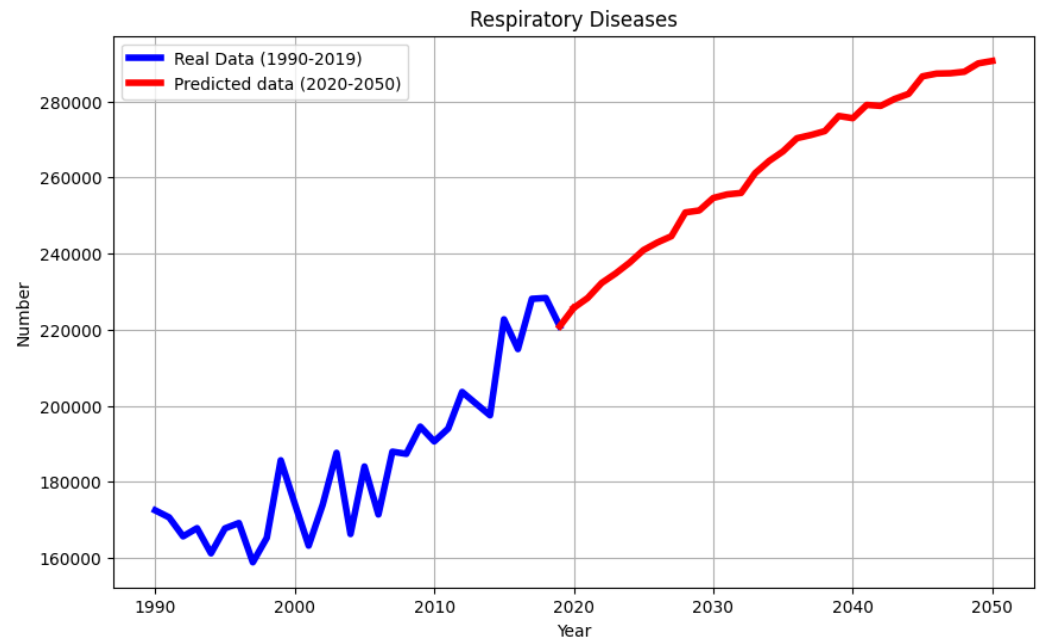
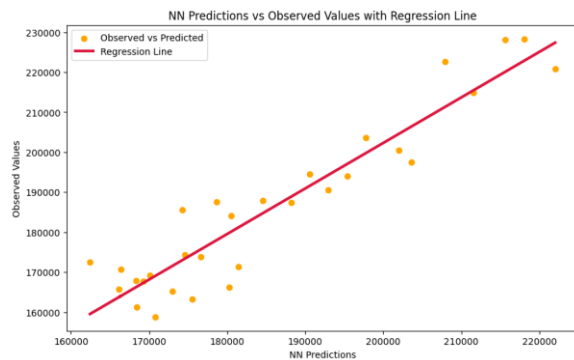
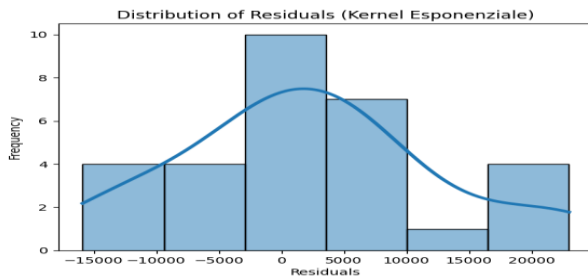
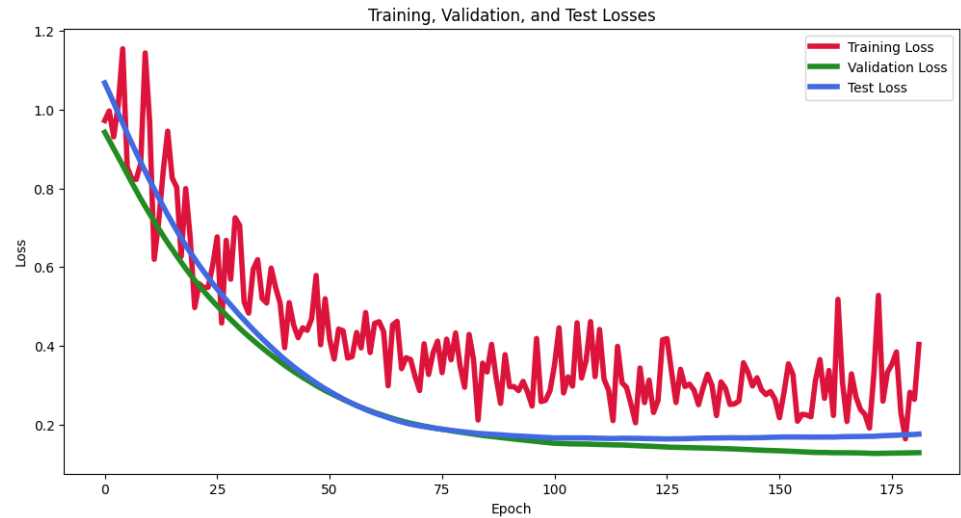
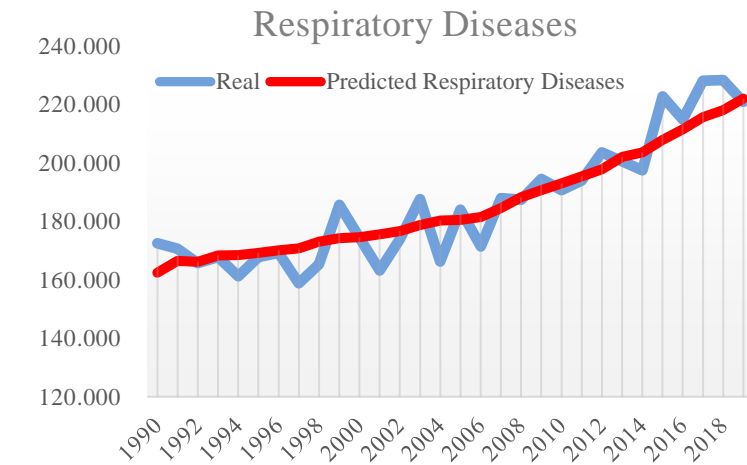
Risultati

Output del Modello: Disturbo mentale e comportamentale



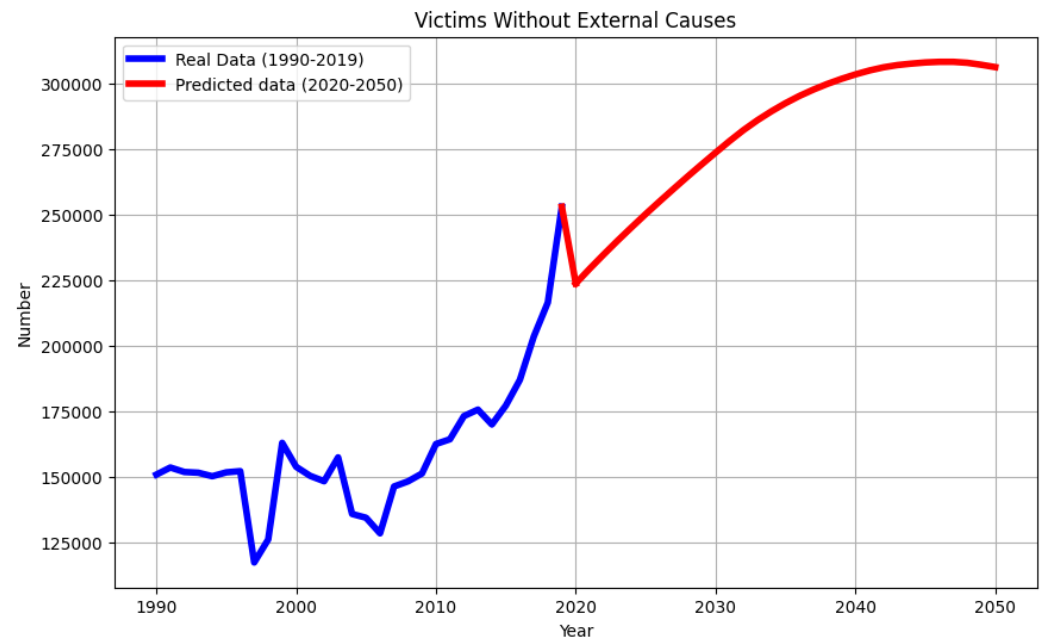
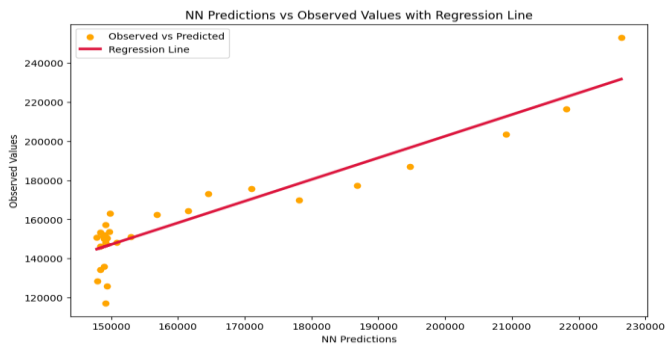
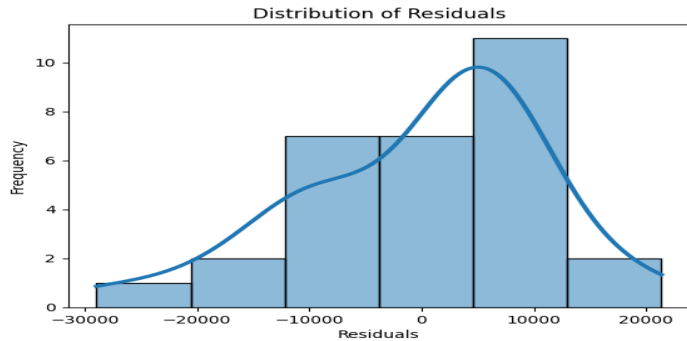
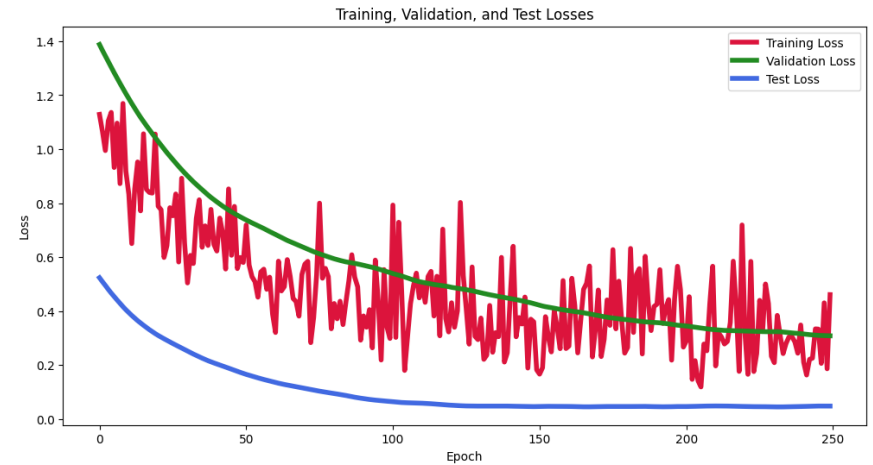
Risultati

Output del Modello: Problemi Respiratori



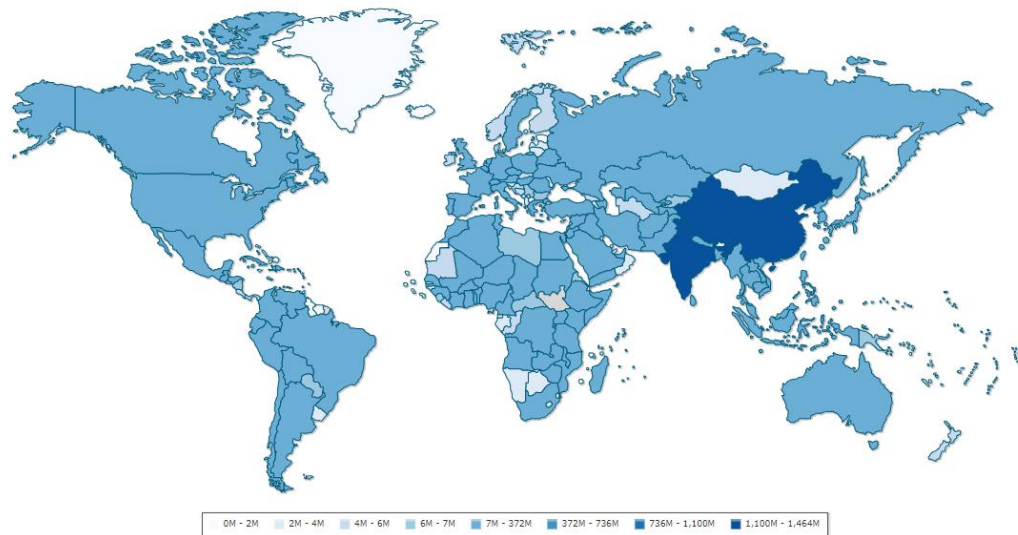
Risultati

Output del Modello: Vittime senza cause esterne



Conclusioni

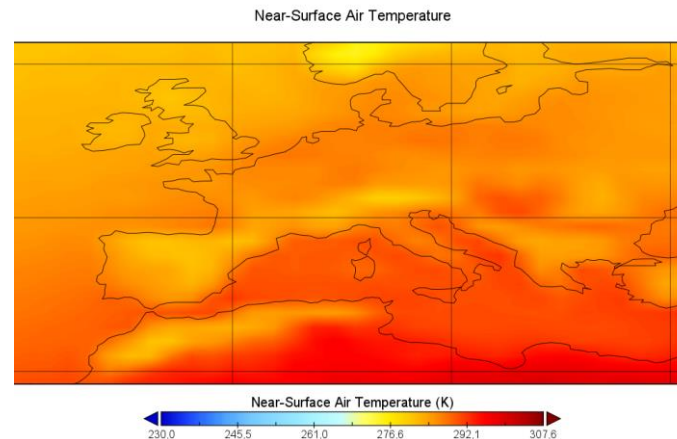
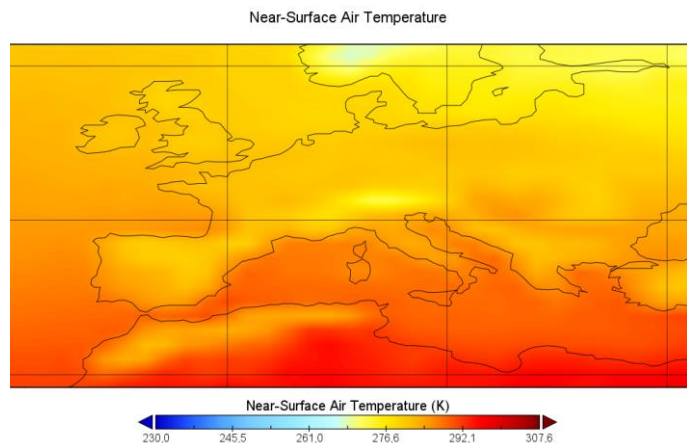
Differenze di impatto dei cambiamenti climatici sulla salute pubblica su base regionale differenti rispetto a modello globale derivanti anche da altri fattori quali densità di popolazione, servizi sanitari, ed altri.



Efficacia dei modelli di machine learning nell'analisi predittiva migliorabile fornendo maggiori dati ed analizzando aree specifiche ed omogenee.

Conclusioni

E' molto importante la formulazione delle politiche per ridurre l'inquinamento e mitigare i cambiamenti climatici che causano un aumento dei decessi.



Il modello CMIP 6 fornisce un quadro delle possibili variazioni delle variabili atmosferiche in base a diversi scenari socio-economici e relative politiche.

