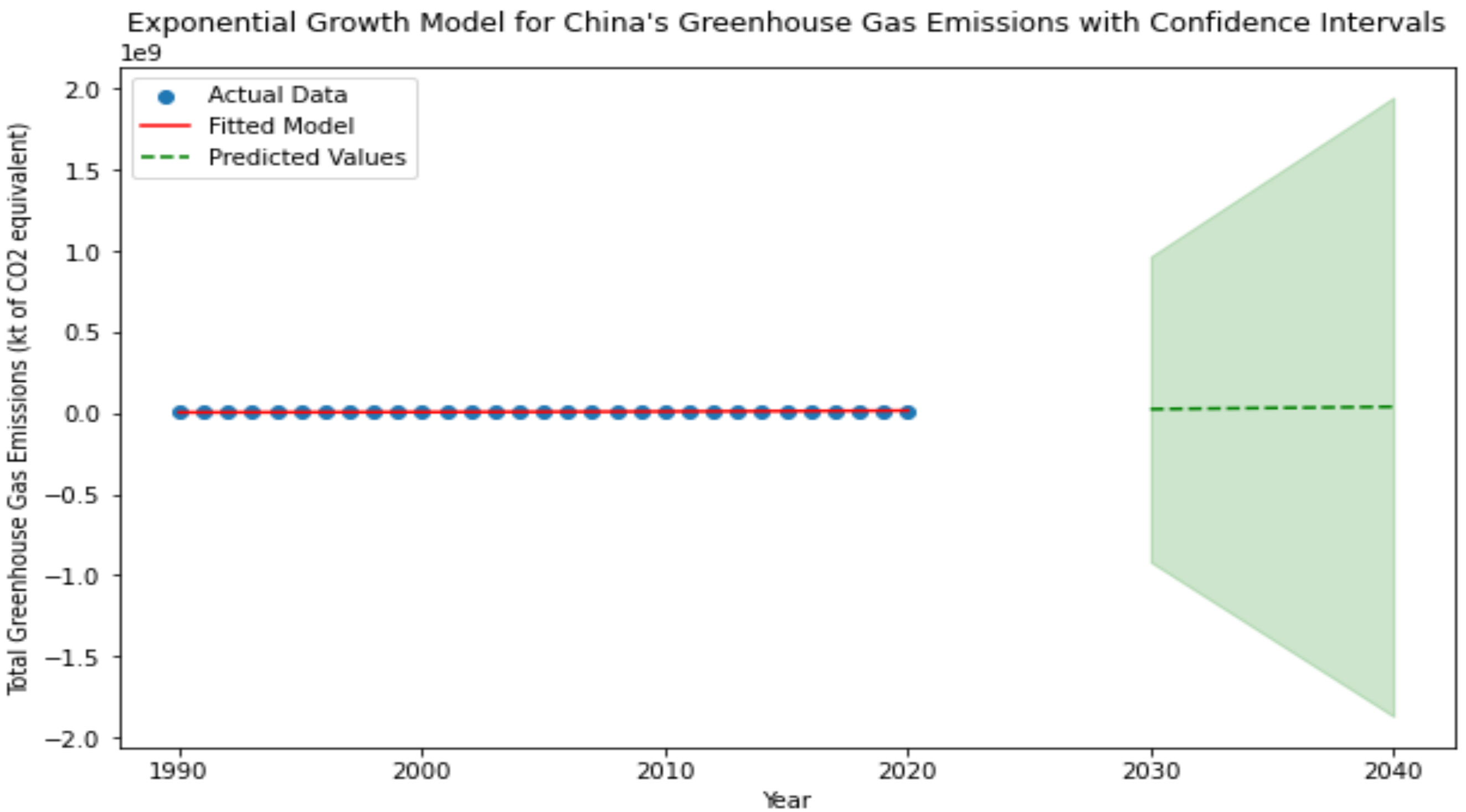
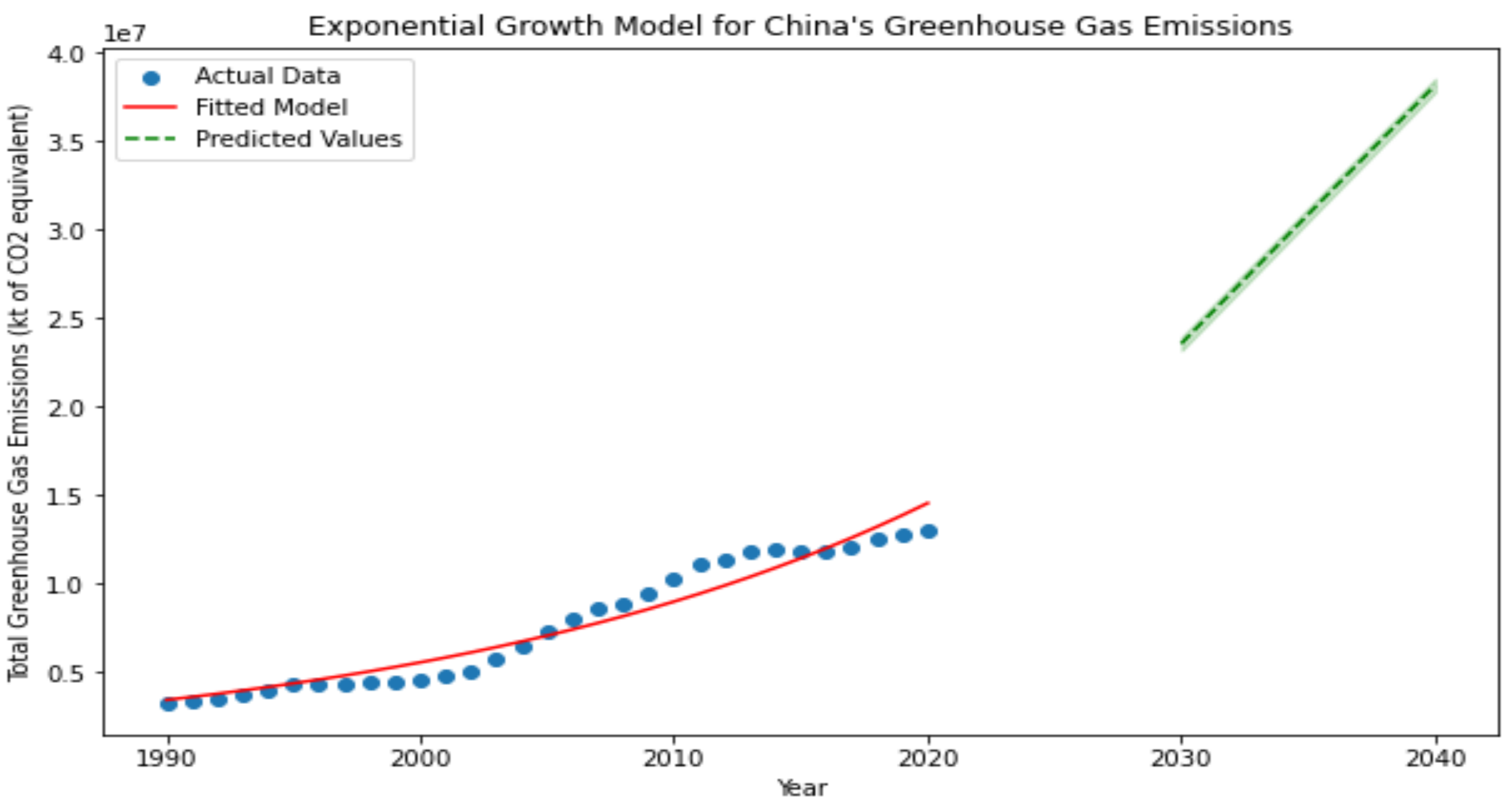
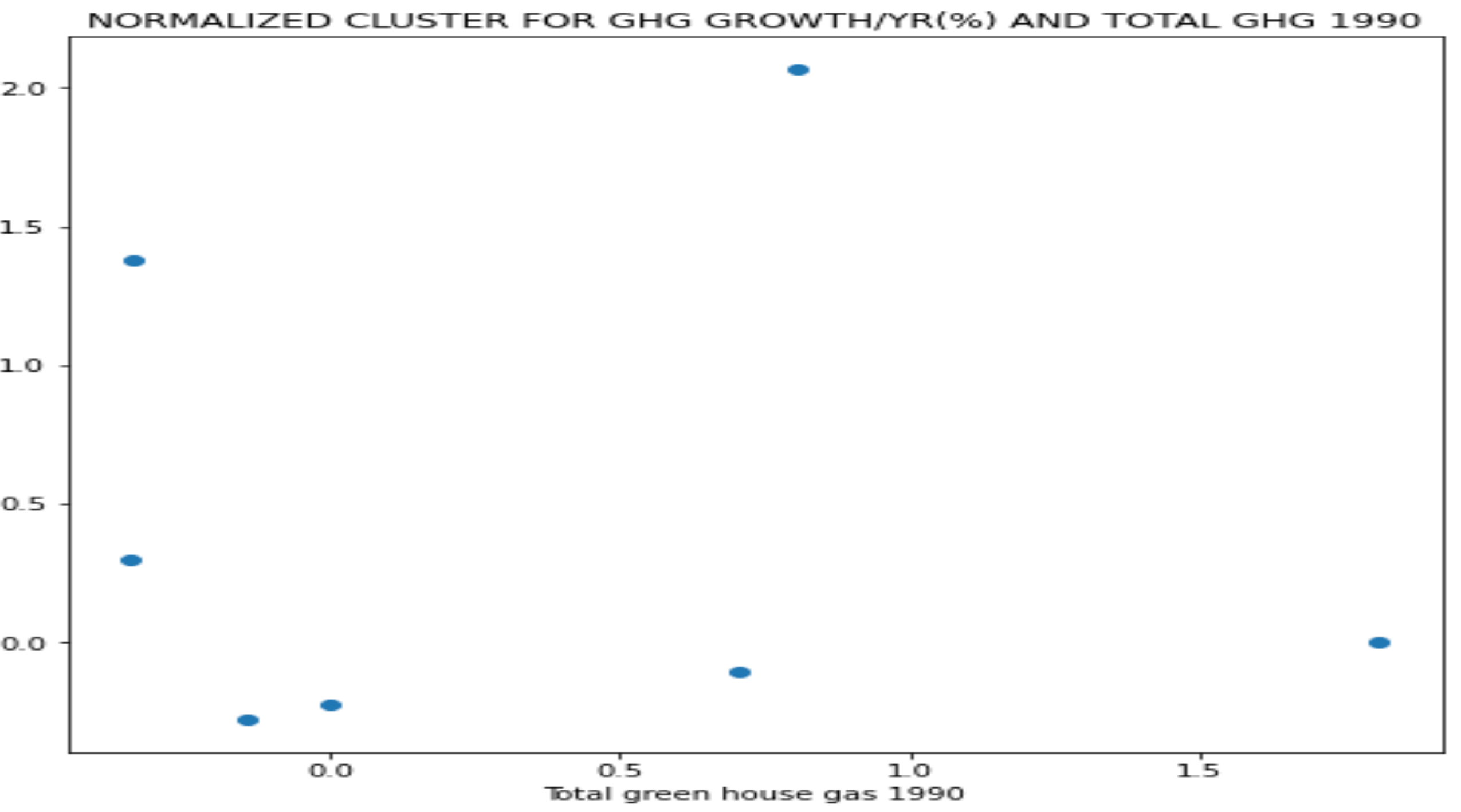
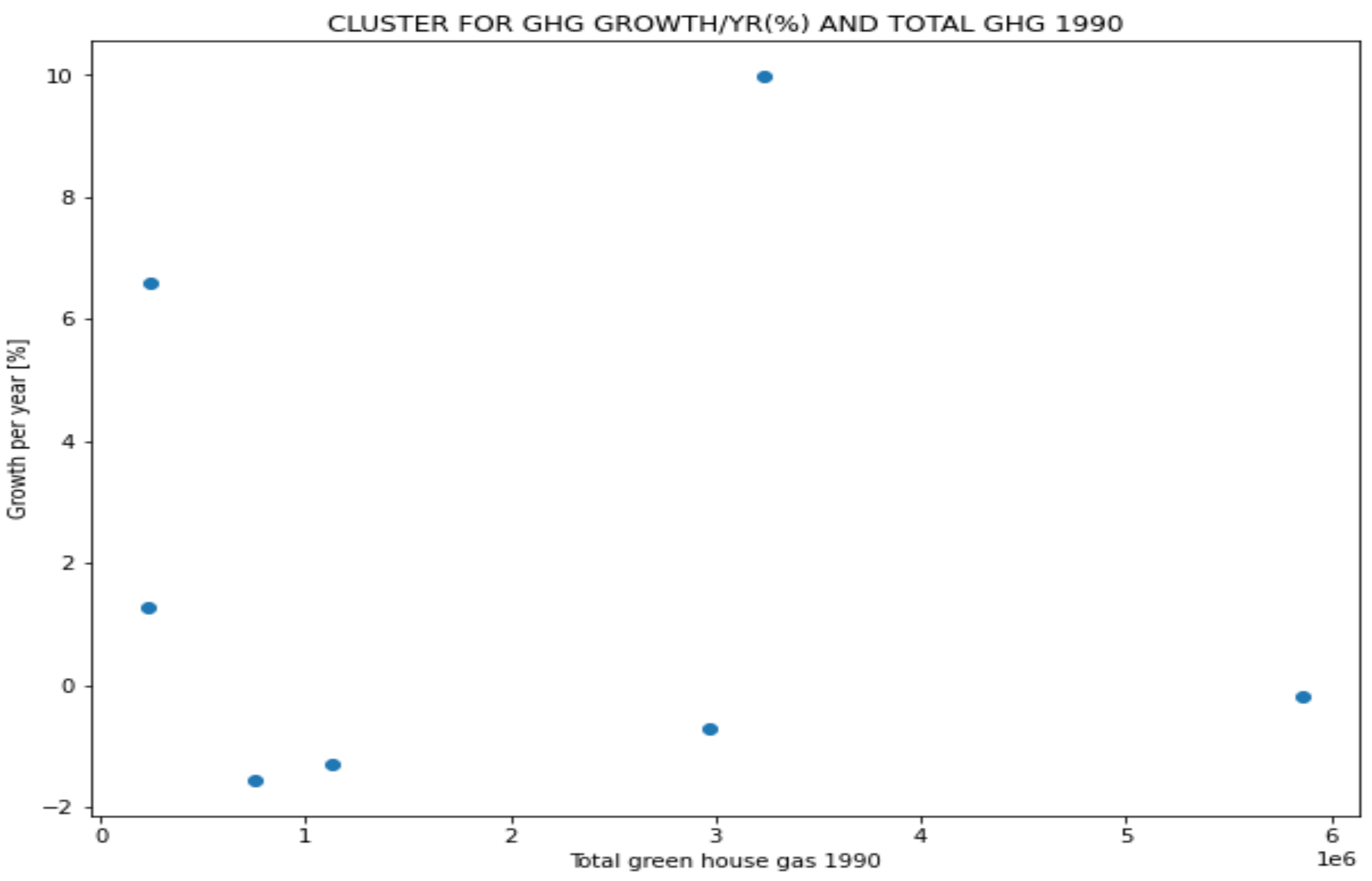


EXPLORATION AND ANALYSIS OF GREENHOUSE GAS EMISSIONS: USING CLUSTERING AND FITTING TECHNIQUES, GROWTH PATTERNS AND PREDICTIVE MODELLING FOR SELCTED COUNTRIES

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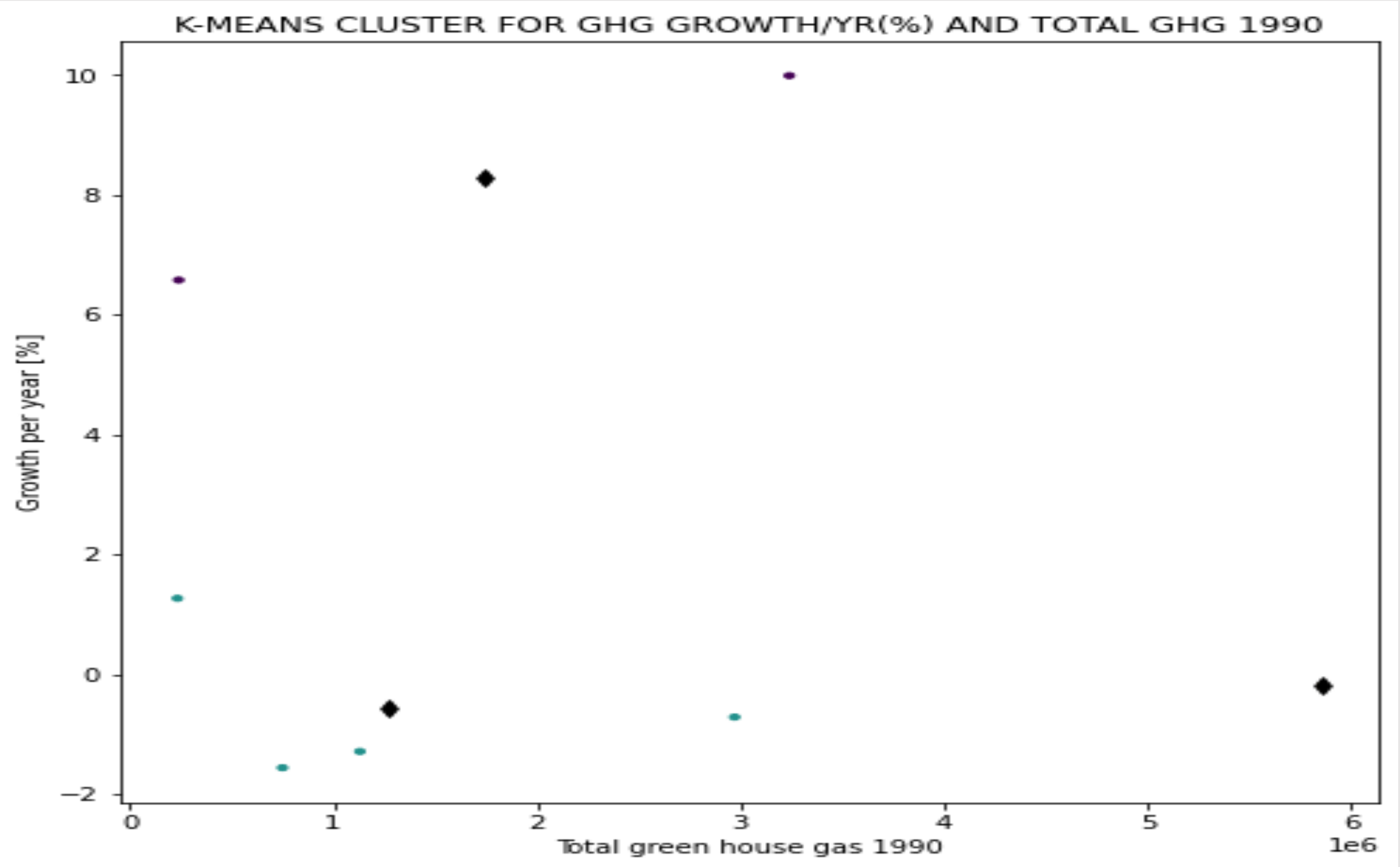
Abstract: This study explores the patterns and trends in total greenhouse gas emissions across seven countries from 1990 to 2020 using the K-means clustering, the analysis is centered around spotting distinct group among the selected countries based on their greenhouse gas emission data. The major objective is to reveal similarities and differences in emission patterns, with emphasis on its growth for over three decades. Additionally, the study also looked comprehensively into China’s emission, fitting an exponential growth model and predicting future emissions with confidence interval.

Introduction: In the face of escalating environmental concerns, The analysis of greenhouse gas emissions has become germane for understanding global climate change dynamics. Identifying key group nations with the highest contribution of greenhouse gases through clustering analysis is important for developing strategies to mitigate climate change. The predictive model helps nation in making informed decisions regarding climate change.



Analysis and Implication

- After careful inspection of my data, it is found that they are highly correlated which is a good criteria for performing clustering. Utilizing the clustering algorithm, it was identified that purple clusters close to the first cluster center identified to be China and Saudi Arabia, experienced high growth of total greenhouse gas but one of the purple clusters which is identified to be China using the cluster labels has high total green house gas in 1990 and experienced high growth of greenhouse gas emissions per year.



The clusters close to the second cluster center are identified to be Nigeria, Russia, Germany, and The United Kingdom experience fairly low growth of green house gas per year. The data close to the third cluster center identified to be the United States, has no significant growth of the total greenhouse gas since 1990. The US produces a consistent amount of greenhouse gas over the years.

The identifies clusters provide information about shared emission characteristics between Saudi Arabia and China, while UK, Germany, Nigeria and Russia has the same emission characteristics with US being distinct amongst the seven selected countries .

The examination of China emission using the exponential growth model shows its long term-term trend of high emissions using the fitted model. The prediction model shows a continuous increase of greenhouse gas emission in China to be 23553035.51kt and 38152146.24 by year 2030 and 2040 respectively.

The inclusion of the confidence interval in the prediction model shows the uncertainty inherent in the prediction of future emissions.

In conclusion, In conclusion , the clustering analysis of the total greenhouse gas emission among the selected countries revealed distinctive patterns in their emission characteristics. The identifies clusters provided insights into shared trends, highlighting similarities and differences in emission growth over the years The forecast predicts continued growth by 2040 for China.

GitHub: <https://github.com/Yhermii/CLUSTERING-AND-FITTING>