

Integration of Data Science in Combating Climate Changes

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Abstract

Data science targets improving the world through the systems, algorithms, and processes that it offers on how specific insights are gained from data to create an impact. Thus, its integration in combating climate change is essential to the public who learn more on techniques to handle such issues. Data science is a novel of interdisciplinary linked to handling climate changes. It can apply the new technologies like machine learning, artificial intelligence, and IoT to combat environmental challenges. Through this, data science has achieved dominance in various countries as they try to check on how it can help combat situation connected to climate changes. Hence, the data science query can help set the policies and interventions that help the public who depend on climate changes. Shreds of literature are essential in providing an overview of how an in-depth research can be done to determine how data science integration will help in combating climate changes. Therefore, the paper addresses the situation by providing various views about the topic.

Key Words: Climate Changes, Combating, Data Science

Introduction

Climate change is a primary issue today that needs solutions that include decision support systems and data-based models that better

understand how complex climate change is to the environment. Based on how complex the results and variables of climate change are, it requires data science to provide an out view of how its integration can help combat issues linked to climate change. Data science is a simple data set query that allows the assembling of various analysis techniques like machine learning and artificial intelligence. Machine learning allows the technologies involved in data science to analyze data needed to combat climate changes. On the other hand, artificial intelligence supports decision-making in that it can complete the observational gaps in instances that involve the combination of numerical climate model data. Besides, applying climate computing allows data science to analyze and capture big data related to combating climate issues, and multidisciplinary Research can also be included in such situations. Thus, AI and ML are used in situations to support the integration of data science.

The use of systems and data science allows a massive amount of heterogeneous data to be combined and integrated into analyzing how climate changes can be handled. Hence, the models and data that define particular areas in climate issues are applied to show how it is a complex problem affecting society. The overview of the paper is guided by data science which is classified as a novel interdisciplinary linked to climate changes, how machine learning improves decision process and

automatic prediction and how the knowledge on big data can be integrated into providing heterogeneous data that solve climate issues in the United States (Chari et al., 2016). In the field of Research, more excitement is on matters concerning climate changes as most people are affected and do not have a solution to the issue. The advantage of applying data science techniques in combating climate changes is that the differences it has to create solutions are huge in complex science (Porfiriev, 2015). Hence, it's a guarantee that through the discussion, the United States will get an overview of how to handle the situation so that it cannot affect them in future. The discussion under this paper utilizes opinions from literature to explain how data science can be integrated with new technologies like big data, IoT, artificial intelligence, and machine to combat climate issues and checks how the United States will benefit from such Research.

Literature Review

Integration of Data Science in Combating Climate Changes

The primary contribution of data science in dealing with climate issues is it gives massive information on how to with the situation and disseminates the data to individuals who should handle it. The rise of data science information is essential to scientists who can use it to understand present and past weather and environmental conditions to determine reliable trends in climate (Amelia, 2017). Through this, the United States can know what is coming concerning climate changes and how it can be handled. Data that is generated by the Internet of Things systems helps the public to conserve water and energy. However, the scientists use this data to establish climate issues that show the

citizens what the real state of affairs concerns the environment and climate (Stoyanovich et al. 2017). In some regions in the United States, lack of visualization has been among the primary problems in getting appropriate buy-in for the environment and climate-friendly policies. Therefore, such regions do not know how to handle the situation, and this is where data science is involved in providing the techniques that can help manage the challenges. In the end, the regions that consider the role of big data in combating climate changes have fewer complains and challenges linked to the environment, and in future, they can maintain the situation.

Data science is essential in understanding how various industries bring about the case of climate change. Under this, the integration of data science is involved in determining where there are essential environmental shifts like deforestation and how the changes affect the climate. An example of this case can be how big data produces knowledge that shows trees in most regions of the U.S are linked to commercial deforestation (Karpatne et al., 2017). Under this, the policymakers and scientists are expected to take the appropriate action in dealing with the changes by applying data science that can launch a satellite that determines the point that contributes to climate pollutions.

Mitigating the effects of climate change and successful adaptation needs strategic plans to direct to getting solutions in combating the issue. Data science tools allow evaluation, processing and systematization of heterogeneous information and data sources (Hsiang et al., 2017). The role can be compared to traditional disciplinary tools that do not consider evaluation and systematization of data to solve climate changes. Besides, there is the

harmonization of diversified data sources and scientific knowledge that connect to features of climate change that prove how environmental factors makes the public uncomfortable when there is pollution. The integrated thinking brought by data science provides a groundwork for significant future trends that can apply computing in climate change.

The primary problem in addressing the issue of climate change in the United States is lack of proper understanding of the climate effects of individuals behavior. Artificial intelligence is stepping to help data scientists combat the issue by building a robust system that can learn and sense any problem brought by environmental conditions (Kalidindi et al., 2015). From this, the public can also learn how to meet specific goals in dealing with environmental changes. Data science has provided an avenue for climate modelling to discover the recent developments that can include AI in solving climate issues. Thus, through the technique, researchers can detect or predict how the environment will respond to variables such as carbon levels and find out the measures that can be applied in protecting the human population (Mons et al., 2017). Data science uses artificial intelligence to help in solutions improve and climate policy that combats climate changes. Thus, it makes energy systems effective. This is where data science techniques can be integrated to machine learning that assists the scientists in proposing significant adaptation policies and improving the environment.

Data science applies machine learning to test the techniques that will significantly help in identifying the appropriate interventions. For example, it can analyze the environmental tests and data that prove why some areas in the United States

experience a specific climate change over a period and the outcomes of things like pollution (Larson & Chang 2016). Thus, it brings various fields together that produces target policies that are effective in impending the climate disaster that may occur in the area. Each program under data science is essential to the scientists in the U.S who can create new applications that combat climate changes.

The integration of data science in combating climate changes in the United States can involve the Internet of Things (IoT). Thus, IoT is responsible for making the devices and appropriate environment that can deal with the fluctuations in the climate in the areas affected in the country. With this regard, it is proof that IoT affects energy emissions and use, which controls the behavior of the climate across various regions. The concepts of energy emission include green building, which is involved in reducing greenhouse gas emissions (Giuliani et al., 2017). The reason for this is most cities account for carbon dioxide emitted in the United States, and it is easier for scientists to detect the environmental impacts that affect the human population. Green building reduces the environmental effects by applying eco-friendly building tools, which impacts the cities as it increases the green space and, in the end, the commute times are reduced. The points prove how IoT is widely spread in energy-saving, and if cities consider such directives from data science, it will clear the issues on climate change (Hardin et al., 2015). Finally, the integration of data science protects biodiversity in instances where the climate issues have surpassed the scientists' knowledge. Under this, there is a connection to IoT systems where illegal logging is stopped to ensure

the climate is not affected by the changes in the environment.

In most regions in the United States, climate issues are influenced by overpopulation which negatively impacts the environment. According to researchers, by 2040, most people in the U.S will be living in the cities, and any chance of ignorance will lead to more climate changes that affect the populations. Data science will be involved in these situations to ensure the cities are energy efficient and there are no negative effects of climate on the population (Cao, 2017). With this regard, the integration of data science to combat climate changes will link the population with IoT systems that can supply water efficiently and improve congestion which helps in reducing the time spent in vehicles. Besides, smart cities can learn how to introduce energy-saving measures that prefer monitoring trash and working remotely like the approach to combating climate changes through data science techniques.

The farming communities are affected by climate changes. Data science connects with IoT to help farming societies by ensuring the techniques they introduce helps the farmers get more water. The cases that lead to soil degradation are reduced. Most advanced scientific techniques consider what society face, and the United States, as a leading superpower, is expected to deliver better agricultural products. Data science allows the implementation of techniques in improving the agricultural sector, which is vulnerable when the climate is negatively impacted (Stoyanovich et al., 2017). The suggestions from data science contribute to climate-smart targets of improving production that advocates for less cost of farming, and the United States

citizens can use this step to increase the agricultural products and improve their health.

Through data science, the technology of discovering models by algorithmic search process can be explained to combat climate changes. It groups the techniques into association, regression, classification and clustering rules. Through data exploration, clustering is used to group similar environmental changes contributing to climate issues in the United States (Kemp et al., 2015). Classification categorizes the data project that helps collect the series of steps that can define what minimizes climate change to affect the population. The association defines what often happens that leads to issue on climate. Regression helps in information extraction and prediction on how the climate behaves after some time, and through this, data scientists can combat climate changes.

How the Research will help the United States

The citizens in the U.S can all benefit from the Research as an environment characterized by climate changes surround them. Data science addresses climate change issues through visualization that allows buy-in for the environment and climate-friendly policies that the citizens in the United States can apply in preventing negative impacts on the environment (Hsiang et al., 2017). With this regard, the algorithm search tools are provided by scientists in the U.S to help various sectors like agricultural schemes that depend on climate change for the production of quality food. The Research provides a solution on how the regions featured by overpopulation can apply data science and new technologies like IoT, AI and ML to combat climate changes. For example, data science

integrates machine learning to determine the interventions for a bad environment.

Scientists in the United States can learn how data science provides information on combating climate issues and disseminates the data to create a change. In the past decade, the public has raised more complaints to the government they believe is lazy in handling problems linked with climate changes (Karpatne et al., 2017). Thus, that should not be a problem again for the government since the Research shows how data science changes the world by applying big data to climate change problems. The public can learn how to preserve energy and water to help them deal with the situation. The public can also learn from the Research that policymakers and data analytics offer appropriate buy-in for the environment and climate-friendly policies that combat climate changes (Gudipudi, 2017). With this regard, they can learn how ideas from the Internet of Things make energy effective. Finally, through the Research, the U.S can learn about the systems that can be deployed to sense and detect any environmental changes that show trends in climate. All these works with the help of data science.

Conclusion

In conclusion, data science provides solutions that manage challenges related to climate change by using new technologies like machine learning, artificial intelligence and the internet of things. Researchers have always determined what implication can data-intensive Research like this can have to the world. The overview of big data presented in the paper shows that climate change coverage has dwelled on the country's techniques to ensure they maintain the water and energy needed to

impact the environment positively. The focus on data science on combating climate change is balanced. There are clear directives on how its tools allow evaluation, processing, and systematization of heterogeneous information and data sources. Data science uses ML to test the techniques that will significantly help identify the appropriate interventions, for example, in testing how the environment of a specific region in the United States is that way. In instances where mitigation of the impact of climate is involved, strategic plans are needed to analyze how the effect will affect the population and how it's easier for data science to deal with it. Finally, learning all the effects data science can have on a nation like the United States will improve various sectors that depend on climate changes and the public, in general, will also benefit.

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