

New techniques and technologies in data driven approaches to sustainability *

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This is just the first draft, everything should be attained to changes. Please feel free to edit this document.

Abstract

In this paper we propose and analyze [...] In this part we write the possible abstract for the project.

Key words: Machine learning, agriculture, climate change, optimization, water

1 Introduction

Sustainability is the greatest challenge facing the human race, and in the face of global warming coupled with population increase, the strain on vital sectors, like agriculture, is mounting at an accelerated pace. This project is focused on the use of open data to improve understanding, and, ideally, predictability, for the environmental impact from agriculture.

Agriculture is one of the most significant areas of economic activity for countries around the world, and it has a significant environmental impact; it is estimated that agriculture accounts for at least 10% of green house gas emissions in many countries ****CITE****. In nearly every country, there is an impact from agricultural practices through changing land use, water consumption, use of fertilizer, GHG and other emissions. From a local

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perspective agriculture creates different dynamics for indigenous plant and animal life in addition to creating different micro-climates. On a more broad scale, agriculture can put pressure on entire river systems and lead to changing weather patterns as atmospheric humidity and solar radiation emissions change.

The ideal outcome of this project is the design of a model and a system of action for environmental impacts that leverages open data and provides a complement to the current TheoryMesh system which is capturing operational impacts from farm activities. Invariably, the project and its outcome will be data driven.

There are many data sources available to investigate environmental changes and impacts due to agriculture. Furthermore, there is a proliferation of data sets that convey information about practices, agricultural production, and green house gas emissions. Combining data across data sources and interpreting the data in new ways could provide better insights on sustainability. Using machine learning techniques to creating models to describe these impacts could improve planning and shift practices to reflect longer term environmental impact. For example, technologies like Blockchain may provide a foundation to create an immutable data ledger for environmental impact while also leveraging smart contracts to take action on data when conditions are met.

For a broader view, the reader is encouraged to read The United Nations Sustainable Development Goals that describe a multi-faceted view of sustainability covering environment, economic and societal factors *****CITE*****.

Outline

Sebastian: Here a little bit of outline of the project, we should write this aprt after the main parts are in place.

2 Motivation

- Bullet points for the main motivation.
- Should talk about the importance of the model
- Why does it fit the data.
- etc.

3 Contributions

- Contributions of our work

- How does our work (try to-) fix the problem. etc

4 Related work

- A little of literature review

5 Setup

- Main mathematical setup. All that is needed to understand the problem. **Sebastian:** Maybe this part changes as we go with the project, because should be something more for the industry than theoretical.

6 The model problem

- What kind of model, prediction are we using. Machine learning approaches, regression models, etc...

7 Problem statement

- We should talk a bit of the statement of the problem

8 Main results

9 Conclusions

10 Future work

References

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