**BABEȘ-BOLYAI UNIVERSITY CLUJ-NAPOCA**

**FACULTY OF MATHEMATICS AND COMPUTER SCIENCE**

**SPECIALIZATION MATHEMATICS AND COMPUTER SCIENCE IN ENGLISH**

**DIPLOMA THESIS**

**Precision Agriculture:**

**Predicting a crop based on environment data**

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**Abstract**

This paper aims to illustrate how integrating AI into agriculture can potentially enhance production. It also seeks to encourage documenting the yields of crops and future development with AI and agriculture data which could enhance future production. Farmers face challenges in considering all natural factors when making decisions, often relying on intuition. However, this paper will delve into these natural factors that significantly influence crop outcomes, outlining the potential long-term impact it could have on farms, leading to a better-informed population that takes advantage of the data to bring out the best productions. Introducing a tool that would make it easier for them to make such decisions while taking such data into account would greatly benefit them. By providing chemical data about the soil at the start of the year this machine learning algorithm can predict the yield of different crops. This can later be developed to use these results to recommend what crop would be best for the current year, or what the chemical levels of the soil should be for their desired crop. This model was initially trained on a public dataset from India. However, it can easily be adapted to other countries with varying climates, provided there is access to relevant training data.

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**Introduction**

* 1. **Motivation**

In recent years, our climate has undergone significant changes, deeply impacting the agricultural sector. On top of the constant change of the climate making it harder for farmers to predict which would be the best crop to be planted, our society continues to expand while arable land is finite. At the same time, not all farmers consider all the knowledge there is about crops. Reaching better productivity out of the current resources we have would be a great improvement on top of making certain decisions easier for farmers. I was determined to look for options to implement artificial intelligence into our agricultural sector in a way that would make farming smarter and more efficient.

**1.2 Objective**

The objective of this project is to encourage the advancement of implementing ai into this field and bringing more efficiency and effectiveness to farming practices. I want to promote both the collecting and utilization of data by showing the effects it can have. With future developments in this field, we anticipate simpler decision-making processes for our farmers, coupled with reducing the waste of resources such as fertilizer. This approach ensures optimal utilization of resources where they are most needed, which provides greater efficiency and sustainability.

Additionally, the data collected, and the progress achieved in this field could have the potential to stimulate further innovations in the agricultural sector.

* 1. **Structure of the thesis**

This Paper is divided into 3