Crop Recommendation System

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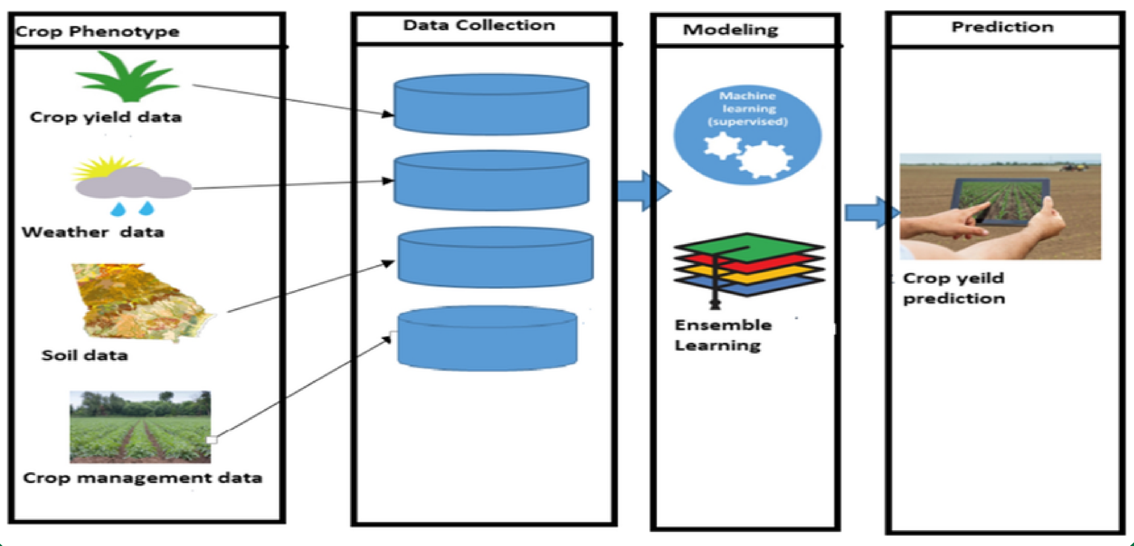
1. Introduction

Agriculture is of immense significance to economies of many countries, but the climate change impacts and the competition for the limited land demand more thorough screening of crops and higher technology farming. Classical approaches based on local sense of place might encounter insufficiency. This research work presents the idea of a machine learning driven crops advice system that serves farmers with relevant information specific to environmental conditions and goals they want to achieve. The system will do this by using diverse datasets and then it may recommend different types of crop, planting times as well as cultivation methods. With this strategy, agricultural procedures in the places affected by versatile climatic conditions may be changed by giving information through data in order that farmers may be able to increase yields as well as optimize resources and boost food security.
This project introduces a novel concept where users can explore the cultivation of non-native crops under similar weather conditions.

2. Related works

Weather factors such as rainfall and temperature produce different effects at various stages of crop growth. At some stages, these become conducive for growth while at other stages these are harmful.

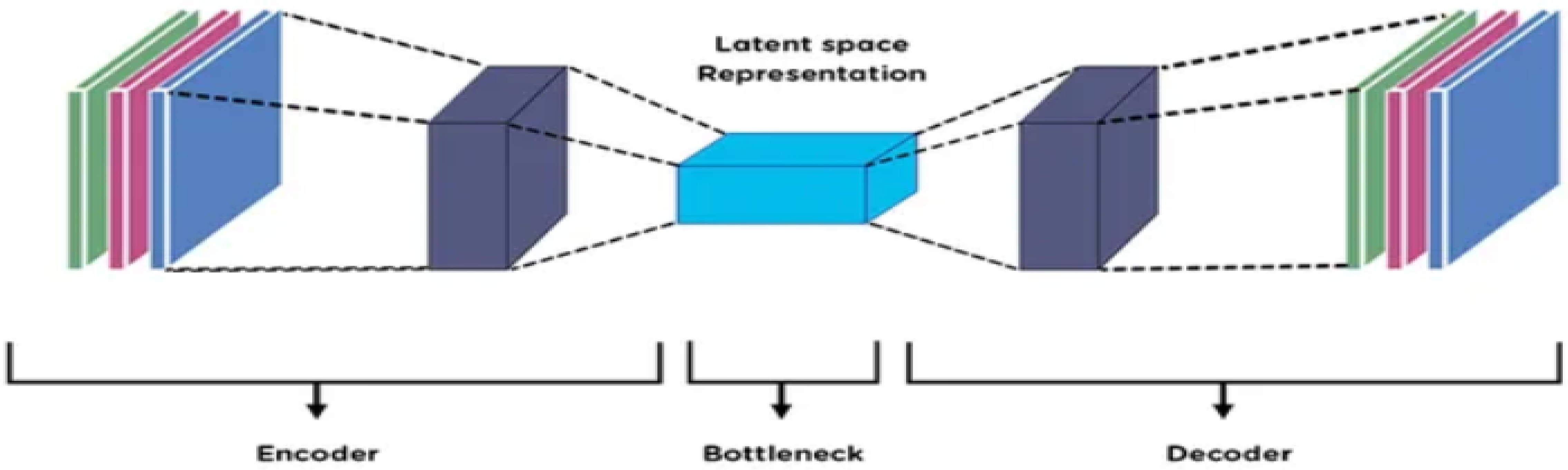


3. Data Collection

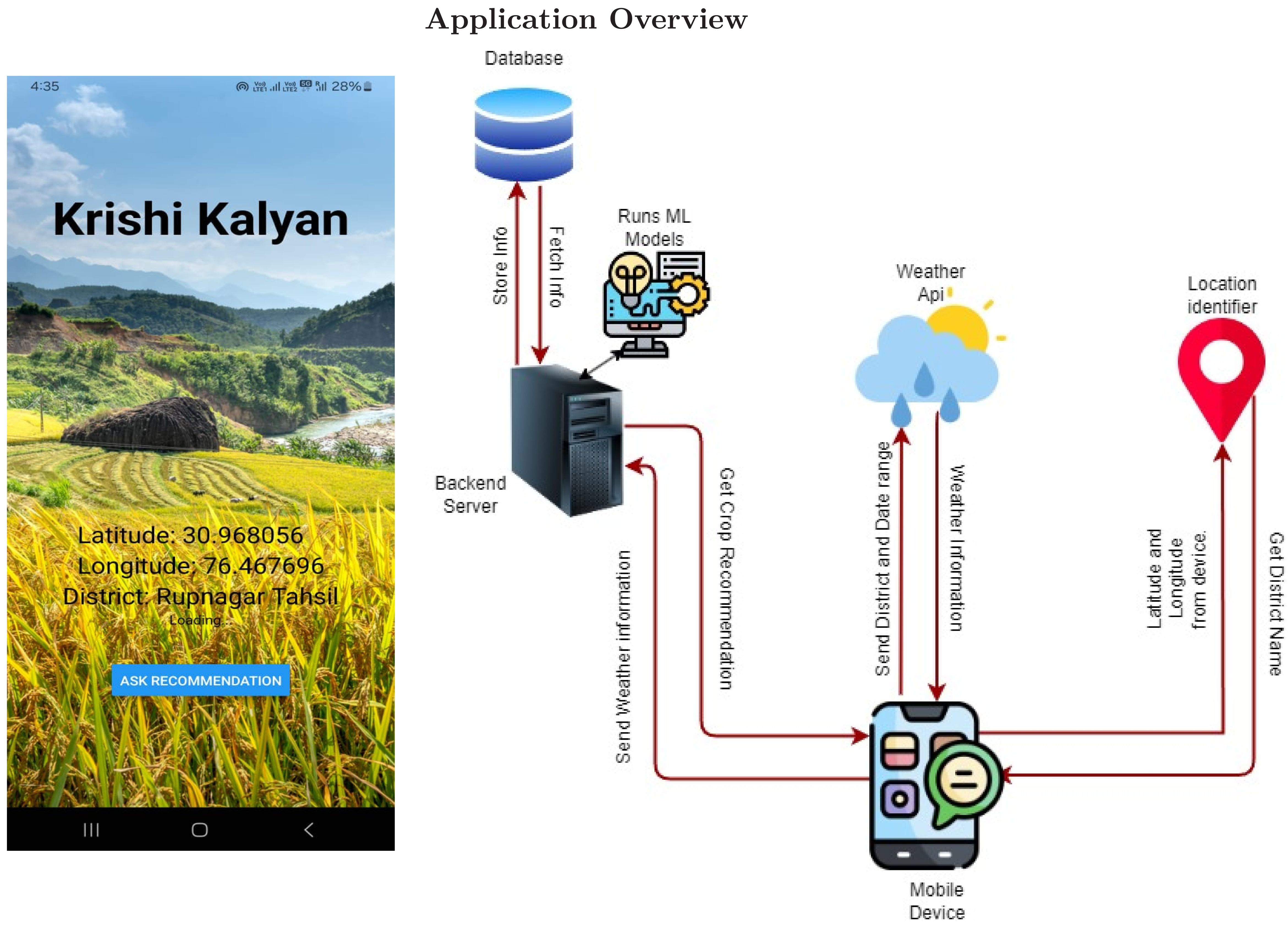
Conducting research on the influences of natural surroundings such as rainfall on cropping endings throughout all Indian states, from planting to harvesting. Historical crop yield data (1997-2015) from ICRISAT and climate data from Visual Crossing API was considered. A Python script that was used to automate the weather data collecting. This strategy provides the knowledge about how weather changes affect crop yields which is very important as it supports decision making in agriculture.

4. Autoencoder and Classification

This part of the document dwells on application of autoencoder-based neural network techniques for unsupervised learning which implies isolation of basic connections using which data dimensionality is reduced. Autoencoders have it advantage over PCA because they can well fit linear and non-linear data. The model architecture is made up of placing a narrowing constraint on the network, which compresses the input into its latent space original representation. One-dimensional convolutional layers in conjunction with dense layers precede the output – and its size is the same as the input. The pre-trained autoencoder becomes the basis for classifier training of which latent space is input for the classifier tasks.



5. Application



6. Conclusions

We utilize machine learning as a tool to study the causality between the weather conditions and the crop production across numerous Indian provinces. We aim at referencing on of investigating the adaptation of non local crop cultivation under similar weather conditions. Comprehensive meteorological and crop production data coming from reliable sources is added to the dataset for high-level analysis. Neural network-supported models for autoencoders and other regressors are utilized for feature extraction and correct crops classification. We developed the Krishi Kalyan mobile application, which has personalized crop advisory based on the future 6 months weather conditions. Our models have exhibited a satisfactory performance outlined by the case of autoencoder attaining minimal reconstruction errors and the classification model reaching 84% accuracy rate. The app Krishi Kalyan farmers enables data based insight for better decision-making of crops. Besides that, in future models can be trained on the dynamic size datasets and the dataset can be expanded to recommend different crops.

7. References

References

[1] Indian Krishi repositories, https://krishi.icar.gov.in/

[2] Tensorflow AutoEncoders, https://www.tensorflow.org/tutorials/generative/autoencoder

[3] ICRISAT, https://www.icrisat.org/