# Machine Learning and Reinforcement Learning for Detecting Weapons in Protective Environments

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## Abstract

Agriculture is a significant economic factor. It is essential for a robust biosphere. A vast variety of agricultural goods are essential to human life in practically every way. Farmers must adapt to climatic change while supplying more food with improved nutritional value. The farmer must be aware of the climatic conditions in order to increase crop output and growth, which will help it choose the best crop to grow in those conditions. By continuously monitoring the field, methane gas-based smart farming enhances the overall agricultural system. It offers a crystal-clear real-time observation and keeps a number of parameters under check, including humidity, temperature, soil, etc. Agriculture uses machine learning to increase output and quality

**Key Words:** Agriculture, Methane gas, Machine Learning, Farmers.

## 1.Introduction

Agriculture plays a vital role in the Indian economy. Over 70% of the rural households depend on agriculture. Agriculture is an important sector of Indian economy as it contributes about 17% to the total GD Pand provides employment to over 60% of the population. Indian agriculture has registered impressive growth over last few decades [1].Muthukumaran Narayanaperumal and Ravi Ramraj (2014) advocated analysing criteria like compression ratio, peak signal to noise ratio, mean square error, bits per pixel in compressed images, and study of challenges during data packet communication in wireless sensor networks [2]. R Kabilan, Ravi, Jenniefer, Sherine, Rajakumar, and Mini Minar (2015) said that the compression performance (CP), objective peak signal to noise ratio, and subjective visual quality of the image are measured and it is found that they outperform the current method. The suggested technique can be used to medical imaging[3]. According to S. Raja Ratna and R. Ravi (2015) the suggested method considerably identifies suspect routes with a higher detection rate and a reduced false positive probability; it also achieves higher throughput and less delay[4]. R.Kabilan, R.Ravi, S. Suhirtha, M. Sankara Gomathi, and S. Sofia (2019) reported that results showed no erroneous object detection in any of the photos evaluated, perfect tracking for the artificial images, and 98 percent tracked rate on the real images[5]. According to B. Suvitha and R. Ravi (2021) an automated flaw detection and classification method can guarantee better tile quality during the manufacturing process as well as higher production rates[6].

But the suicide rate among Indian farmers is concerning. In order of significance, the following factors were cited as contributing to farmer suicides: debt, the environment, low produce prices, inadequate irrigation, higher cultivation costs, usage of chemical fertilisers, and crop failure. The decision of a farmer on which crop to cultivate is typically influenced by his intuition and other unimportant variables, such as the desire to make quick money, ignorance of market demand, exaggeration of a soil's ability to support a particular crop, and so forth. The urgent requirement is to create a system that might offer Indian farmers predictive information so they could choose which crop to produce with knowledge. This necessities the usage of methane gas in smart farming, which is necessary.

The connected work is partitioned into two areas, segment one zeroing in on weapon-related lit-erasure and the subsequent area zeroing in on sporadic article shape identification which depicts methods that could become gainful to the exploration. The motivation behind the writing audit is to examine the current programming procedures/approaches proposed in contemporary examinations in this space. A unified object is to decide the examination holes and the key difficulties connected to this area.

According to Climate Change Crop yields are forecast to decrease, with the largest decreases anticipated in numerous developing economies, including Southeast Asia (-5%) and India (-5%). The range of factors, such as infrastructural and marketing difficulties, improper harvest timing, unexpectedly harsh climatic conditions, and the inability to foresee acceptable crops for farming in such settings, may help to explain at least some of the difference in on-farm losses between locations. Below is a comparison that shows:

Dataset is trained by learning networks to classify it into organic, inorganic and real estate for predicting the type of soil. It compares the accuracy obtained by different network learning techniques and the most accurate result is delivered to the end user. System will check soil quality and predict the crop yield accordingly along with it provide fertilizer recommendation if needed depending upon the quality of soil.

Determines real time sampling of soil properties using, modified support vector regression a popular machine learning algorithm and four modules. The modules comprise a sensor connected to a methane gas device, an agricultural cloud, an AUI for analysing real-time sensor data, and others. The first module is a portable methane gas sensor with PH and soil moisture sensors, together with other environmental sensors (Node MCU). Storage is included in the agri cloud module. Processing of various crops and tiny plants recommended using a modified support vector machine method is part of the real-time data analysis module. A basic web interface is the agri-user interface. Thus, with the aid of soil attributes and the Modified Support Vector Machine algorithm, farmers will be able to determine the kinds of crops and small plants that can be cultivated on farms. It is also evident that our recommended method works.

The ARIMA model uses to estimate temperature, moisture, and PH for crops. The model estimates the value of that specific parameter one month from now using the values from the database as input. The predicted values are then sent to K means algorithm for classification based on pH value thus creating k clusters of crops having similar PH value. KNN algorithm is used to predict top N suitable crops which are displayed to user.

Based on the values obtained in real-time, the Machine Learning Algorithm (KNN) determines the parameter to advise the crop that is optimal to grow in the specific field. For the purpose of crop prediction, a standard dataset that contains the minimal needs for a specific crop is kept up to date. The field where the readings are required for calculation receives the sensors. The readings are transmitted in real time to the cloud server using the DHT11, MQ2, Soil Moisture Sensor, and Light Intensity Sensor.

## PROPOSEDSYSTEM

The system's goal is to assist farmers in making wise decisions while anticipating the crops. Along with the live data, historical temperature and humidity data from a government website is also gathered and saved to improve accuracy. Additionally, archived rainfall data is gathered and saved. that the field of natural language processing has just recently developed. Research on deep learning is still ongoing. The project analyses the field's temperature and humidity using live data from a DHT-22 sensor as well as historical data from a government website and/or Google Weather API, the type of soil the farmer uses, and historical rainfall data in order to make certain and accurate crop predictions. Either an unsupervised or supervised machine learning approach can be used to do this. Training a dataset uses learning networks. The most accurate result, which will then be sent to the end user, is determined by comparing

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the accuracy obtained by several machine learning approaches. The method not only suggests the best crop, but also the fertiliser for that crop. In order to interact with the system, the farmer uses a responsive, multilingual website.

**Hardware Components:**

DigitalTemperature&HumiditySensor: DHT22 sensor is preferred to monitor live temperature and humidity. This sensor is proved to be more precise and accurate. It uses a cap active humidity sensor and a thermostat to measure the surrounding air and spits out a digital signal on the data pin to Arduino Uno port pin. The range of DHT22 is 0 to-100 % RHforhumidityand-40to80degree Celsius for temperature.

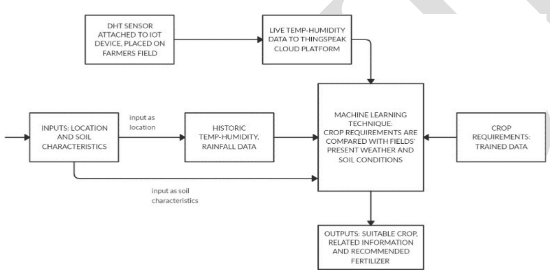


Figure 1:The functionality of the architecture is methane gas detection.

The above Figure 1, Farmer logins and enter the Locationofthefieldandthetypeofsoilavailableatthefieldforfarmingasinput, both the input are processed further.

Location is used as an input to collect the historic data of specified location i.e. the field. The historic data is collectedusinggovernmentwebsitesorthird-partyapplicationslikeAPIsforweather and temperature, amount of rain fall in the region.

The live data is collected by placing the Methane gas device on the field. Methane gas device consist of DHT 22 sensor – TemperatureandHumidityconnectedto ArduinoUNOalongwithESP8266Wi-Fi module. The live data is collected every hour and the stored-on Thing Speak Cloud platform.

The live and historic data is collected. The VAR(Vector auto regression) model is applied on this collected data to forecast the rainfall, temperature-humidity for a period of time when farmer is supposed to cultivate the crop. Now, this forecasted temperature, humidity and rainfall along with Soil characteristic entered by farmer are supplied to three different ML algorithms:- Decision Tree, K-NN, Support Vector Machine wherein the combination of the above results and the predefined data set i.e. actual requirements of the crops present in the crop data store is compared. Finally, by comparing the accuracy obtained by different machine learning techniques, the most accurate result i.e. the most suitable crop is presented to user. On the website, farmer gets the most suitable crop as an output. Along with this, the end user is provided with all the information about the crop and the best suitable fertilizer.

## CONCLUSION

In this paper we have proposed an innovative approach for smart agriculture using two emerging technologies: Internet of Things and Machine Learning. With the use of both live and historical data helps to increase the accuracy of the result. Also comparing multiple ML algorithms enhances the accuracy of thesystem.Thussystemwillbeusedtoreducethedifficultiesfacedbythefarmersandwillincreasethequantityandqualityofworkdonebythem.

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