INTERNATIONAL JOURNAL IN ENGINEERING SCIENCES

Journal Homepage: https://www.ijesjournal.com

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Research Article

Smart Irrigation System using Neural Network

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ARTICLE INFO

Published: 20 June 2024

Keywords:

Neural Network, Moisture, Humidity, relay, motor pump.

DOI:

10.5281/zenodo.12177724

ABSTRACT

Soil and farming are considered important in our country. If there is irrigation in the fields, then grains will be produced. And water is considered important all over the world. The more water there is in the fields, so the crop yield will be higher. Water is required for agriculture and irrigation. In view of population growth of India, more crops are being produced. The greater the harvest, more grains and plants are produced. And there will be more food items as well. Today we are using neural network technology. The application of IOT in agriculture and farming is quite new. IOT has been used to measure Information such as soil moisture, temperature, humidity, nutrients and concentrations for plants. Neural Network: - Large amount of data are collected and produced in many fields and applications there are many challenges to be faced in agricultural business. A smart irrigation system using ai is used. Due to which water will flow easily. And if crops grow, all living beings will survive.

INTRODUCTION

Now days, it is considered an important source of agriculture and soil not only on in India but also in the whole world. Agriculture provides employment to about 50-60 percent of the population. But due to technological development people shifted from rural areas to urban area to live a sophisticated life. Agriculture is important to meet food demand and get more produce. Because it affects the economy of the country, the government organization cancels the loan support taken by farmers and helps in providing food fertilizers. Many steps are taken grow crops such as soil characteristics and climate, which affect crop losses. With the help of precision farming. Things like air, soil, and climate can be analyzed using neural networks in the present time. Precision farming improves yields by using efficient natural resource management methods. A large amount of data book transmission is used with the help of soil moisture. Farmers can do farming easily in this. Three types of crops are grown in the AI irrigation system. Kharif crops is cultivated from June-July to October-November;

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Rabi corps from December-January to April-May; Zaida crops from December to March etc. In agriculture, neural network are used to detect crop diseases by observing microscopic amounts of soil can be seen. Cells are detected in plants. Water should be applied in equal quantity in the fields. Water can be controllers through a smart irrigation system. Due to this, monitoring irrigation helps in saving water and also in irrigating from a distance.

1.1 Problem and Identification:

Smart irrigation system use computer system and sensor to help manage various activities on the farm. Sensors like soil moisture, DHT 11 and temperature are measured; soil moisture problems in the fields are usually soil drainage-related. Helps maintain poorly drained soils. Plants must either tolerate dry conditions or provide additional water. Pests infesting plants should be removed. Fertilisers and pesticides should be used. So that crops remain safe in agriculture. The amount of soil water in plants can vary from 3-10 percent in very sandy soils in the driest conditions to the most poorly drained conditions or up to 20-40 percentages in clayey soils.

1.2 Objective:

Although CNN and DNN are sub-areas of artificial intelligence, it is necessary to apply it in various stages of agriculture, such as crop recommendation, disease detection, yield prediction, etc.,. DNN techniques are better performance than CNN techniques. The Detailed comparison analysis of neural network is mentioned in further sections.

1.3 Definition:

Smart Irrigation system uses weather data soil moisture data to irrigation the irrigation need of the landscape. Smart irrigation technology includes: - These products maximize irrigation efficiency by reducing water waste. While maintain plant health and quality. Smart Irrigation system uses to System Such as DHT11 Humidity Sensor, Temperature, Light Intensity, Soil Moisture Smart Irrigation System important is the greated advantages of a smart irrigation are its ability to save water. Generally Speaking, Rational watering methods can waste used due to inefficiencies in irrigation, evaporation and over watering. Smart irrigation systems use sensors for real time or historical data to inform watering routines and modify watering schedule to improve efficiency.

2. Literature Review:

Archana and Priya (2016) proposed a paper in which the humidity and soil moisture sensors are placed in the root zone of the plant. Based on the sensed values the microcontroller is used to control the supply of water to the field. This system doesn't intimate the farmer about the field status. Sonali D.Gainwar and Dinesh V. Rojatkar (2015) proposed a paper in which soil parameters such as pH, humidity, moisture and temperature are measured for getting high yield from soil. This system is fully automated which turns the motor pump ON/OFF as per the level of moisture in the soil. The current field status is not intimated to the farmer.

Topsoil information captured with a smart phone camera is used as input to predict the structure and texture of the soil in. The Low-level image features such as color and other texture are extracted and mapped with reolocation information with the existing land information. A NN model is used for predicting the soil texture of three types - sand, silt and clay. The prediction is also made on the soil structure with the five-point scale and other soil features such as soil density, pH value and drainage categorization of particular soil. Better spatial resolution of the soil mapping is needed in their work to further improve the performance.

Archana and Priya (2016) published a paper in which determined value of soil and a temperature sensor placed in roots of plants control the switch on and switch OFF of the water motor. The drawback of their project is that they didn't include any technique to send the status of the agriculture field to the user.

Prof C.H.Chavan and P.V.Karnade (2014) proposed a system smart wireless sensor network for monitoring environmental parameters using Zigbee. In this model, nodes can send data to a central server, which stores and further process the data and then displayed it. The drawback is we Author forecasting and nutrient content is not determined in their proposed system.

In Maharashtra state 27 districts are chosen and in that, publicly available records were taken, these records include parameters like minimum temperature, average temperature, maximum temperature, area, and production. For this dataset Multilayer Perception, Neural Network is applied for processing with the help of WEKA tool. But this work suggests that in the Artificial Neural Network based model the prediction capabilities can be improved by considering additional parameters. Amir Haghverdia, Robert A. Washington-Allenb, Brian G. Leibc predicted the cotton lint yield using remote sensing technology. The satellite remote sensing technology is primarily used for assessment and monitoring of the agricultural land in order to determine the area, amount and type of crop production. Deep Learning can be applied and used for this type of problems. In this Artificial Neural Network (ANN) approach is used to generate the models related to individual Crop Indices (CI) and CI phonology to map and predict the yield of cotton lint in two growing seasons.

Deep Learning is one of the techniques recently used for data analysis and for processing images. It provides better results and used for various purposes other than agriculture. The advantage of Deep Learning in agriculture is not limited. It has wide applications in agriculture like classifying images, data analysis and so on. The drawback found here is the training time taken by the Deep Learning algorithm, but it provides faster computation. The study area contains parameters like mean temperature and precipitation for the respective growing season. This shows that the yield found using spatial data highly correlates with the earlier prediction. Hence ANN can be used for providing great yield prediction using remote sensing. Umair Ayub, Syed Atif Moqurrab proposed a data mining technique for Predicting the Crop Diseases. In their method, the author focuses on the prediction of crop loss due to grass grub insect. They used different data mining techniques to overcome the problems faced in agriculture. The results suggested that classification which is one of the data mining approaches is very much effective one predicting crop-related problems and also helps the farmers to take decisions.

Research on new grounding technology of transmission line tower in Karst area - (2014 International Conference on Lightning Protect ion (ICLP))

Resistivity of soil in Karst area is on the high side so that resistance of transmission line tower is difficult to fulfil the requirements of lightning protection. This paper mainly studies the calculation method of transmission line tower resistance in Karst area, and influences of Karst caves to resistance. Considering Karst topographical features, according to the similarity of constant current field and electrostatic field, the model of soil and the physical model of grounding device in frequency current are built based on current distribution, electromagnetic fields, grounding and soil stricter analysis(CDEGS), the model of soil and the physical model of grounding device in impulse current are built based on COMSOL Multi-physics, frequency resistance and impulse resistance are calculated respectively. Finally, frequency and impulse simulation experiments are carried out in high voltage test platform to verify the models, based on dimensional similarity principle. The results show that the r esistances calculated by models and resistances obtained by experiments match well. What is more, factors such as cavity size, distance between cavity and grounding device, are founded to have significant influence on resistance.

Samy et al. discussed the importance of the risk of having an increased number of devices connected to IoT, especially zero-day attacks. The authors proposed a framework that uses an LSTM DL model to detect unknown attacks. They compared it with other DL models, such as GRU, LSTM, CNN, CNN-LSTM, and DNN, in five different IoT datasets. The experiment showed that the highest accuracy achieved by LSTM was 99.96% in binary classification and 99.65% in multi-class classification, with a 99.97% detection rate. However, the proposed model needs massive datasets and a long time to train. The authors in discussed the risk posed by network traffic over IoT networks. This study used machine learning methods, such as Hoeffding tree (HT) and naive Bayes, and a DL method (DNN). They used four different IoT datasets. The experiment showed that the highest accuracy achieved by DNN was 0.9975% in binary classification with seven hidden layers. The highest precision, recall, and F score were 0.9937%, 0.9937%, and 0.9937%, respectively. However, the experiment tested only four different attacks (scanning, DoS, MITM, and Mirai), which are not enough to represent real-world attacks. According to, DL methods exhibit extensive performance but have a prominent drawback: they need massive data for training algorithms. This study used two methods: LSTM and ensemble learning. A comparative analysis was performed between LSTM and other machine learning approaches, such as RF, stacking, bagging, AdaBoost, and XGBoost, by using Smart-Fall datasets. The experiment showed that the highest accuracy achieved in LSTM was 0.934%; the precision reached 0.920%, the recall was 0.934%, and the F score was 0.9178%. The highest accuracy achieved in RF was 0.999%. The accuracy of LSTM was lower than that of other methods and techniques. However, the study applied the method on only one dataset for an evaluation, which is considered a limitation.

The authors of propose an irrigation system using control-based scheduling to manage different factors such as humidity, wind speed, wind velocity, soil moisture, etc. The sensor-based predict- tion for managing irrigation and soil moisture sensor senses different soil conditions, and mobile applications are used to measure and monitor different activities of the irrigation system. Different recommendation systems such as statistical, machine-learning and deep- learning models are used to manage the prediction.

The irreversibility of urbanization will lead to the emergence of more and more cities and megacities. Given that cities are not only the centre of human activity, but also where social, economic, and environmental needs are magnified, urbanization has induced important social, economic, and demo graphic transitions.

.Indeed, urbanization has greatly improved people's quality of life. In particular, as cities become the economic, political, and cultural centre of a region, they can improve the living conditions to people in many ways. However, urbanization can also inevitably bring about a variety of negative effects, resulting in more challenges and problems faced by cities: the ecological environment has been devastated; natural resources are gradually being depleted; pollution (air, water, and sound) is increasing; and infectious diseases and cancer cases are growing; criminal activities remain rampant; and so on.

METHODOLOGY

Working Method:

To get a good yield in the fields, it is necessary to have moisture in the soil. Making deep drains between crop rows to maintain moisture in the soil. And to store rainwater, make small pits in the ground at various places between the rows of trees. In a smart irrigation system, water is required in the fields. And the water does not irrigate the crops. There must be more food to farm. Soil moisture used to measure. And the temperature sensor of the irrigation system is used to measure the temperature. DHT 11 humidity is also used to measure temperature. And light intensity is used for working at night. Today we can detect irrigation using neural networks. And can do farming. If there is excess or less water in the fields, crops and plants getting damaged? Therefore, water should be applied in equal quantity in the fields, but the more crops will grow. Today we are using the technology of CNN and DNN. When connected to a neural network, sensors like soil moisture, DHT 11 humidity, and relay connected to motor pump are being used. A computer system is programmed through a neural network and displays data in the system. A data book is being used in this programme.

By connecting no Node MCU like thing speaking, CNN/DNN can be used to monitor temperature, DHT 11 humidity, soil moisture and relay connected to motor pump etc

Block diagram:

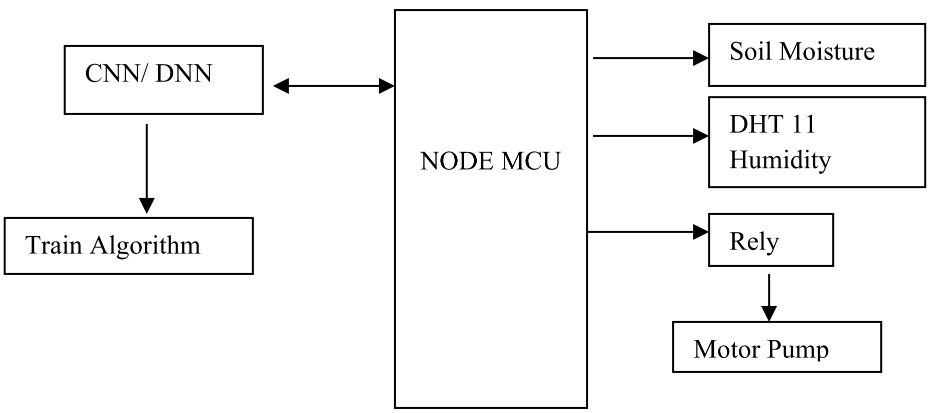


Fig 1: Smart Irrigation System

Advantage and Disadvantage of micro irrigation:

1. This system saves 40-60 percentage irrigation water.
2. The quality of Product high.
3. There is reduction in labour expenses.
4. The possibility of salt accumulation in the root zone is reduced.
5. The incidence of diseases reduces.
6. Soluble chemicals and fertilizers can be easily used with irrigation water.

If fertilizer is given by adopting this system, it saves a lot. Along with the advantages of this system, there is also some disadvantages like-in the initial stage. There is more investment in pipelines and necessary systems. Sometimes due to some reason the pores get clogged. Apart from these, sometimes pipes and parts are stolen.

Work of Smart irrigation system:

Smart irrigation systems are an innovative technology that you can incorporate into your existing irrigation system. They automate, monitor and analyze your water consumption, helping to reduce waste, detect leaks, and alert you of any potential problems.

By using a smart system that connects all water-related operations, you can use external inputs like soil moisture levels and weather conditions to create irrigation schedules based on your plants' real-time needs, rather than rely on traditional, manual methods of watering. This helps conserve water by reducing runoff, erosion, and evaporation.

Smart Irrigation systems, a grower will manually open and close valves as needed. On the contrary, in smart water technology, the smart water valves embedded into your drip irrigation system intelligently track your water consumption while allowing you to remotely control your usage.

A smart water valve contains a valve controller, flow computer system software, and a power source. The smart valve captures data from flow meters, which measures water flow through each of your irrigation lines. It then sends that information to a cloud managed software platform via a wireless connection. From there, you can access your water usage data on your phone or computer at any time, from anywhere and make adjustments accordingly.

Real Time data:

Real-time data analytics are more significant than ever for growers. Following

1. Soil moisture sensors
2. Humidity DHT 11 Sensor and Temperature sensor
3. Light intensity

What is Neural Network:

The surface soil moisture state can be inferred by using remote sensing data from Multi-Wavelength Satellite Observations in a process known as retrieval. Neural Network Soil Moisture Retrieval is able to provide global soil moisture estimates at daily or sub-daily resolution.

ANN:

Artificial Neural Networks are one of the deep learning algorithms that simulate the workings of neurons in the human brain. There are many types of Artificial Neural Networks, Vanilla Neural Networks, Recurrent Neural Networks, and Convolution Neural Networks. The Vanilla Neural Networks have the ability to handle structured data only, whereas the Recurrent Neural Networks and Convolution Neural Networks have the ability to handle unstructured data very well. In this post, we are going to use Vanilla Neural Networks to perform the Regression Analysis.

RNN:

Neuron-inspired neural networks (RNN) Nodes are stacked in layers that are essentially neuron-like. These directed connections, also called one-way connections, are employed in many agricultural disciplines; including soil cover categorization, crop yield calculation, weather prediction, soil moisture content estimate, and animal research. In addition, a recurrent neural network is a good fit for processing time-series data. RNNs are a game-changing invention in the field of artificial intelligence and machine learning, especially when dealing with sequential and time-series data. These dynamic models are ideally adapted to problems involving data points in sequences, allowing them to grasp temporal connections and patterns that typical feed forward neural networks miss. An RNN's central feedback loop enables information to be sent from one step in the sequence to the next. RNNs may consider the context of previous inputs when processing new ones thanks to the recursive structure that gives them a form of memory. An RNN's central feedback loop enables information to be sent from one step in the sequence to the next. RNNs may consider the context of previous inputs when processing new ones thanks to the recursive structure that gives them a form of memory. RNNs with traditional neural networks, on the other hand, have limitations. They frequently struggle with the vanishing gradient problem, which refers to the difficulty of representing long term interdependence. The learning process is hampered when the gradients used to update the model's parameters become too small to provide meaningful updates. RNNs have several applications. They have pioneered the way for language production, sentiment analysis, and machine translation in natural language processing. RNNs are used in finance for stock price prediction and algorithmic trading. They contribute in the diagnosis of disorders in healthcare by using medical data sequences. Nonetheless, RNNs have drawbacks. Training may be computationally demanding, particularly when using deep networks or extended sequences. Addressing disappearing and bursting gradient concerns is also critical for good training. Finally, Recurrent Neural Networks have made important advances in the field of sequence-based learning by helping machines to analyze and anticipate sequential input. Their distinct architecture makes them a vital tool for dealing with time-series data across disciplines. While there are problems, RNNs have established themselves as a vital asset in the current machine learning arsenal, allowing advancements in a variety of areas of our technological world.

Convoluted Neural Network: - CNN is a cornerstone of artificial intelligence and machine learning, particularly developed to excel at image and video identification, analysis, and processing tasks. CNNs have reshaped the way computers perceive visual input by being inspired by the sophisticated arrangement of the human visual system. A CNN is composed of a complicated array of linked layers, each of which is meant to extract and analyze various information from visual inputs. The basic layer is the convolution layer, which scans the input picture for edges, patterns, and other critical visual components using a sequence of learnable filters. This method enables the network to gradually construct increasingly abstract visual data. Pooling layers, which are frequently included after conventional layers, improve the network's efficiency and resilience by lowering the spatial dimensions of the data while keeping key characteristics. Following layers, such as completely linked layers, aid in the translation of extracted information into meaningful classifications or predictions. Back propagation is used to train a CNN by changing these learnable parameters, and the network learns to minimize the gap between its predictions and the actual labels. CNNs are used in a wide range of applications. CNNs have broken records in image classification, displaying superhuman ability in tasks like as detecting objects, animals, and even illnesses inside medical pictures. They excel in object detection, identifying and locating several items within an image, which is essential in autonomous cars, surveillance, and robotics. Image production, style transfer, and image segmentation are among more creative uses that demonstrate CNNs' adaptability. CNNs are not without difficulties, despite their efficacy. Because of their sophisticated architecture, they need a significant amount of computer resources for training. Furthermore, preventing over fitting (when a model excels on training data but fails miserably on unknown data) remains a worry, needing approaches such as regularization and large datasets. Convolution Neural Networks, in conclusion, have radically altered the environment of image analysis and recognition. Their capacity to understand complex visual elements and patterns has opened the door for breakthroughs in areas ranging from healthcare to entertainment. While problems remain, CNNs' long-term influence on artificial intelligence and computer vision is obvious, establishing them as a seminal breakthrough in the area of machine learning.

Deep Neural Network:-Deep Neural Networks (DNNs) are one of the most powerful and disruptive achievements in artificial intelligence and machine learning. These elaborate models are intended to emulate the intricate operations of the human brain, allowing robots to learn and make judgments from complex data. DNNs are distinguished by their ability to automatically extract complicated hierarchical features from data, allowing them to excel in applications ranging from image recognition to natural language processing. DNNs are built on a network architecture made up of numerous layers, each of which contains nodes or "neurons." These layers are divided into three categories: output layers, hidden layers, and input layers. The word "deep" refers to the presence of numerous hidden layers, which enables DNNs to grasp complex and abstract correlations inside data. Weighted connections connect neurons inside each layer, and the network learns to change these weights during training to minimize the discrepancy between its predictions and the actual target values. Back propagation is a technique used in DNN training in which the model computes the gradient of the error with respect to its weights and then modifies them using optimization techniques. The network's parameters are continually fine-tuned through this iterative process, allowing it to produce more accurate predictions over time. The breadth of DNN applications demonstrates their adaptability. They have revolutionized picture categorization, object identification, and facial recognition in computer vision. DNNs have enabled machines to interpret and create human-like language in natural language processing, leading to advances in machine translation, sentiment analysis, and chat bots. They've also found use in industries including banking, healthcare, and robotics. Despite their impressive capabilities, DNNs are not without problems. Because of their sophisticated design and enormous datasets, they frequently necessitate significant computational resources for training. Another issue is over fitting, which occurs when the model becomes overly specialized to the training data, necessitating procedures like as regularization and cross-validation. Deep Neural Networks, in conclusion, offer a paradigm leap in machine learning, allowing machines to tackle complicated tasks with surprising precision. Their capacity to discover complicated patterns from data has accelerated progress in a wide range of fields. While issues remain, DNNs have had an indisputable influence on technology and society as large, ushering in a new era of intelligent automation and data-driven decision-making.

Hardware Component:

(a) Node MCU:

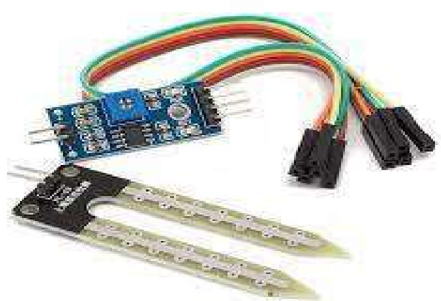
Node MCU is an advanced API for hardware input/output device which can be dramatically reduces the work for configuring manipulative hardware. It uses a code like Arduino but rather is an interactive script called Lua. It is an open source IoT platform. It runs on a firmware of ESP8266 WiFi Soc produced by Espressos if systems. Node MCU has 16 input/output pins and hence 16 nodes can be connected to a single node. The ESP8266 is Wi-Fi Soc which is integrated with a Tensilica Xtensa LX106 core which is widely used in IoT applications." NodeMCU" refers in default to the firmware rather than the development kits. ESP8266 is an inbuilt WiFi module which can also be used as an individual module as a Wifi module. Node MCU is an open source firmware for which open source prototyping board designs are available. The name "Node MCU" combines "node" and "MCU" (Micro-controller Unit). Strictly speaking, the term "Node MCU" refers to the firmware rather than the associated development kits.

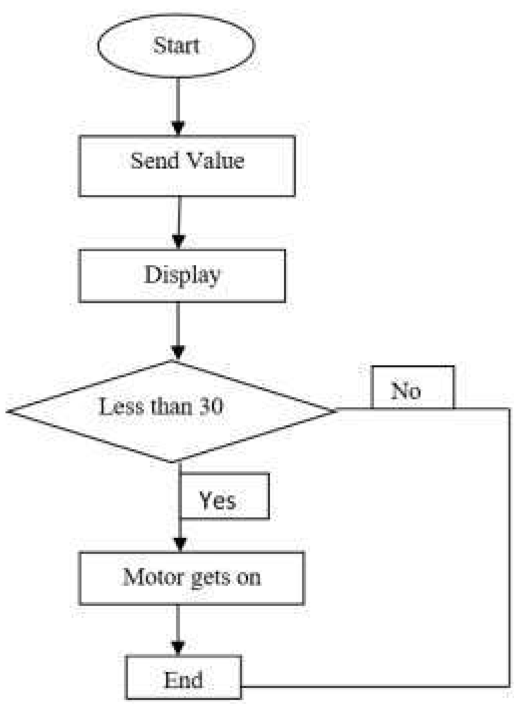
(b) Soil Moisture Sensor:

Soil Moisture sensor is used to measure the moisture content present in the soil. When the soil moisture value read by the sensor is above the threshold value, low level (0V) will be the digital output and if it is below the threshold level, high level (5V) will be the digital output. The digital pin is used to directly read current soil moisture value to see if it is above threshold or not. The threshold voltage can be regulated with help of potentiometer.

Table2: Soil Moisture sensor Specification

Input Voltage	3.3-5V
Output voltage	0-4.2V
Input Current	35MV
Output Current	Both Digital and Analogy

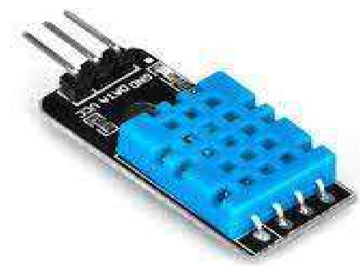


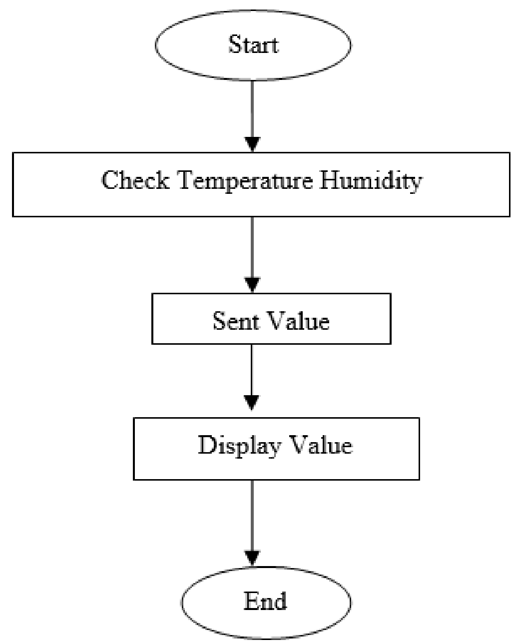


Flow chart 2: Soil Moisture

(c) DHT11 Sensor:

DHT11 sensor is used for measuring temperature and humidity. It uses a capacitive humidity sensor and a thermostat to measure the surrounding air. This sensor is cost effective, provides low power consumption and up-to 20-meter signal transmission is possible.





Flow chart 3: DHT11 Humidity Sensor

(e) Relay: Relays is an electrical switch.one or more keys are switched on or off with the help of an electromagnet. A relay can also be considered a generalized power amplifier because lower power circuit is used to control a higher power circuit is used to control a higher power circuit. The contractor also works on relay but is often used to switch on/off the contract with a current of more than 15 amps.

(f) Motor Pump:

A Water Motor is used for agricultural irrigation. The amount of Water required for th crop in the field is more. Boring is needed for more irrigation in the fields. Difficult to get off the ground. The depth of the water closes. Today, water crisis is more in the fields. The level from which the water fells down for that, a motor is required to pump out the water at high speed. Low-power motors do not go very deep.

Software Component:

Python programming is an interpreted high-level programming language for general -purpose programming. Created by Guido van Rossum and first related in 1991.used to python program

Sensor: Light Intensity, Soil Moisture, Temperature, Humidity

Jupyter notebook, Thing Speaking API

Irrigation System flow diagram:

Machine learning and deep learning, CNN and DNN are used to us AI in Smart Irrigation Systems. A Artificial Neural Network Regression algorithm has been used in this, sensors like humidity, soil moisture, and temperature, and light intensity have been used. Data set fields are used in CNN and DNN. The algorithm is being run and displayed through a computer program. We can do farming easily with this project. Soil moisture is measured by soil moisture. Temperature is measured with humidity and temperature sensors.

The Artificial Neural Networks consists of the Input layer, Hidden layers, Output layer. The hidden layer can be more than one in number. Each layer consists of n number of neurons. Each layer will be having an Activation Function associated with each of the neurons. The activation function is the function that is responsible for introducing non-linearity in the relationship. In our case, the output layer must contain a linear activation function. Each layer can also have regularizes associated with it. Regularizers are responsible for preventing over fitting.

Artificial Neural Networks consists of two phases,

Forward Propagation

Backward Propagation

Forward propagation is the process of multiplying weights with each feature and adding them. The bias is also added to the result. Backward propagation is the process of updating the weights in the model. Backward propagation requires an optimization function and a loss function.

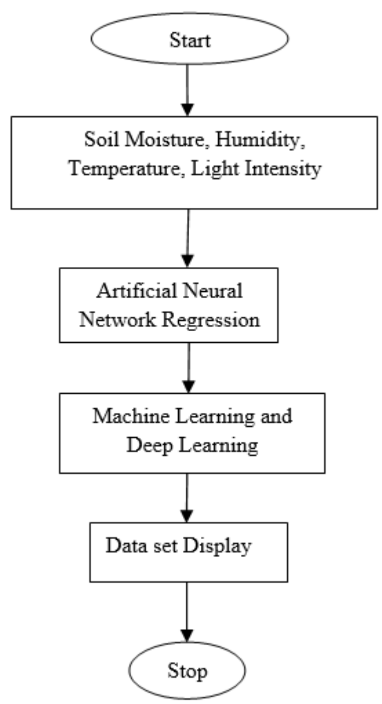


Fig 4: Irrigation System

```
Data = pd.read_csv (r'C:\Users\SONY\Documents\Research Papar\feeds.csv')
Data = Data. Sample (frac=1)
x_train = Data [['field1', 'field3', 'field4']]
x_train = x_train. Values
y_train = Data.iloc [:, 3].values
model.fit (
    x_train, y_train,
    eval_set=[(x_train, y_train)],
    eval_name=['train'],
    eval_metric= ['mse'],
    patience=300,
    max_epochs=500, batch_size=2048)
```

Neurons:

The neural network consists of three layers: an input layer, *i*; a hidden layer, *j*; and an output layer, *k*. When the input data x_i (i = 1, 2… *I*) are applied to the input layer, we obtain the output O_k in the output layer. The output O_k is compared to the desired value d_k, which is assigned in advance.

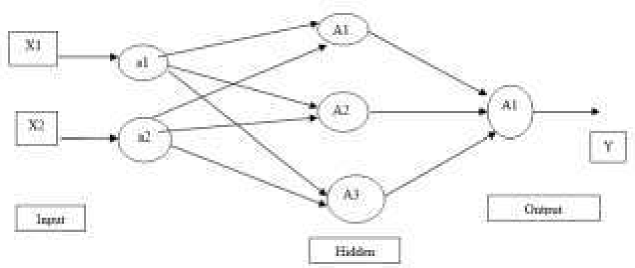


Fig 5: Neurons

By Aaron Master and Doron Bergman If you are one of the millions of people who have tried to learn neural networks, odds are you've seen something like the above image. There's just one problem with this diagram: its nonsense. By which we mean confusing, incomplete, and probably wrong. The diagram, inspired by one in a famous online Deep Learning course, excludes all of the bias coefficients and shows data as if it were a function or node. It "probably" shows the inputs incorrectly.

```
def __init__(self):
    super ().__init__()
    self.fc1 = nn.Linear (3, 16)
    self.fc2 = nn.Linear (16, 32)
    self.fc3 = nn.Linear (32, 64)
    self.fc4 = nn.Linear (64,128)
    self.fc5 = nn.Linear (128,128)
    self.fc6 = nn.Linear (128, 1)
  Def forward (self, x):
    x = F.relu (self.fc1(x))
    x = F.relu (self.fc2(x))
    x = F.relu (self.fc3(x))
    x = F.relu (self.fc4(x))
    x = F.relu (self.fc5(x))
    x = self.fc6(x)
    Return x
```

RESULT

Specifications for experiments and implementation requirements are Temperature, DHT Humidity and wind speed (mil per hours) are included. Collected from the agricultural crop research centre in India. Apart from this, the maximum and minimum water requirements are collected manually from the farmers. The test requires a maximum of 50 percent water for 1-2 months to determine the limit value. And irrigation is collected at intervals of 7-8 days. It is the algorithm used to Artificial Neural Network of Regression message.

Epoch 0 | loss: 3120.26788| train_mse: 2661.0411| 0:00:01s

Epoch 1 | loss: 2933.84113| train_mse: 1650.69275| 0:00:02s

Epoch 2 | loss: 2794.64929| train_mse: 1291.21248| 0:00:03s

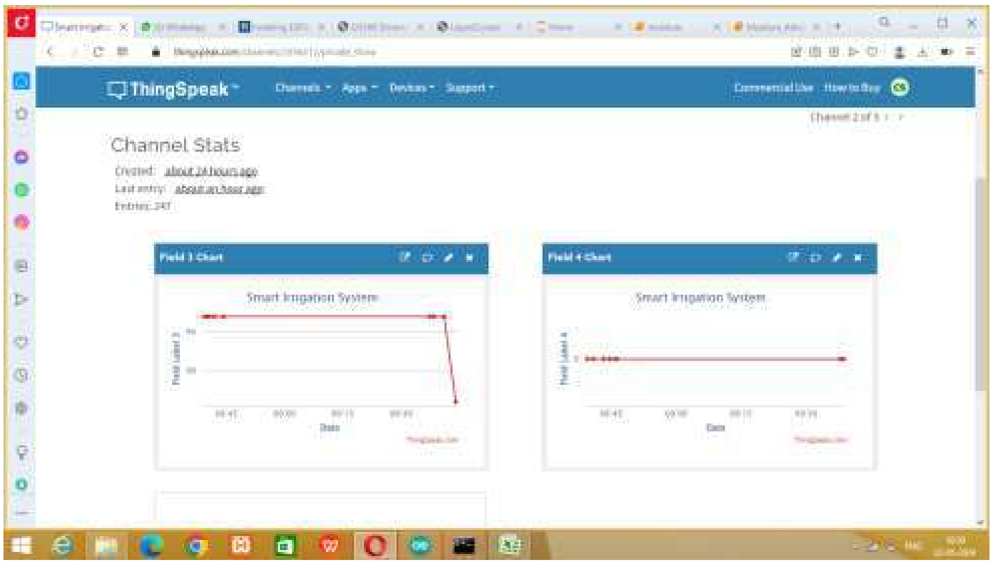
Epoch 3 | loss: 2651.42267| train_mse: 1460.05829| 0:00:04s

Epoch 4 | loss: 2483.37305| train_mse: 1565.02818| 0:00:06s

Epoch 5 | loss: 2311.44348| train_mse: 1518.94181| 0:00:07s

Epoch 6 | loss: 2118.85431| train_mse: 1472.92491| 0:00:08s

Epoch 7 | loss: 1919.82663| train_mse: 1498.08249| 0:00:09s
Epoch 8 | loss: 1716.43271| train_mse: 1455.38942| 0:00:10s
Epoch 9 | loss: 1513.31219| train_mse: 1400.04102| 0:00:11s
Epoch 10 | loss: 1294.6069| train_mse: 1401.62787| 0:00:13s
Epoch 11 | loss: 1099.87747| train_mse: 1327.66731| 0:00:14s
Epoch 12 | loss: 911.10519| train_mse: 1135.41588| 0:00:15s
Epoch 13 | loss: 740.43561| train_mse: 1087.19359| 0:00:16s
Epoch 14 | loss: 611.47086| train_mse: 1165.34293| 0:00:18s
Epoch 15 | loss: 508.66584| train_mse: 1658.68354| 0:00:19s



Graph: Moisture

Input layer: 3 neurons
Hidden layer: 16 neurons, 32 neurons, 64 neurons, 128 neurons, 128 neurons
Output layer: - 1neurons
Net ((fc1): Linear (in features=3, out features=16, bias=True)
(fc2): Linear (in features=16, out features=32, bias=True)
(fc3): Linear (in features=32, out features=64, bias=True)
(fc4): Linear (in features=64, out features=128, bias=T-rue)
(fc5): Linear (in features=128, out features=128, bias=True)
(fc6): Linear (in features=128, out features=1, bias=True))

DISCUSSION

In a smart irrigation system, the stress applied to plants during irrigation helps in completing the vegetative period of plants rapidly. Due to crop irrigation in the fields, the consumption of irrigation water has required by 35 percent. Green farming can increase yield and quality with less water. The computer system also depends more on water than the sensor base. The efficiency of the irrigation system can increase. Helps to reduce water wastage. Farmers can track the status of water shortages. Crop production and income can be increased even in conditions of water shortage. Crop can be grown. It is run in matrix form, so to speak. Smart Irrigation System in CNN and DNN using graph in Soil Moisture and DHT11.

CONCLUSION

There is a need to give importance to the agriculture sector in our country. More efforts were made to distance crops from agricultural areas. Insects and worms are detected in plants. The roots of plants spread only due to moisture in the fields. And iti is because of plants that the soil gets food. Due to excess water, crop humidity causes root rot. If you give less water, the crop will dry up. And the crop will be damaged. Therefore, water should be given in equal quantities. In agriculture, efficient analysis is done to improve the quality of crops. The exact crop is recommended only then. Accurate results are given when agricultural crops are developed. The issue is overcome in agricultural fields by using IOT neural network and collecting field data. Then, by analysing the data collected, the result of the farmers and help them grow the crop at the right time to increase productivity. It helps farmers achieve higher profits and yields despite changes in growing and cultivating crops. Farmers get more profit from water irrigation. Water is used to provide soil moisture, trace nutrients, food fertiliser, and plant growth. There are three types of measurements in this. Like soil moisture, DHT11 Humidity, Temperature etc. Its use in neural networks is described on computer displays.

Table 3. Sensor of measure value

Sensors	Sensor value range
Soil Moisture	-10dC to +85dC
DHT11	Temp -55dC to +150dC Humidity 40 percent

FUTURE SCOPE

By using smart irrigation systems in the CNN and DNN using data training and testing algorithms. Future results and forecasts are predicated according to the market situation. Soil moisture data is helpful to farmers by providing realistic information about the changes that need to be incorporated into crop patterns. In the future, soil moisture sensor node deployment can be increased in the area of interest to collect measurements. We are using sensor soil moisture, DHT 11 Humidity, temperature etc. In our smart irrigation system in the future. We use the data analysis algorithm, field, latitude, evaluate and status in this way one can study directional short term data feeds. For this, a matrix from the data Neural Network Regression algorithms is used.

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HOW TO CITE: Chhatrapal Sinha, Prabhas Gupta, Smart Irrigation System using Neural Network, Int. J. in Engi. Sci., 2024, Vol 1, Issue 1, 24-37. https://doi.org/10.5281/zenodo.12177724