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AGRICULTURAL INTELLIGENCE DECISION SYSTEM

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Abstract: In the recent years, the huge volume of real time data in the agricultural sector and its need for an efficient and effective processing, stimulate the use of novel technologies and platform to acquire, store, process, analyze and visualize large data sets for future predictions and decision making. A field which uses information technology to aggregate data from multiple sources is something called the practice of precision agriculture.Big Data is an evolving term given to a good area of data-intensive technologies during which the datasets are extremely large that handling them become tougher than how it was before. Due to the critical challenges facing the agriculture sector farmers feel more forced to adopt intensive farming practices and sustainable. Analysis of agricultural land use in development and environment projects, also for preventing and assessing climate events, or for monitoring and forecasting food security crisis, all these need a reliable crop classification.

I. INTRODUCTION

Now we are living in Big Data Era. Few years ago, Systems or Organizations or Applications were using all Structured Data only (Structured Data means in the form of Rows and Columns). To store, manage, process and report this Data, it was very easy while using the relational data bases (RDBMS) and also the old tools. However recently, Nature of Data is changed. Data in variety of formats at very fast rate are being generated by the systems or organizations or applications in a very huge amount which means Data is not simple Structured Data. It does not have any proper format, just raw data without any format .To store, manage, process and report this Data is going to be very difficult or not possible since those are the old technologies ie, traditional relational databases and tools. The BigData Solutions come into picture now since the storage and the processing and the analysis of these kinds of data cannot be done by the traditional data bases. When the problem of working with data which exceeds the computing power or storage power of a single computer is not a new issue, the pervasiveness, scale, and value of such type of computing has greatly expanded in recent years. Big data is a field that treats ways to analyze, systematically extract information from, and also deal with data sets that are too large or complex, that make us feel tough to be dealt with by traditional data-processing application software. Data with many cases offer greater statistical power, while data with higher complexity (more attributes or columns) will lead to a higher false discovery rate. Including the processes of capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy and data source makes the big data analysis. The three key concepts: volume, variety, and velocity have been associated with the big data. The big data often consists the data with sizes that exceed the capacity of traditional software to process within an acceptable time and also value.

Agricultural being a very vast field being followed from ages of human race, has a very wide range of varieties, the volumes that had to be grown in, the the kinds of crops and its corresponding limits to be consumed which includes the volume of its production, definitely has a huge scope which can't be dealt that easily. Hence were using big data analysis which is primarily known for the usages of these kind of scenarios

The smart machines and sensors crop up on farms and farm data that grow in quantity and scope, also farming processes will become increasingly data driven and data enabled. The phenomenon of what is called Smart Farming (Sundmaeker et al., 2016) is rapidly growing with the development in the internet of things and also with the cloud computing that is propelling this phenomenon. Real time assisting reconfiguration features will be required to carry out agile actions, such especially in cases of suddenly changed operational conditions or other circumstances (weather or disease alert). These kind of features typically include intelligent assistance in implementation, maintenance and also use of the Smart Farming along with the management cycle as a cyber-physical system, which means that smart devices are being connected to the Internet and these are controlling the farm system.

II. RELATED WORK

At the end of 1970's ,the expert system starts to be applied in agricultural domain. After almost 30 years of development, the application domain has been spread into wide crops cultivation management, installation horticulture management, poultry

raising, aquaculture activity, and plant protection breeding as well as the economical decision making.

Yang and Okrent (1991) had said that most successful application of Artificial Intelligence in decision making has so far been the development of Decision Support System (DSS), particularly the expert system, which is a computer program also that act as a consultant or advisor to the decision makers (Wash, 1999).

Expert systems are much cheaper compared to human experts in the long-term scenario. However, expert systems can relatively be costly to develop but easy and cheap to operate though. In addition to this, the expert systems allow automation of many tasks that might not be effectively handled by human Experts also.

Pinaki Chakraborti, Dr. Dilip Kumar Chakraborti (2008)[2], discussed the success of expert system for management of Malformation disease of Mango i.e. ESMMDM. This system considers variety of plant, the number of malformed shoots, climatic facts etc and prescribes suitable treatment package. It is interactive software tool with graphical user interface.

G.N.R. Prasad, Dr. A Vinaya Babu (2006) discussed various Agricultural expert systems which said that in order to remain competitive, the modern farmers often rely on agricultural specialist and advisors to provide information for the decision making. Unfortunately agricultural specialist assistance is not always available when the farmers need it. In order to solve this problem, expert systems were identified as powerful tool with extensive potential in agriculture. In this paper, we discuss an expert system to outrage these problems.

Big data helps agriculture to counter the pressures of increasing food demand and climate patterns.

Feeding a growing population is one of the key challenges that even governments are putting their heads together to solve. One way to achieve this is to increase the yield from existing farmlands.

Big data provides farmers granular data on rainfall patterns, water cycles, fertilizer requirements, and more. This enables them to make smart decisions, such as what crops to plant for better profitability and when to harvest. The right decisions ultimately improve farming.

McKinsey reports that a third of food produced for human consumption is lost or wasted every year. It's a devastating fact since the industry struggles to bridge the gap between supply and demand. To address this, food delivery cycles from producer to the market need to be reduced. Big data can help achieve supply chain efficiencies by tracking and optimizing delivery truck routes.

The cloud and the future of big data in agriculture is success in farming has been largely dependent on favorable natural forces, but not anymore. The coming together of cloud computing and big data has ensured that farmers have sufficient data points to make good decisions.

The agricultural intelligent system can guide farmers on how to adjust their production based on market demand and how to improve their yield and profitability. Today, a farmer can micromanage farming and all its accompanying activities even before planting crops, it's feasible to estimate the results by tweaking the variables involved.Within agriculture, these technologies include sensors, geospatial datasets, as well as information from smart-connected devices (e.g. machinery) linked to the Cloud via the Internet of Things. Big data also encompasses datasets collected for other purposes which would have remained in silos but whose potential can now be used in other contexts to deliver real-time actionable insights for farmers.

Within the agriculture, as global food demand is projected to double by 2050 which is due to rising of populations, farmers and agricultural suppliers will also increasingly be expected to do more with less by increasing productivity from the limited resources and of the inputs. Due to these kind of pressures, innovative technologies such as Precision Farming will definitely play a major role in the development of agriculture.

Advanced algorithms will be needed to swiftly unlock the highly valuable insights that are available from big data so that the products are performing to the expectations on an ongoing basis despite of the changing conditions.

The development of highly specific customer segmentations: it has become possible to tailor product offerings to precisely meet customer needs as they evolve. Considering for instance, if the Black Grass becomes problematic in a given region, suppliers can deploy the big data techniques such as the real-time micro segmentation of customers to target the promotional and the marketing activities. Thus facilitating better utilization of the marketing spend.

Competitors that fail to develop or gain access to sophisticated analytics expertise will be left behind.Big data has already changed the way we do business. With the rise of new technologies in the agricultural sector, it offers a chance for all businesses to better harness their data and to convert their processes.

Methodology

In this paper, we are performimg the needed linear regression on the big data of the ten years pani records. and giving the corresponding results for the further farming which is the smart farming.

• propose an effective data mining technique based on profiling(PHANI) improve their traditional decision-making process using Linear Regression algorithm we are suggesting the what type grains and vegetable farmer has to cultivate to get more profit.

• In this module admin will upload the previous 10 year dataset like

• vegetable demand

• crops demand

• vegetable yield dataset monthly wise

New Demand Calculation process:

In this module we predicting the Yield From Yield Dataset Using the Linear Regration Technique Let NYLD and No acres former going to cultivate NACR and calculate the ne demand.

NewDemand1=NYLD*NACR

Demand Prediction Process:

In this module we predicting the demand From Demand Dataset Using the Linear Regration Technique Let NewDemand2.

Land Suggestion Process:

We are comparing the NewDemand1 and NewDemand2 if NewDemand2 is greater than NewDemand1 admin will give permission to cultivate.

Project Module Description:

PHANI Registration:

In this module admin can add the former land information details like Adhar No and survey no of the land and No of Acers Land.

Upload the dataset:

Admin will upload all the above datasets using the Excel API

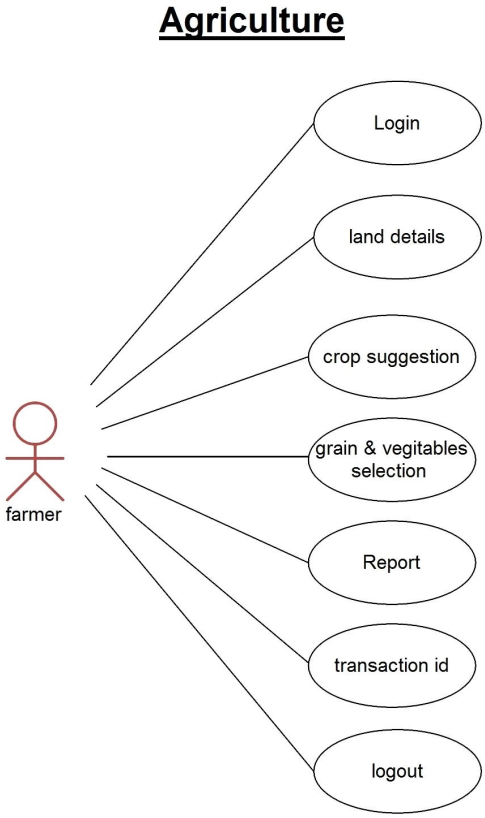
System Design

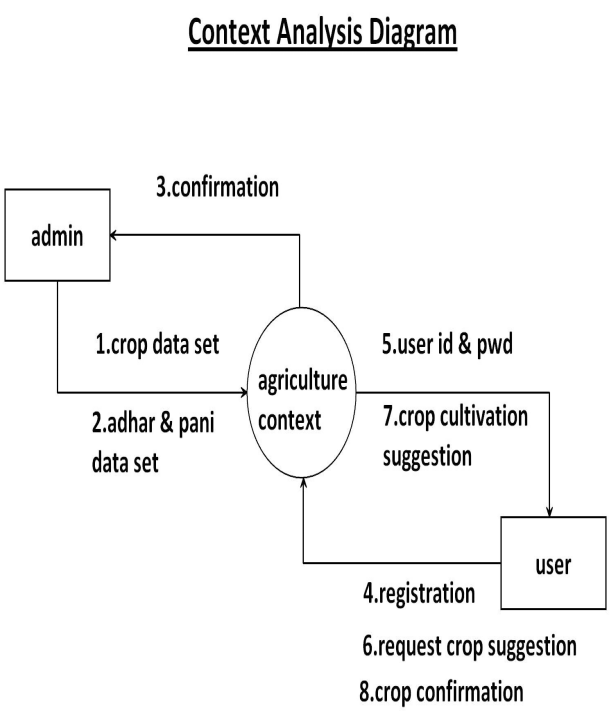
Admin Session

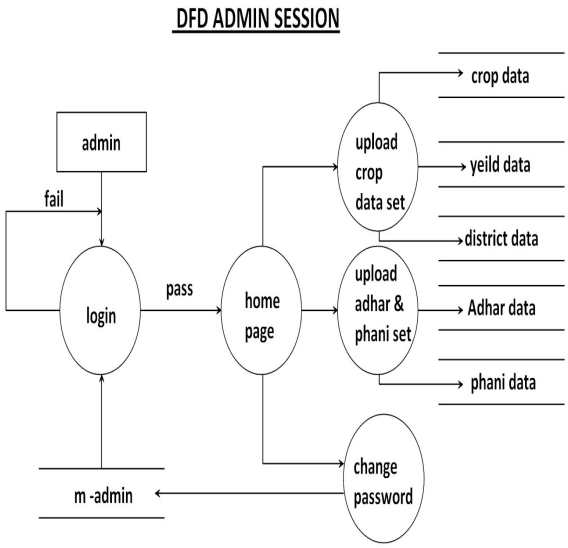
- Login
- Adhar Details
  - ✓ Admin can Add the Adhar details
  - ✓ Extract the Adhar details From Excel Sheet
- User list
  - ✓ Admin can see registered user List
- Upload Dataset
  - ✓ Upload District vise Crop dataset
  - ✓ upload Crops Demand Dataset
  - ✓ upload Vegetable Demand Dataset
  - ✓ upload Crops Yield Dataset
  - ✓ upload Vegetable Yield Dataset
- Phani Details
  - ✓ Admin can Add the Phani details
  - ✓ Extract the Phani details From Excel Sheet
- Change Password
  - ✓ Change Admin Password
- Logout
  - ✓ User Session
- User Registration
  - ✓ User(Former) Register with Adhar no.
- Login with Adhar no
- Login With OTP
- Land Details
- Crop Suggestion Process
  - ✓ Show list of land the logged in Farmer have
  - ✓ Select the land where user wants to cultivate crop.
  - ✓ Based on the user selection system will show the suitable crops and vegetable which are best suit the selected land.
  - ✓ User has to select Grains OR Vegetable with how many acres user is planning to cultivate.
  - ✓ System calculate Yield Prediction Process Using Linear Regression Algorithm
  - ✓ System calculate Demand Prediction Process Using Linear Regression Algorithm
  - ✓ System will suggest the user which crop or vegetable to cultivate in his land with Yield calculation process
- Display the Report
- Cultivation Finalization process
- Generate Transaction code.
- Logout

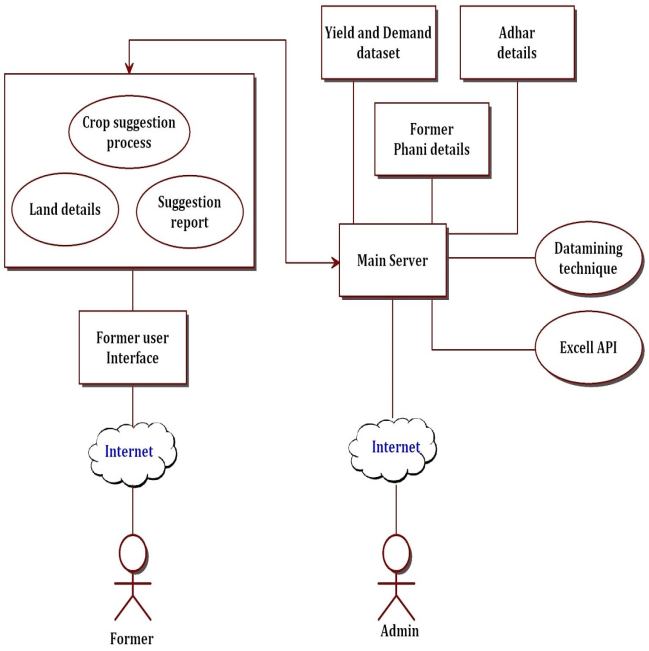
Modules Identified

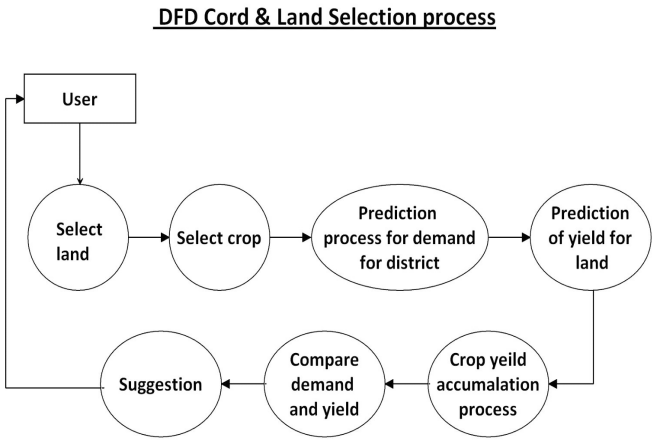
- In this module admin will upload the previous 10 year dataset like vegetable demand crops demand etc.
- In this module we predicting the Yield From Yield Dataset Using the Linear Regression Technique.
- In this module we predicting the Demand From Demand Dataset Using the Linear Regression Technique.
- Using the Linear Regression Machine Learning A











- ✓ Linear regression:
- ✓ The reason we are choosing this is because linear regression has been around for very long (more than 200 years). Linear regression has been studied from every possible angle and each angle has a new and different name.
- ✓ Linear regression is a linear model, which means a model that assumes a linear relationship between the input variables (x) and the single output variable (y). Meaning y can be calculated from a linear combination of the input variables (x).
- ✓ When there is single input variable (x), the method is referred to simple linear regression and When there are multiple input variables, literature from statistics refers to the method as multiple linear regression.
- ✓ In a simple regression problem, a single x and a single y, this form of the model is:
- ✓ y = B0 + B1*x

- ✓ Linear Regression Algorithm :
- ✓ Step1:
- ✓ Let
- ✓ double[] year_data =
- ✓ {2008,2009,2010,2011,2012,2013,2014,2015,2016,2017};
- ✓ double[] demand_data={18,24,32,40,58,72,80,93,102,118};
- ✓ Step2:
- ✓ SumX= ∑ year_data
- ✓ SumX2= SQRT(year_data);
- ✓ SumY= ∑ demand_data
- ✓ Step3:
- ✓ double xbar = sumx / n;
- ✓ double ybar = sumy / n;
- ✓ Where n=no of the year.
- ✓ Step4:
- ✓ xxbar += (year_data [i] - xbar) * (year_data [i] - xbar);
- ✓ yybar += (demand_data [i] - ybar) * (demand_data [i] - ybar);
- ✓ xybar += (year_data [i] - xbar) * (demand_data [i] - ybar);
- ✓ double beta1 = xybar / xxbar;
- ✓ double beta0 = ybar - beta1 * xbar;
- ✓ final predicted_value=(beta1*(present_year))+beta0;
- ✓ Main Result of the system is giving the suggestion of the farmers using Regression Technique. Here we will study the environmental data which is provided by precision agriculture information technologies. It also represents a crucial source of data that is in need of being wisely managed and analyzed with appropriate methods in order to extract the meaningful information and values.

I. RESULTS AND DISCUSSION

This project will be able to suggest what type grains and vegetable former has to cultivate to get more profit and production. Output will be in the form of and table format including the complete data sets output. The graph includes the no of acres of land and what will be our cultivation yield based on different crops.The project also predicts the yields based on the different factors like rain fall temperature etc. and can be suggested to farmers.

Every farmer has a goal for their operation. Some of the more commonly cited are around improving profitability and efficiency, reducing the cost of an operation, or increasing product value. To achieve each goal, farmers must make better decisions and move beyond the use of general knowledge from research experiments, which can only carry them so far.

No business is the same, and there is now an increasing need for information generated in a location-specific manner, providing a solution which fits in line with what each farmer needs. Through big data and connected devices, every one of the goals around profitability, efficiency and cost management are not only achievable but completely realistic.

Looking to supercharge your agricultural business? Contact us to see how big data and connectivity can impact your organisation.

PERFORMANCE ANALYSIS

Comparing the scenario of agricultural practices present right now to the improvement that could happen by using is agriculture intelligent decision system formulated by us in this paper, a significant growth in the improvement of the cultivation strategies and with the accurate crop type and production would take place leading to a higher financial outcome by alomst 7%.

II. REFERENCES

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