St. MARTIN'S ENGINEERING COLLEGE

(An Autonomous Institute)

Dhulapally, Secunderabad– 500100

NBA & NAAC A+ ACCREDITED

Agri Seva App

Presented by

1. **Shubham Agarwal (17K81A05H6)**
2. **Koushik Bhargava (17K81A05H3)**
3. **Suraj Sharma (17K81A05H8)**
4. **Akash Singh Rawat (17K81A05C3)**

Under the Guidance of

Dr. N SATHEESH (B.E., M.E., Ph.D.)

PROFESSOR,

Department of Computer Science and Engineering

ABSTRACT

Basic Description : Platform for farmers-agricultural, farming information and services providing app

- A project work is undertaken under rural India agricultural development with an initiative and intention of providing easily accessible informational resources, services and to heighten awareness.
- Agri Seva App is a platform for farmers and for any other people working in agri and farming sector.
- It has various features through which it aim to provide agricultural information and services by means of internet and use technology.
- The main goal of the research and project is to facilitate the farmers by educating them using a web-app and smart mobile device which will provide them information on farming, right usage of related commodities, suitable weather and climatic conditions and other services discussed in further sections.

INTRODUCTION

In the present scenario with steep **rise in the percentage of consumers** and **advent in technology** where different sectors in the country INDIA and the world are experiencing an era of overall advancement along with **ease of access to information and services yet the farming and agri sector is lagging behind** even though being one of the most important sectors where **humans serve for humans** and is a **major sector supporting the means of human life**, **survival** and **social prosperity**, besides in a country like INDIA where agriculture supports the economy and where **share of agriculture in GDP is continuously increasing** ie. **20.19%** till june 2021 from **19.9%** in 2020-21 and **17.8%** in 2019-20, we think we have a lot more to offer to the agriculture-farming sector and vice versa.

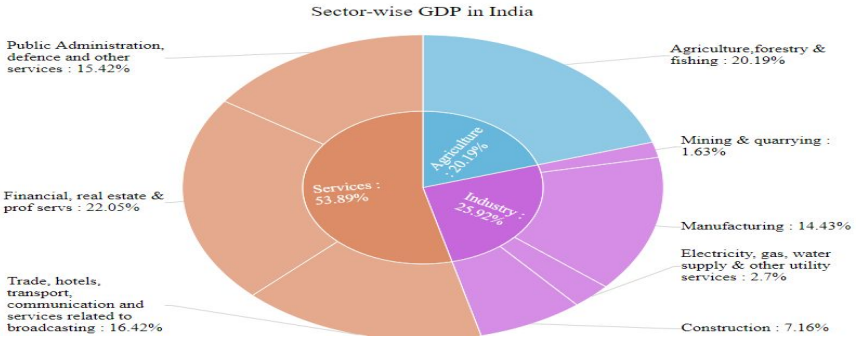


Figure 1 : Sector-Wise GDP Contribution, Data Source : Ministry of Statistics and Programme Implementation(jun, 2021)

Existing System and disadvantages

Farmkart

Founded by : Atul Patidar

- ➔ Farmkart is one of such platforms which aims to provide similar services to Agri Kiosk, is a Madhya Pradesh based agritech startup
- ➔ Farmkart's tech solutions provide farmers with fertilisers, pesticides, fungicides, seeds, equipment, among other at their doorsteps with no delivery cost. Besides, farmers can also rent modern farm equipment from Farmkart's e-commerce platform.
- ➔ Web link to Farmkart: https://farmkartgroup.com/about-us

Disadvantages with existing products identified during research

- ➔ Lack of outreach plan.
- ➔ Lack of implementation strategy and practicality in the solution.
- ➔ Less for the average and more for the well-off.
- ➔ Limited use of technology.
- ➔ More interest in business(providing and selling machinery) and less towards seva(spread awareness by providing valuable insights).

Proposed System and its advantages

- ➔ Firstly, let's make ourselves familiar with all the features and functionalities available on agri seva app for better understanding, hence, the various features are: Crop information, Agri-news and Schemes, Weather forecast, Real time standardized pricing, Agri-store, Expert consultation - drop a query to hear back from an agri expert option.

Advantages with respect to portal

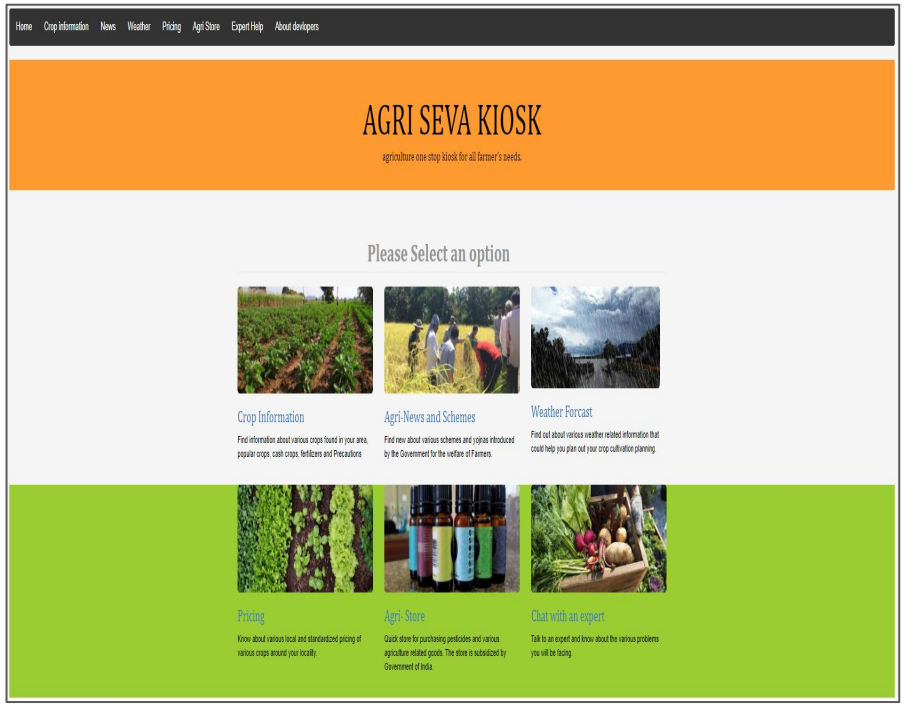
- ➔ Ease of access.
- ➔ Minimalistic User-Interface.
- ➔ Easily modifiable design to make sure changes in future are easier.

Advantages with respect to concept and sector

- ➔ Focus is on spreading awareness, providing information and making the user ready for future endeavors, and helping them become self sustainable.
- ➔ Well planned scope.
- ➔ Timely delivery of information to the user.
- ➔ Minimal prerequisite and limited need for resources for starting with Agri Seva App.

Architecture of Proposed System and modules of the project

Main Screen-Homepage - I

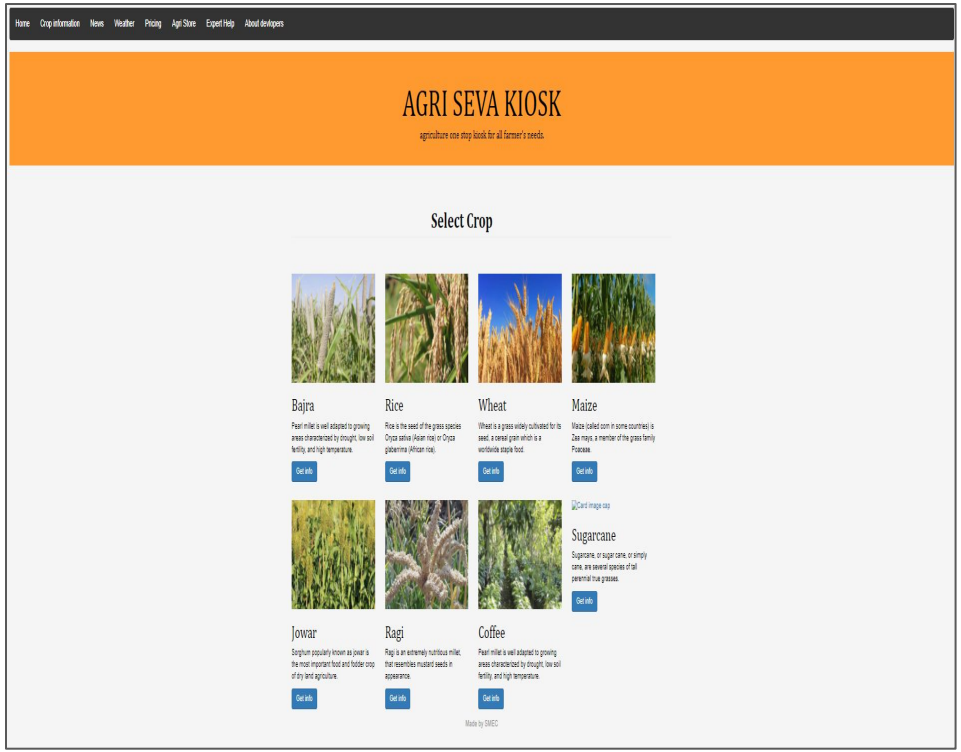


Homepage

Homepage is the main screen of the Agri Seva App, using this screen farmer will be able to scroll through the different feature of the app, like Crop information/ selection/ info- -rmation, Agri- News and Schemes, Weather forecast, Current market pricing, Agri store, Expert support and the other features of the app.

Note: All the options on the main screen are functional.

Homepage/Crop selection page - II

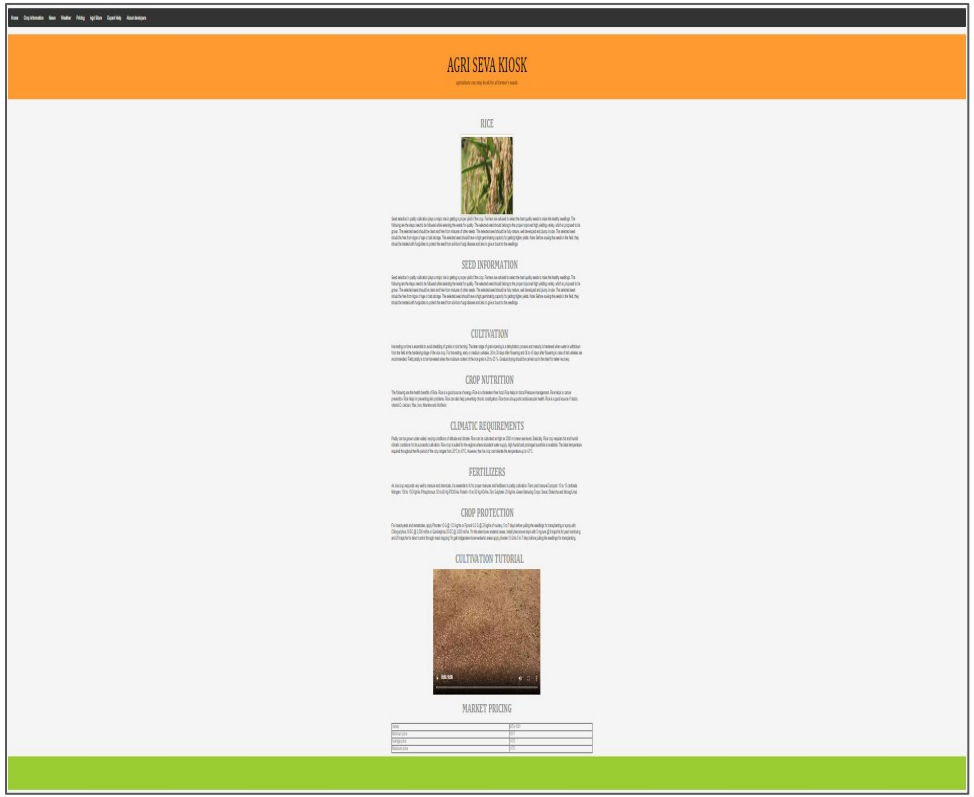


Crop Selection page

When clicked on the **CROP INFORMATION** option on the main screen the person will be taken to the next extended page which is crop selection where the farmer can select the particular crop for which the information is required Although some of the popular crops selections are already appended on the page to make the selection process easier.

Note: Crop selection is done to minimise the complexity.

Homepage/Crop selection page/Crop info page(for selected crop) - III

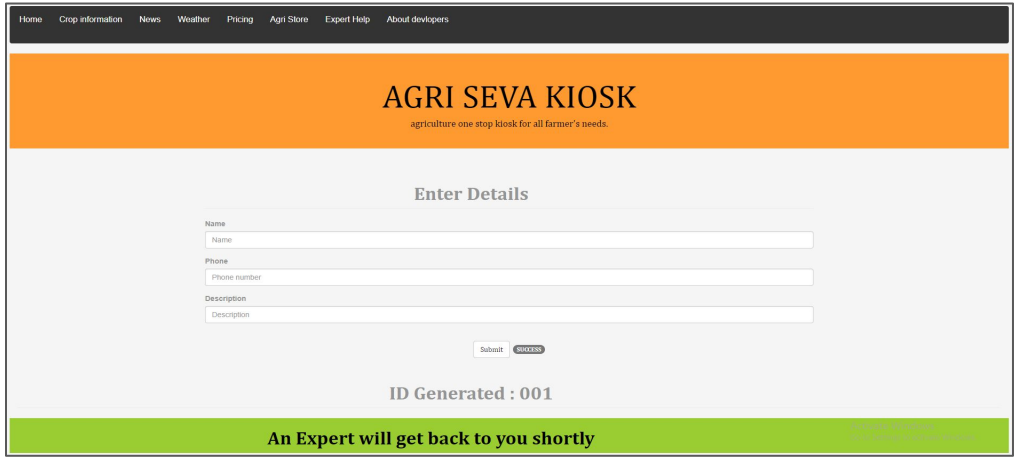


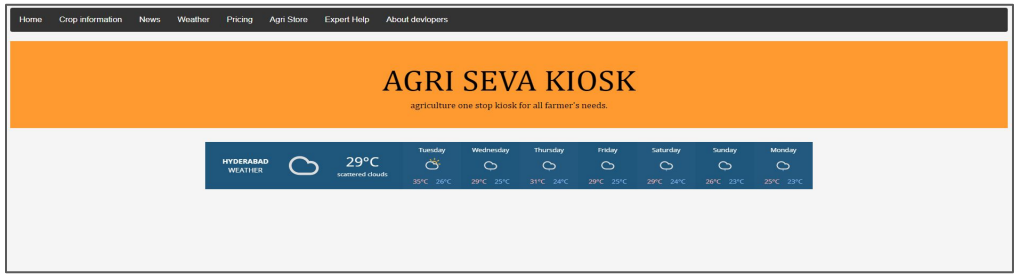
Crop

Farmer will be taken to the **crop info page** after the selection of crop, where the farmer will have all the required details of the crop, Seeds to be used(quantity/quality), Link to place orders for the best quality fertilizers at government pricing, Safety measures to be taken care, Current market pricing, Cultivation Tutorial(Video) etc.

Note: cultivation videos will educate the farmers about the best and latest farming techniques from sowing to cultivating the seed/crop.

Other, unique features of the app - I



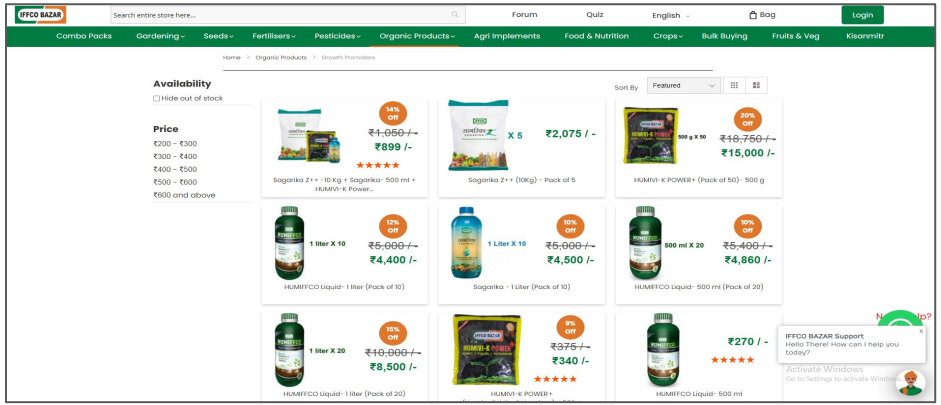


Chat with an expert

Next is, expert consultation/chat with an expert where the farmer will guided by an agri expert who can acquaint the farmer through the process from sowing the crop to harvesting it along with the required peripherals.

Agri News and weather forecast will elucidate farmers into making better decisions by giving them an insight on current conditions both climatic and market.

Unique features of the app - II



Latest Crop Pricing and Product inventory

The next feature which makes Agri Seva App unique is **crop pricing**, Latest crop prices will be displayed, current plan is to modified and change in pricing manually on daily basis - 24 hour cycle.

Agri Store, the goal is to provide an product inventory with wide range if agri supplies, this is where farmers will be able to place orders to purchase high quality farming related items and commodities

Implementation, features, functionalities and working of Agri Seva App in depth:

let's d**eep dive into implementation of functionality and internal working of each feature mentioned**, hand in hand algorithms, techniques and technologies used, with rapid increase in use of mobile applications and web applications among almost all age group of people, making agri seva app available via web-application is preferable, this was about the infrastructure as a service part.

Lastly, during the research we identified some **additional possibilities of complications,** following is the **probable solution after performing the research and analysing the situation in depth**,

- ➔ Global Forecast System.
- ➔ Convolutional Neural Networks(Additional algorithm for testing purposes).
- ➔ Linear Regression.
- ➔ Outreach Strategy and Product Delivery

Working of features - I

Feature : Real time weather forecast with suitable crop suggestion

Tools and services : Global Forecast System

Description : The Global Forecast System (GFS) is a global numerical weather prediction system containing a global computer model and variational analysis run by the United States' National Weather Service (NWS).

Working of Global Forecast System : The mathematical model is run four times a day, and produces forecasts for up to 16 days in advance, but with decreased spatial resolution after 10 days. The forecast skill generally decreases with time (as with any numerical weather prediction model) and for longer term forecasts, only the larger scales retain significant accuracy. It is one of the predominant synoptic scale medium-range models in general use.

Working of features and algorithms applied - II

Algorithms and strategies being applied for crop recommendation system :
Convolutional Neural Networks and Logistic Regression

A **Convolutional Neural Network (ConvNet/CNN)** is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.

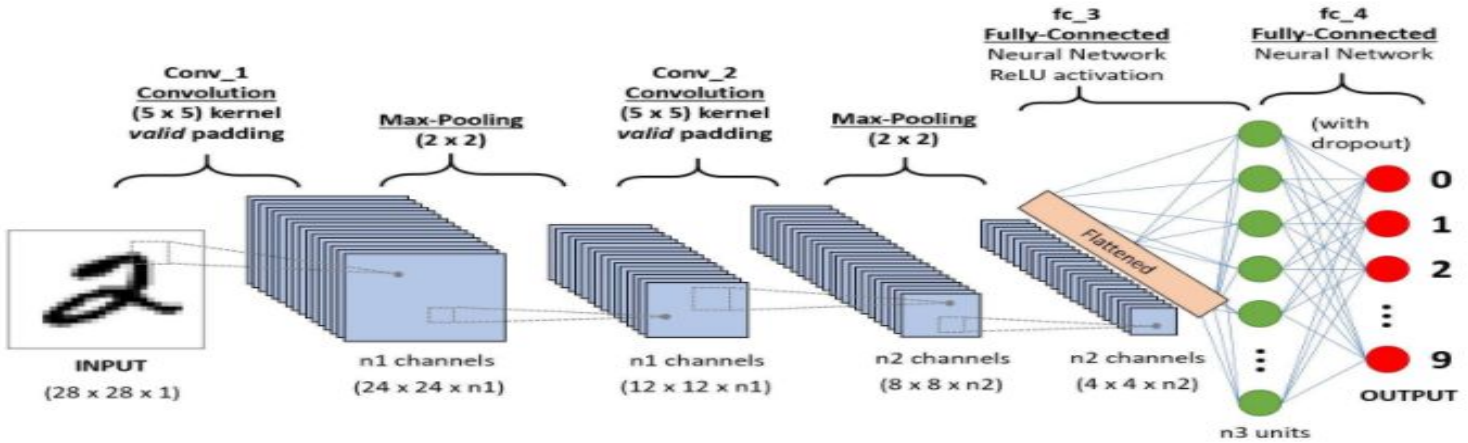


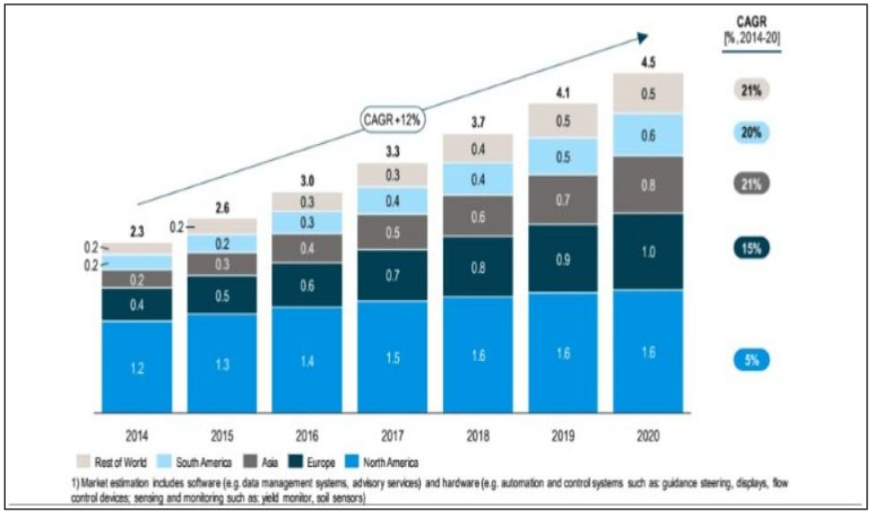
Figure 1 : CNN and its layer(Source of image: TowardsDataScience)

Working of features and algorithms applied - III

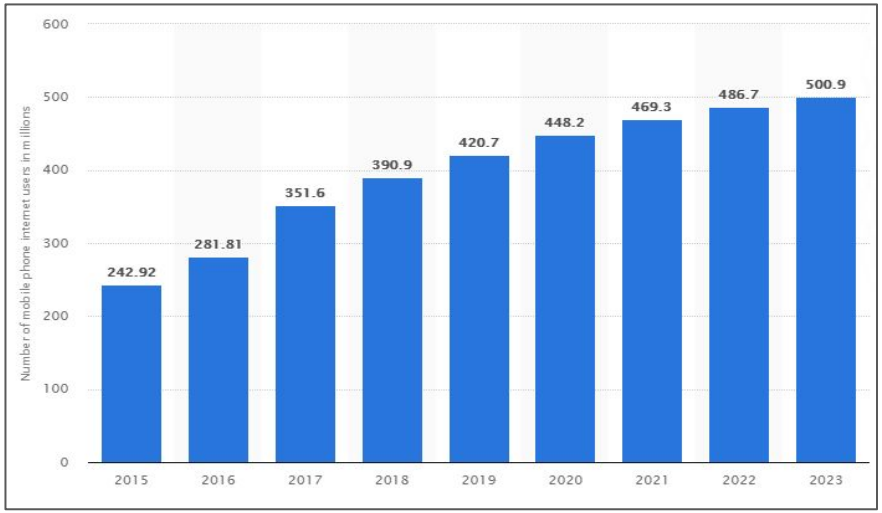
Description and working of Logistic Regression :
Logistic regression is a classification algorithm. It is used to predict a binary outcome based on a set of independent variables.

working of logistic regression model (Source of image: Towards Data Science)

Outreach Strategy and Product Delivery(implementation) - IV



Compound annual growth rate of precision farming(image source : mobindustry)



Mobile phone internet users in India 2015-2023(image source:statista.com)

The next challenge after designing and inventing the solution was to deliver the product and to make sure that the product has some relevance, can create impact. As seen in the above graph the usage of agri apps and smart mobile phone in India is uninterruptedly growing, consequently delivering the Agri Seva App to the user via a web-app is the finest method calculated after considering multiple other factors throughout the process.

System Requirements

SOFTWARE REQUIREMENTS

Desktop devices(non-mobile devices):

Operating System : Windows(latest is preferred)
Browser: chrome, IE, Firefox

Other smart devices(mobile devices):

Operating System : Android or iOS

Browser: chrome, Safari

3.2 HARDWARE REQUIREMENTS

Desktop devices(non-mobile devices):

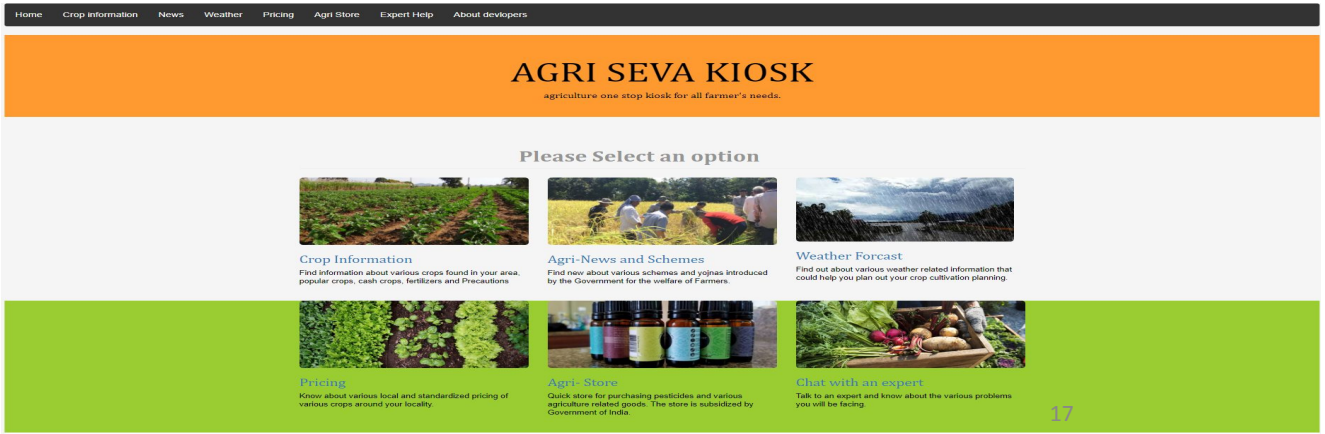
Processor : 2 core CPU
RAM : 4 gb
Storage : 2 gb(considering downloadable content: Pdfs, images, catalogs)
Internet connection : 8 mbps(the higher the better)

Other smart devices(mobile devices):

Processor : 4 core CPU
RAM : 4 GB
Storage : nill for the portal, 2 gb(for browser and downloadable content)
Internet connection : 8 mbps(the faster the better)

EXPERIMENTAL RESULTS

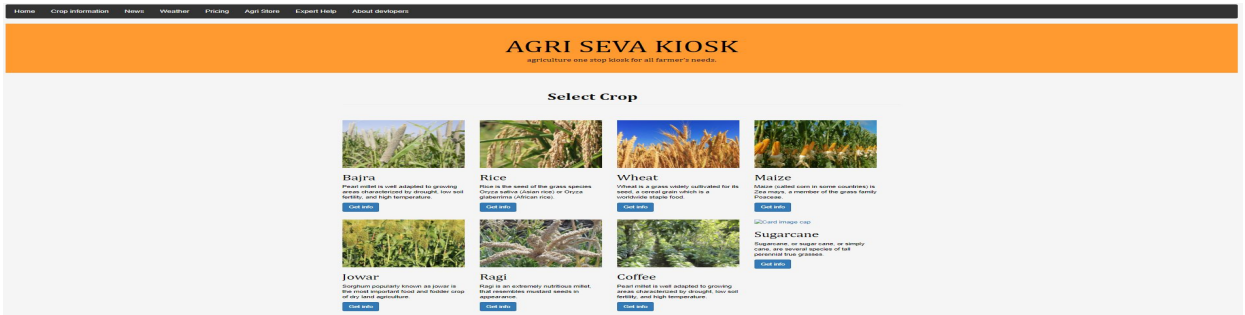
➔ **Experiment 1:** User trying to fetch “crop information” related to “wheat”



HomeScreen - Select desired option (Crop information/Agri-news/Weather forecast, Agri-store, Chat with expert)

EXPERIMENTAL RESULTS

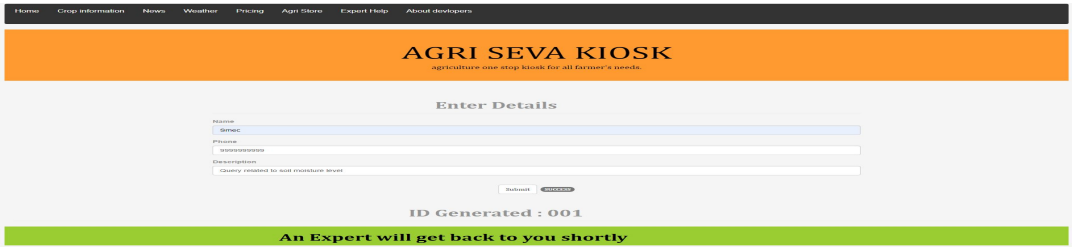
Next, Crop selection page-user will have to select desired crop, selecting wheat for this experiment



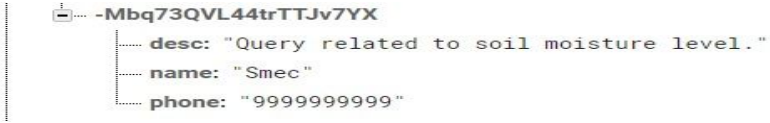
User will be displayed with vital information related to selected crop, and it can make use of this information and could improve its farming capacity and quality

EXPERIMENTAL RESULTS

➔ **Experiment 2 :** A farmer is in need of some additional help and let's see how "chat with an expert" is useful



Next, the farmer will have to enter its name, contact number, and a simple description of the query , then after clicking on submit the request will be sent to Agri Seva App team and a id will be generated which the user need to preserve for future references and follow ups.



At our end the user query will be saved in the above format, there after an agri expert will get in touch with the user as soon as possible and try to resolve the query to the fullest, and close the request if resolved.

PERFORMANCE EVALUATION

- ➔ Techniques and Algorithms selected exceptionally constructive.
- ➔ Rigorous checks and tests lead to the development the project which is compliant to the prescribed guidelines and to the purpose.
- ➔ Mature and effective algorithms and services such as: convolutional neural networks, global forecast system and herokuapp are applied.
- ➔ Going through reviews made us understand why the project is important, what minor and major modifications or enhancements are required to make our it quintessential and how we could solve trivial worldly problems using this project.
- ➔ Input & Output: input-user queries related to particular crop, output - particular information based on selected crop
- ➔ Algorithms and services used : Global forecast system, convolutional neural networks and herokuapp.

PERFORMANCE EVALUATION

Planned budget vs actual project expenses:

- **Planned budget(With kiosk model):**
- **Breakdown:**
  - **Hardware:**
  - Computer: 25000
  - Cabinet: 7500
  - Internet devices and supply: 8000
  - Power supply units: 12000(24 hr backup)
  - **Software:**
  - Operating system: 5000
  - Kiosk maintenance cost: 20000
  - **Total: 77500(per unit deployed)**

- **Actual project expenses after eliminating kiosk model at this stage:**
- **Breakdown:**
  - Server cost(increase with number of users
  - and load): 4000-6000 per year
  - Software tools - nill as of now
  - API services - currently on free trial version
  - Portal maintenance and handling : 7500
  - **incidentals:** 3500
  - **Total**: 17000

PERFORMANCE EVALUATION

Review stage assessment :

Stage 1: Initiating
understanding problem statement, objectives and need for Agri Seva App, team building.

Stage 2: Planning
Planning was done to strategize how the platform will work, basic requirements, what problems it will solve, what all features has to be added, scope of the project, risks involved, initial budget requirements.

Stage 3 : We started designing and developing the web-app
We had to re-work a little on the requirements part and selection of production environment, algorithms and models was a task.

Stage 4 : We faced new challenges
When the app was almost completed the new challenge was to find the best viable method to deliver the app to the user, after talking to our guide, some online research and going through previously published research papers we could finalise and shape it into a web-app and make it accessible on all Smart mobile devices.

Stage 4 : Project closure
By this stage our project was ready and is being tested at functional and component level for any quick minor modifications which could improve the load time of app

CONCLUSION AND FUTURE ENHANCEMENT

- Agri Seva App is a transparent, unbiased and theocratic approach towards the welfare of farmers and the agri sector on the whole. The principal objective of this research work, design and application development is to facilitate a smart, reliable and sustainable solution to problems related to the farming sector, agri sector and for the welfare of rural India development.

Future goal:

- To deploy Agri Seva App and remain widely available and accessible, install kiosk and make farmers aware about the various benefits of it.

Future outreach strategy/activity:

- Kiosk will be set up, internet and electrical connections will be provided. Demos and workshops will be conducted at the initial stages to make farmers acquainted to it.
- The kiosk machines are placed at various places in villages such as Post offices, Banks, VR offices, panchayats etc. to facilitate the farmer.

REFERENCES

[1] Balkrishna, A., Sharma, J., Sharma, H., Mishra, S., Singh, S., Verma, S., & Arya, V. (2021). Agricultural Mobile Apps used in India: Current Status and Gap Analysis. *Agricultural Science Digest*, *41*(1).

[2] Kumar, Y. P., Shivacharan, G., Raghuveer, M., Poshadri, A., Kumar, M. S., & Ramadevi, A. (2020). Evaluation of Mobile Based Advisory Services on Agri and Allied Sectors in Adilabad District. *Int. J. Curr. Microbiol. App. Sci*, *9*(7), 1191-1196.

[3] Mohan, K. (2020). Development of Android Mobile Application on Groundnut Crop Cultivation for Transfer of Technology. *Indian Research Journal of Extension Education*, *20*(1), 15-20.

[4] Raj, S., & Darekar, A. Farming 2.0: Digitising Agri Value Chain, 2020.

[5] Gupta, C., Gupta, M., Joshi, P., & Kumar, A. (2021). Information and communication technology in agribusiness: A study of mobile applications in perspective of India. *Journal of Applied and Natural Science*, *13*(2), 766-774.

[6] Kumar, A., Kumar, S., Khan, N., Singh, C. B., & Singh, S. Weather based agromet advisory bulletin to the farmers under Gramin Krishi Mausam Seva (GKMS) project during lockdown period (Covid-19) at Kanpur region of Uttar Pradesh.

REFERENCES

[7] Yadav, A., Babu, J. M., & Shivnani, T. (2020). EXTENSIVE REVIEW ON COMMUNICATIVE TOOLS USED BY FARMERS IN INDIA TOWARDS SUSTAINABLE DEVELOPMENT OF AGRIBUSINESS. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(6), 12984-13004.

[8] JINDAL, N., THAKUR, K., & SHARMA, T. (2019). DIGITAL INDIA: CHALLENGES, SOLUTIONS AND ITS IMPACT ON SOCIETY. *International Journal of Environment, Ecology, Family and Urban Studies (IJEEFUS)*, *9*(2), 83-90.

[9] Pal, S., Marwaha, S., Arora, A., Choubey, A. K., Singh, A. K., Poswal, R. S., ... & Kumar, S. (2019). KVK Mobile App: An ICT tool to empower farmers.

[10] Mohan Kumar, S., Suman, S., Kulkarni, U. P., & Siddalingaswamy, N. H. (2019). Feasibility study of effective usage of available Agricultural Information System for various Village Boundaries of India. *J Robot Mech Eng Resr*, *3*(2), 1-7.

[11] Sharma, A., & Kumar, S. Information and Communication Technology (ICT) in Indian Agriculture. *Agri Mirror: Future India ISSN: 2582-6980*.

[12] SARMA, V. S., & KATTA, P. K. (2020). SMART FARMING USING AGRI AIUTO APP IN INDIA. *Journal of Natural Remedies*, *21*(4), 239-243.

CONTRIBUTION OF THE PROJECT

Koushik Bhargava - 17K81A05H3 - Backend Developer
Responsible for developing backend and integration with database and frontend, testing and maintenance.

Shubham Agarwal - 17K81A05H6 - Product manager and principal architect
Product, features selection, product infrastructure, project development, product delivery and deployment strategy, thought process, overall project management, project compliance, communication, quality management, documentation, testing and maintenance.

Suraj Sharma - 17K81A05H8 - Production and DevOps engineer
Responsible for setting up production environment and deployment, testing and maintenance.

Akash Singh Rawat - 17K81A05C3 - Frontend Developer
Responsible for developing user-friendly frontend using latest cutting edge technologies, quality assurance, testing, maintenance.

Results, Discussion and Demo

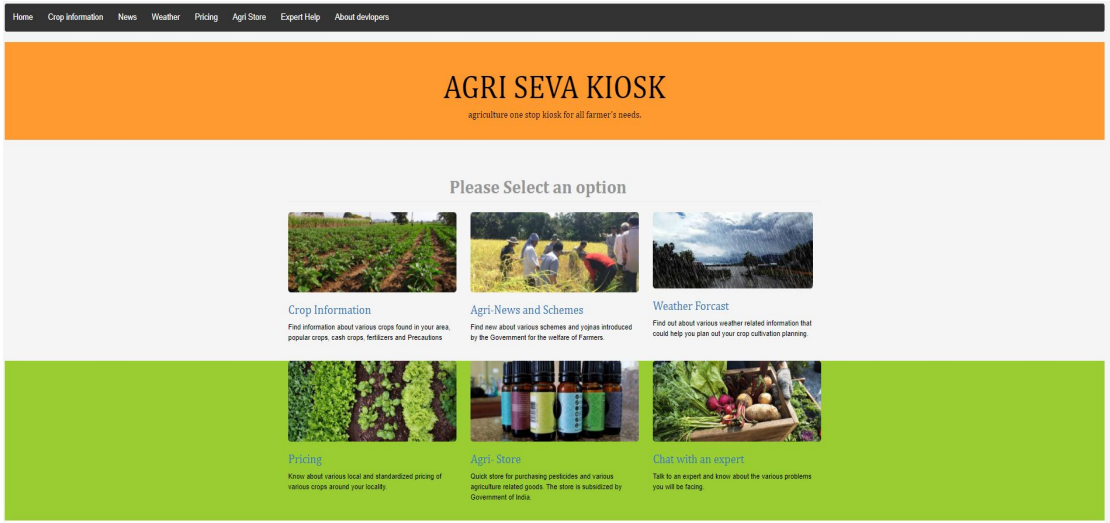


Figure : Agri Seva App Prototype

A working prototype of Agri Seva App is available @ : https://agri-seva-kiosk.herokuapp.com for better understanding of reader and to have a glimpse of the app, the prototype includes most of the findings, features, functionalities and methodologies discussed in this research and project work, However some sections are still under R&D and will be deployed ASAP, using above prototype we have made it possible for peer members, scholars and other researchers to get an idea of what the app does, how it does, what are its probable impacts and real-life applications.

Conclusion

Agri Seva App is a transparent, unbiased and theocratic approach towards the welfare of farmers and the agri sector on the whole. The main goal of this research work is to provide a smart, reliable and sustainable solution to problems related to the farming sector, agri sector and for the welfare of rural India development.

Jai Kisan

Thank you