

Survey on Krishi-Mitra: Expert System for Farmers

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Abstract —In agricultural sector, farmers in rural areas faced major problems because of illiteracy. They cannot take the advantage of internet to access the information related to farming. The information represented in icons will help the farmers to take the important decisions. Also there will be additional benefit to farmer as there is speech based interaction in Indian language with icons. According to UNESCO report, 64% population in India cannot use the internet due to lack of technical knowledge. Here, we are extending the approach from computer devices to small mobile devices application.

Keywords- Icons, Agriculture, Farming, Languages, speech.

I. Introduction

In highly increasing ICT(Information & communication technology)environment we are focusing on the people which are from rural areas, these people can learn more about agricultural sector as well as they can find the queries which are arises during farming. They cannot access information which is needed on the farming seed selection, pesticides, market price etc. Hence they are unable to take decision on the farming. Therefore impact can be seen on farmers like suicide rates have increase in India [1].

The information is retrieved by the people by giving the search key words to the search engine. But as large numbers of farmer are English illiterate e they cannot fire their queries in the search engine. This results that farmers cannot retrieve the specific content he requires. So text based information cannot help farmers in providing the required information. Our primarily studies tells that tells that it is essential for farmers to get the information at appropriate stage of farming lifecycle in order to take the right decision. But many Indian farmers are enable to read/write even in their mother tongue. Hence even if the Interaction technique(s) is very essential.

With respect to above user group, some pictorial mode such as icons will be useful to enter their queries and the interface gives the solution in speech format. So this difficulty of farmer can be solve through picture based system [2].

II. Literature Survey

After the survey, we found many expert systems which consist of information of a single crop or single crop disease. But this can be beneficial only on small scale or for few farmers but if we will consider our country size (India) this is insufficient and so we need multiple expert systems.

Another problem regarding current agriculture systems are you have not cultivated the right crop for the correct soil and weather conditions. The farmers do not take the other factors into considerations such as distance from the market demand and the storage facility.

Thus it is our interface which is used to design an agriculture expert system which will be in a simple format and gives solving of any query to the farmer related with agriculture.

III. Need of System

By recognizing the problems in the agriculture need of the system was occurred.

The problems were recognized using traditional system and by providing this system can help to overcome the problems. The problem maybe such as follows,

3.1) Information Transfer Problem

The information which is available on Agriculture domain may not fulfill the growers need. The documentation only has general recommendations because here are many factors and each factor cannot be taken in consideration

3.2) Specialties Integration

The extension documents includes many problems which are related to plant nutrition, pathology, or others specialty but in real time there may be different causes for the problem and which needs the vast knowledge for the information, which are from different documents and books.

3.3) Combination of Information Source

There may be need of an expert to combine images and other factors to reach till the correct diagnosis, but even though the diagnosis is reached

the extension document should provide its information.

3.4) Updating

If there is change in the amount of quantity, chemicals it effects on the environment which should be considered. And it takes along time in updating and distributing this information. Similarly this can be applied to audio tapes, which are only invoice format instead of written documentation.

3.5) Unavailability of Information

Information in any form of media may not be available. In current era there is a rapid development in all fields of development. So there is requirement for the farmer that they should get information of experts in this area, but there is less number of experts then their demand in this technology.

IV. System Approach

We design the proposed system that can design interface for Indian farmer community to get agricultural information from global internet repository and store these into local repository. In emergency, the farmer can retrieve the information from local repository [1].

The detail architecture of the interface is shown below using block diagram.

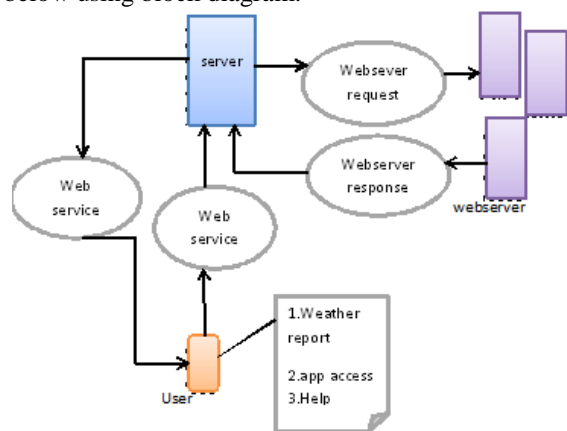


Fig.1 system architecture

In this interface user can only communicate with the system through icon which are understandable to the user. Here, we renew the existing search engine (Google search engine) with our proposed interface called Krishi-Mitra.[1].The detailed description of each module of our developed interface is given in the following section. We get the Results in both forms as voice and text. To get the appropriate agriculture information farmers have to choose only icons. To reduce the searching time of icon(s), they are represented in hierarchical form. After choosing the icon there are two modules natural language generation module and keyword extractor module.

Natural language generation module converts the selected icon(s) to

Text in Indian language. Keyword extractor Module converts this text into Indian language query string.

V. System Implementation

5.1) Methods of Selecting Crops

Phase1

After choosing the crop which is given by the expert system, the expert system or interface can generate following report

- 1) Depending on the cultivation area the quality of soil and quantity of a seed. This idea can help to the farmers for saving money and he or she can buy only that much seed which is required for the cropping.
- 2) Also, amount of fertilizer are used depending on soil and crop.
- 3) Then at the time of cultivation amount of pesticides (if needed) depends on crop immunity and preventing crop diseases in the area.
- 4) To gain the optimum advantage of the area under the cultivation methods of seeding are there.
- 5) Also, water required for cropping.
- 6) Before the seeding fields are to be prepared.

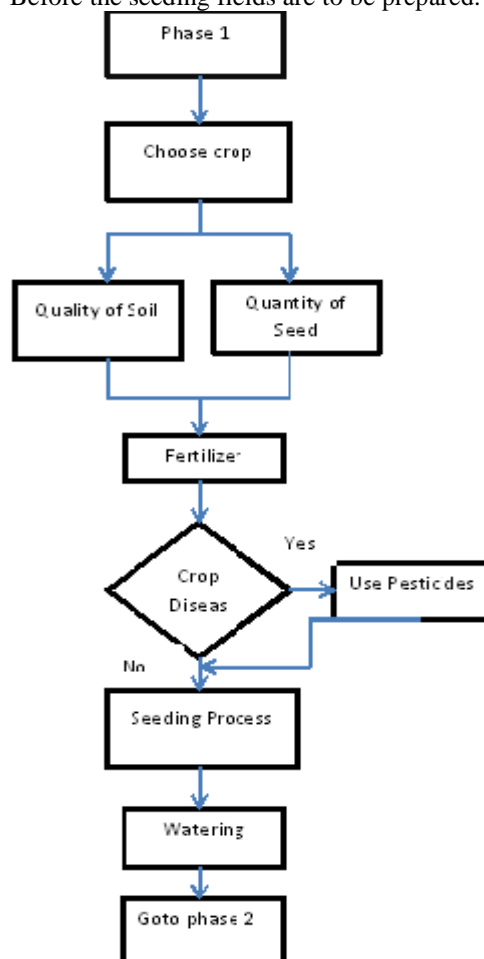


Fig2.flowchart of phase 1

Phase 2

1. This phase of cultivation is start after the seeding phase and then lastly until the crop is ready for harvesting. This is important phase of cultivation.
2. It is almost similar to monitoring the quality of Product which will be ultimately cultivated.
3. The pictorial representation of the Phase 1 and Phase 2 is shown by using flowchart given below:

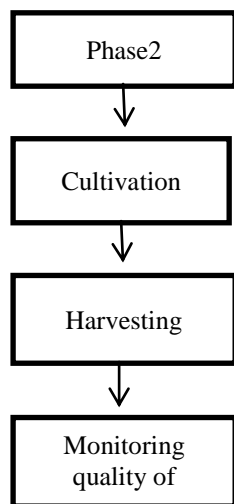


Fig.3 flowchart of phase 2

5.2) Soil Report

For this, the timing of fertilizer, amount, type, methods to be used are checked. The Fertilizer has two side effects:

1. More fertilizer can damage crop or
2. Too little fertilizer may be probably yield poor output.

Then amount of pesticides, type and methods to be put is depend on general diseases in the area. Amount of water and timing of watering to be given is depend on soil moisture, crop requirement and preventing farmer and this can be grow using digging, stirring and over turning with many efforts. This interface provides process description, number of times it is to be done and method to be used.

5.3) Disease Management

Farmer observes the development process of the plant. If he encounters any abnormal change or symptom, then proposed system look for that disease in local repository as well as in global repository. Then appropriate solution is provided to the farmer when we are using global repository. The solution provided is predicted by the internet.

VI. Proposed Methodology

In this section, we discuss our proposed system to develop a user interface to internet for the people. Architecture of the interface is shown in figure. A

User can interact to the internet with two modes: text and icons.

6.1) Text-based interface

In this text based interface user would be able to enter search queries in their mother language. In order to choose the language farmer use the icons. Once icons are generated by user, keyword is translated into English. This is because the user's keyboard is in user's mother language through which we would like to search the engine to guess English content in the web. To do this we propose a language translator to translate keywords in users, mother's language.

The module 2 generates string which we called 'Query string' in English or user's mother language. The module 3, namely 'keyword extractor' will extract the appropriate keyword effective to search only [10]. Further in order to reduce the number of pages retrieved, query expansion, user personalization etc can be applied in this system. So the 'keyword extractor' module will refine the query strings. For refined these queries strings getting from 'keyword extractor' module the 'search engine' would be invoked and on successful invocation of search engine it would result a number of the web pages 'content retriever. The content retriever will maintain the structure of pages and returns the tag set in the html pages.

Then Main target would be translated in to user's mother language. The entire webpage contain would be translated in users mother language. We proposed language translate or to translate English to user's mother's language.

6.2) Icon based Interface

This is the third mode of interaction. The set of icons would be displayed on the users interface. It is interface the users' have to select appropriate icon in order to specify the keyword for searching. Once the keywords are selected, it would be transformed to query string. For handling this one manager is used which is called 'visual language manager'. Visual language also plays the role of managing large set of icons, using icon publications to enhance the rate of icon selection, reducing the search time etc.

VII. Case Study

Towards implementing the above mention proposed methodology, we have developed one Krishi website which supports to the common people in Maharashtra. In this website, we have Considered three Asian languages namely Hindi, Marathi and English and Hindi is the national language in India and most of the peoples in northern, central and western part of the India with 45.66%oftotalpopulation speak in this language. Website considers text, icon in this three Indian

languages only. So the two different interfaces are described in above subsections.

VIII. Conclusion & Future Scope

This expert system or interface will need to be researched further for implementation. Hence future of this task lies in developing the actual system schema and adding extra new functionalities which may be implementation specific. The proposed interface can overcome the language barrier which are main challenges of growing the ICT(information and communication technology).also cost of development includes in a language translation, speech recognition ,text-to- speech. In future, the scope of this system or interface can be increased by adding extra various functionalities.

IX. Advantages

- I. Low or no start up costs.
- II. Great flexibility in relation to fast up and down scaling of resource needs.
- III. Easier access to new versions.
- IV. Other common outsourcing advantages like security for uptime, availability, Contingency Arrangements, reduced costs of investment in organizations infrastructure.
- V. Encryption methodologies for secure and fast communication.
- VI. Voice over technique can be beneficial to the personnel even if he/she can't read the Information.
- VII. Weather updates can be arranged to change after some specific duration so latest updates can be fetched.
- VIII. Native language support has been provided wherever required and possible.

X. Future Scope

More Native language support can be given. Dynamic query resolution.

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