## Expert Systems in Agricultural Development

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An expert system is a software application that attempts to reproduce the performance of one or more human experts. Expert systems are mostly based on a specific problem domain, and are a traditional application of artificial intelligence. The complexity of problems faced by farmers are yield loses, soil erosion, selection of crop, increasing

chemical pesticides cost, pest resistance, diminishing market prices from international competition, and economic barriers hindering adoption of farming strategies. Expert systems are composed of several basic components such as a user interface, a database, a knowledge base, and an inference mechanism. Various types of Web-based and mobile based Expert systems are developed in India will provide advisory support to the farmers.
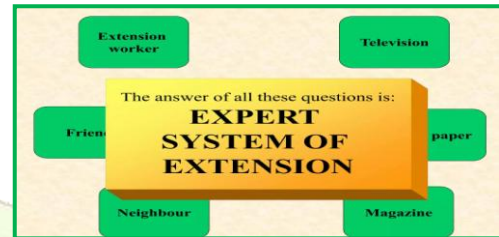
Introduction

An expert system is a software application that attempts to reproduce the performance of one or more human experts. Expert systems are mostly based on a specific problem domain, and are a traditional application of artificial intelligence. The expert system is used to behave like a human expert to solve the problem with the help of pre-set conditions in the software application. A wide variety of methods can be used to simulate the performance of the expert, which is

1) The creation of "knowledge base" which uses some knowledge representation formalism to capture the Subject Matter Experts (SME) knowledge, and

2) A process of gathering that knowledge from the SME and codifying it according to the formalism, which is called knowledge engineering.

Expert systems may or may not have learning components but a third common element is that once the system is developed it is proven by being placed in the same real world problem solving situation as the human SME, typically as an aid to human workers or a supplement to some information system.

Importance of Expert Systems

The complexity of problems faced by farmers are yield loses, soil erosion, selection of crop, increasing chemical pesticides cost, pest resistance, diminishing market prices from international competition, and economic barriers hindering adoption of farming strategies. The farmer may not become expert manager of all these aspects of farming operations. On the other hand, agricultural Researchers need to address problems of farm management and discover new management strategies to promote farm success. Numerical methods have failed to provide better solution because understanding about crop systems is qualitative based on experience and cannot be mathematically represented.

Expert system are computer programs that are different from conventional computer programs as they solve problems by mimicking human reasoning processes, relying on logic, belief, rules of thumb opinion and experience. The experience and knowledge of scientists will be used to develop expert system on various issues of agriculture, which in turn will provide advisory support to the farmers.

In agriculture, expert systems are capable of integrating the perspectives of individual disciplines such as plant pathology, entomology, horticulture and agricultural meteorology into a framework that best addresses the type of ad hoc decision-making required of modern farmers. Expert systems can be one of the most useful tools for accomplishing the task of providing growers with the day-today integrated decision support needed to grow their crops.

Components of Expert Systems

Expert systems are composed of several basic components such as a user interface, a database, a knowledge base, and an inference mechanism. Moreover, expert system development usually proceeds through several phases including problem selection, knowledge acquisition, knowledge representation, programming, testing and evaluation.
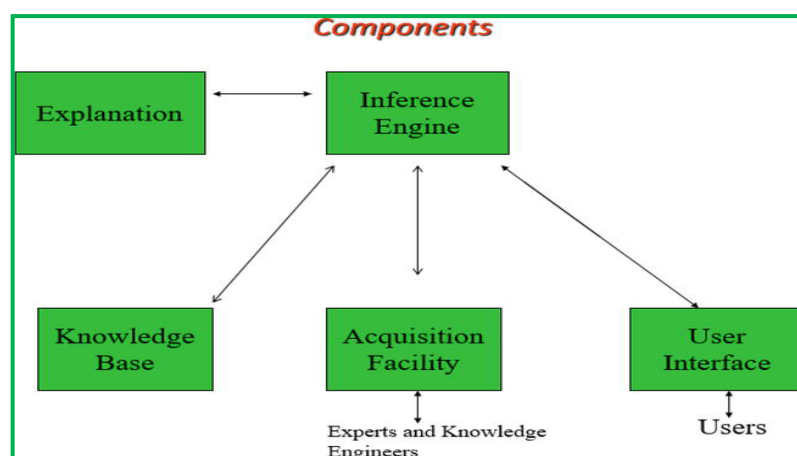
Web based expert system: Various types of Web-based and mobile based Expert systems are developed in India will provide advisory support to the farmers.

1. Maize Agri Daksh developed by IASRI
2. Wheat expert system developed by IASRI
3. Digital mandi for the Indian kisan
4. mKisan Agri portal
5. RICE Doctor by IRRI
6. TNAUs AgriTECH PORTAL
7. Barley expert system
8. Rice knowledge management portal
9. Expert system for Agriculture and Animal husbandry by DWCRA, Bhubaneshwar

Mobile based expert system:

1. Crop insurance mobile app by Ministry of Agriculture,GOI.
2. Agrimarket mobile app
3. mKissan app
4. RainbowAgri app
5. Manditrades app
6. Mpower social app
7. IFFICO kissan app
8. eSAP app....etc

Web based and mobile based Expert systems:

- **Agriculture and horticulture-**
1. Paddy expert system
2. Banana expert system

3. Sugarcane expert system
4. Ragi expert system
5. Coconut expert system
- **Animal husbandry-**
1. Cattle and Buffalo
2. Sheep and Goat
3. Poultry

All these are developed by TNAU collaboratively with ICAR, Available in 4 languages Kannada Tamil

References

1. www.manage.gov.in (National Institute of Agricultural Extension Management
2. http://www.agritech.tnau.ac.in
3. Vizureanu, P. (2019). Introductory Chapter: Enhanced Expert System - A Long-Life Solution. IntechOpen. doi: 10.5772/intechopen.85704