Comprehensive Model of Intelligent Counselor

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Abstract

Higher education industry in India has been given a boost in the past couple of decade. Due to the tremendous increased number of HEI and courses around, it is difficult for students to select appropriate choice for branch and college which best suit their need. In Gujarat for engineering admission "Admission committee of professional courses (ACPC)" conducts online admission procedure. Due to lack of awareness, experience and absence of proper evaluation channel, at a time of selection procedure eligible candidates get droop in allotment process. Paper include descriptive model of intelligent counselor works as an intelligent advisory which candidate can utilize to receive approbation of a certain choice of colleges and branches in which he/she would likely succeed by self-assessment. Different factors that influencing the selection of specific course or college were converted into computer coding by which system identify students interesting pattern of selection and apply expert system to choose appropriate branch and college with respect to given pattern of interest ,where students have large degree of chances of admission and success . Feed forward multilayer Neural Network techniques have been used with an aim to find the structures and relationships among the student interest and available choice of college or branch of engineering.

Keywords: Decision Support System, Intelligent Decision Support System, Intelligent counselor

I. INTRODUCTION

As we know that education is one of the most important issues all over the world. Education institutes should not be just a neutral setting, but the place in which to create and share knowledge, an innovative and productive actor in interaction with the economic, administrative, and cultural environment. The dynamics and transformation of education, characterized by complex processes and statuses, generate a massive volume of data, and their acquisition and storage requires the use of the innovation in the IT field. Modern education institutions experience the need of effective decision support tools to accurately inform them, and assist in all educational processes.

Decision-makers try to apply new approach and use new tools to convert this data in useful information that would contribute to managerial problem solving. Decision making tasks are subject to certain limitations as they depend on human knowledge, experiences, judgments and preferences. Computer applications as decision support tool can be used to provide reasonable and consistent decisions, and at the same time it can improve the effectiveness of decision making process. DSS do not supervise the decision and never replace human decision makers, but they do support them and help them to make better and constant decisions. Large numbers of frameworks or topologies have been proposed for organizing our knowledge about decision support systems .In education environments, DSS are well suited technologies to provide decision support by generating and presenting the relevant information and the knowledge towards quality improvement of education processes. Recently, many improvements have been noticed in the DSS field, with the inclusion of artificial intelligence techniques and methods, as for example: knowledge bases, fuzzy logic, natural language, genetic algorithms, multi-agent systems, neural networks and so forth. The new common denomination is: Intelligent Decision Support Systems – IDSS.

Making use of Intelligent Decision Support Systems (IDSS) technologies provide users the capability of intelligent assistance which significantly improves the quality of decision making, Support recurring, complex real-time decision making. Intelligent systems are developed to fulfill the two main functions. Firstly, to screening, shifting and filtering the increasing overflow of data, information and knowledge. Secondly, as a supporter of an effective and productive decision making that is suitable to the user needs.

In a technologically oriented society education knowledge is crucial to the entire developmental process of a country and its welfare, progress and security. Student course registration is an important as well as a trifling process and may encounter unnecessary graduation delays. One of the main problem faced by students is to take the right decision in relation to their academic schedule based on available information for example courses selection, college selection. This System is devised to guide students in selecting appropriate college branches at the time of college choice selection in Gujarat online admission Registration System. Using of the intelligent technology and the field of expert systems has proposed new branches of sharing knowledge. Intelligent Decision Support Systems (IDSS) technologies provide users the capability of intelligent assistance which significantly improves the quality of decision making, Support repetitive, complex real-time decision making.

II. LITERATURE REVIEW

A. Decision Support Systems:

Decision support systems are knowledge-based information systems to capture, hold and analyze information which affects or is intended to affect decision making performed by people in the scope of a professional task appointed by a user. An effective DSS should:

- Assist decision makers for availability of new and verified data of relevance,
- Provide access to a knowledge repository,
- Be able to discriminate between verified and unverified data.
- Provide an infrastructure for interpretation and classification for new knowledge

Fig 1 gives us an overview of fundamental Components of DSS.

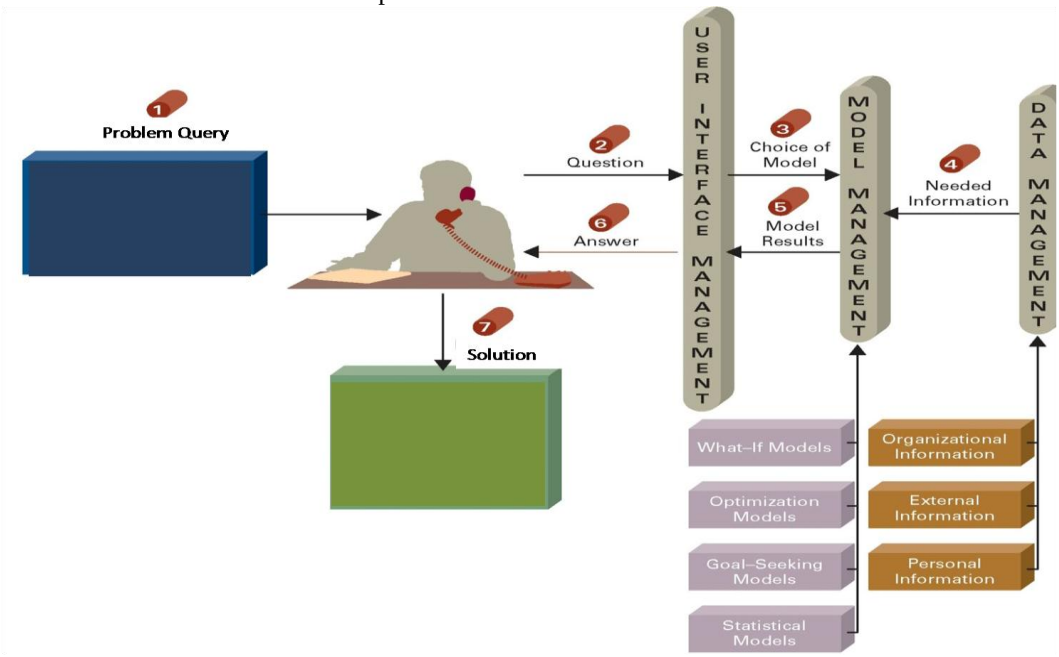

Fig. 1: Decision Support Systems Components.

B. Artificial Intelligence in DSS:

A regular decision support system helps decision-makers to manipulate data and models. It does not play the role of an intellectual assistant to the decision maker. The use of Artificial Intelligence tools and models provides direct access to expertise, and their flexibility makes them capable of supporting learning and decision making processes. There integration with numerical and/or statistical models in a single system provides higher accuracy, reliability and utility [Cortés et al., 2000]. Fig 2 gives us an overview of integration of Artificial Intelligence with Decision Support System.

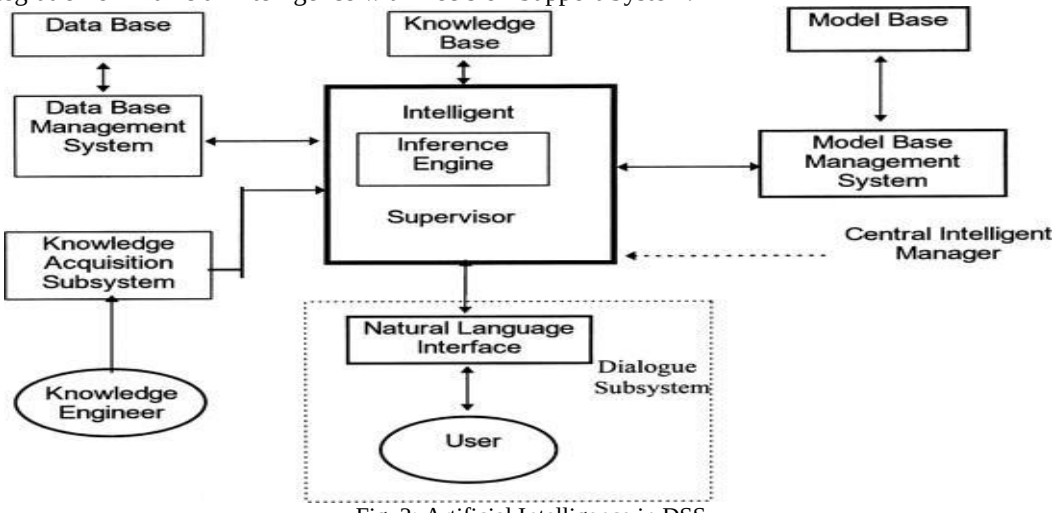

Fig. 2: Artificial Intelligence in DSS

C. Feed Forward Neural Network:

Artificial neural networks abbreviated as ANN, mimic the biological brain of the human body system. In its functioning, they are modeled after biological brain neuron. As with the neuron, they learn by the training given to it and produce output accordingly. They can extract patterns that are not visible to our naked eyes. The typical neural network [1] is constructed around a set of adaptive elements, linked through a connection matrix. The exact structure of the connection matrix, the value ranges and the interaction between neural elements vary from model to model. These structures built on the basis of adaptive elements are capable of complex learning behavior. This behavior is *self-organizing*—it is not programmed or governed by an internal central processing unit (Kohonen, 1987).

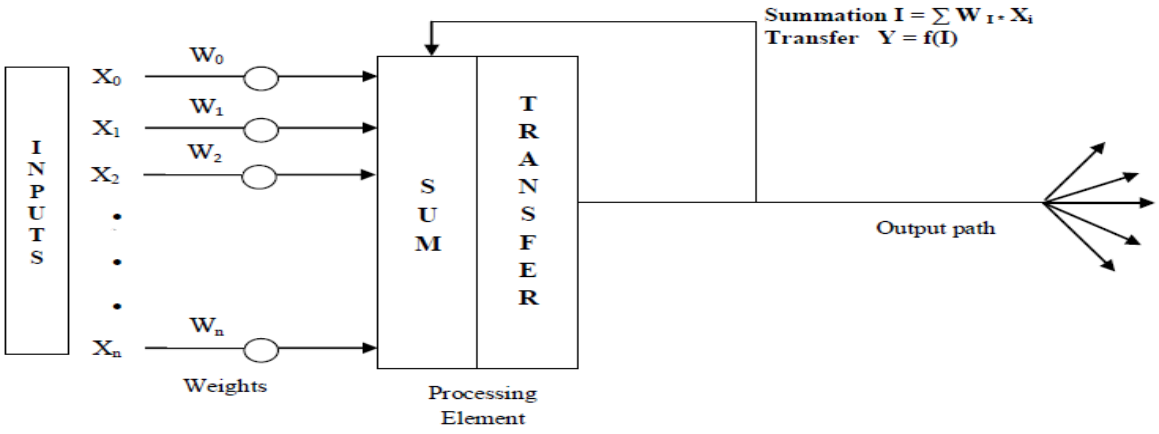

Fig. 3: Neural Network .

In Fig.3, inputs to the network are represented by the mathematical symbol, $x(1)$, $x(2)$, $x(3)$, … $x(n)$ and each of these inputs are multiplied by a connection weight. These weights are represented by $w(n)$. These products are simply summed, sent through a transfer function to generate a result. A functional model of the biological neuron is based on three basic components of importance. First, the synapses of the neuron are modeled as weights whose value gives the strength of the connection between an input and a neuron. Negative weight values shows inhibitory connections and excitatory connections are given by positive values. The next component, an adder sums up all the inputs modified by their respective weights. This activity is known as linear combination. And an activation function controls the amplitude of the output of the neuron is the last. An acceptable range is usually between 0 and 1, or -1 and 1.

In feed Forward architecture, there are 3 layers, namely, input layer where neuron receives signals from the environment, output layer whose neurons gives the output and a middle layer called hidden layer which process the signal arriving from the input layer and gives its output to the output layer through an activation function.

III. CONCEPTUAL MODEL

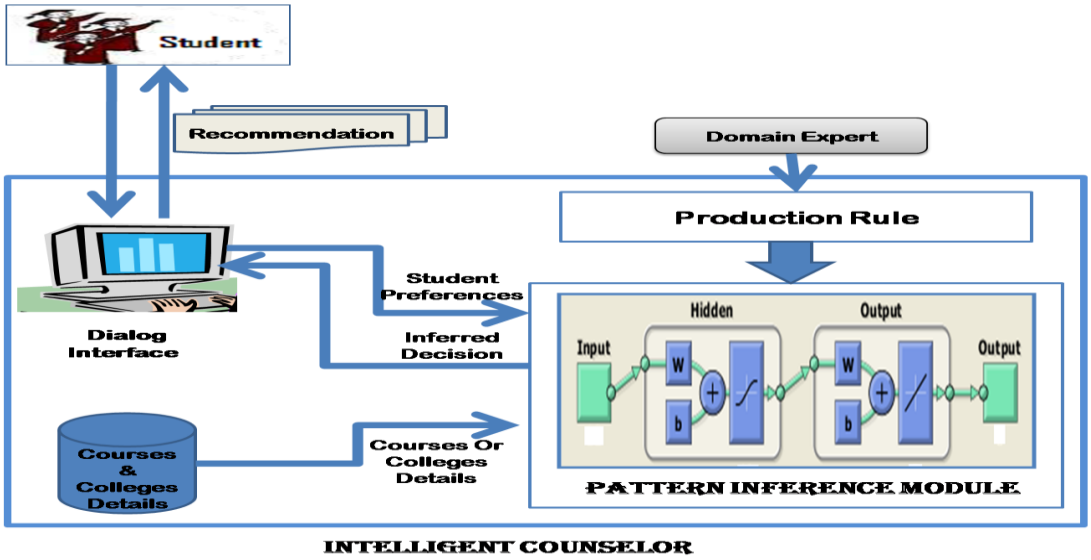

Fig. 4: Schematic View Of intelligent counselor.

Proposed model of intelligent counselor consist five components:

- User(Student)
- Dialog interface
- Database
- Production Rule
- Pattern inference module

1) *User:*

User is a person who is using a specific system to take advice from it. Here in the present system user is a student who is going to participate in online engineering admission conducted by Gujarat admission committee for professional courses. Student use system to take advice on preferable choice of engineering branch and college based on their preferences where they have higher chances of succeed.

2) *Dialog Interface:*

The Dialog interface subsystem is that expertise component of a computer system that allows bidirectional communication between the system and its decision maker. It includes not only the hardware and the software but also the factors that deal with ease of use, human-machine interactions.

3) *Database:*

It provides the data related with available number of colleges and branches of engineering which user wants to evaluate based on their preferences.

4) *Production Rule:*

Production rule is rule base containing a collection of rules. The rules result from the conducted knowledge acquisition and derive from the mental model of the domain expert. The rule-based form of knowledge recording of "if ...then" type is assumed. The premises are connected with factors determining from user for selection process and conclusions with available number of engineering branches and colleges. Here knowledge comes from domain expert. It is obtained in the course of acquisition process during knowledge acquisition sessions.

5) *Pattern Inference module:*

Pattern Inference module is a kind of inference engine which constitutes the central element responsible for inference within the system. It is an important part of system which actually identifies the decision pattern. This pattern will help to evaluate set of engineering branches and colleges based on preferences of student by applying rule and recommend best engineering branches and colleges. Multi-layer feed forward Neural Network technology is used to find best match for student based on their preferences. Here network takes user preferences as an input variable and specific branches and college of engineering as a target data. Based on preferences and by applying production rule trained network will be used to recommend best choice of branch and college to them.

IV. CONCLUSION

This paper, illustrated the DSS, Intelligent DSS, NN and activities regarding course selection and college selection where decision support systems are required. Intelligent integrated with decision tool assist student in high level phases of decision making by integrating human knowledge with modeling tools. The final section comprises the proposed model of intelligent counselor which assists the students for selection of best course and college according to their preferences. By examining deployed decision support systems we hope to capture the characteristics that can guide future development efforts.

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