INTERNATIONAL RESEARCH JOURNAL OF HUMANITIES AND INTERDISCIPLINARY STUDIES
( Peer-reviewed, Refereed, Indexed & Open Access Journal )
DOI : 03.2021-11278686 ISSN : 2582-8568 IMPACT FACTOR : 5.71 (SJIF 2021)

# A Role of Data mining technique in Healthcare System of Lactating Animals

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**DOI No.** 03.2021-11278686 **DOI Link::**https://doi-ds.org/doilink/08.2021-69569939/IRJHISICPC210804

***Abstract:***

*The current era is witnessing a vast development in all fields of animal health care. The usage of IT to transfer information and knowledge in the animal health care domain using expert systems is one of the areas investigated by many institutions. The transfer of knowledge from veterinary consultants & scientists to livestock holders represents a bottleneck for the development of animal health care in any country. Measuring the performance of an expert system is difficult as knowledge cannot be quantified. But it is impossible to present formal proofs of correctness for expert systems. Expert systems can be supported with mechanism for correctness of the results for users who rely on them. The paper has proposed a new kind of association algorithm based on support and certainty, which can scan the datasets several times to discover certain frequent item sets whose length complied with fixed increment. The objective of this paper is to propose a data mining technique, which can be used for storage & assessment of data for different diseases in lactating animals and observe associative rules based on clinical diagnostic parameters. The dataset being designed in this study for storage of clinical data, should be able to render the data in appropriate structures, provide metadata that adequately records semantics of data. Applying Apriori algorithm to a given clinical data set can have the potential to confirm results of expert system regarding disease and symptoms co-occurrences. Under the architecture based on support and confidence, the Apriori algorithm can prove to be certainty association rule, when a piece of association rule is larger than the expected support and meets the condition of certainty.*

***Keywords:*** *Data mining, Apriori Algorithm, Expert System, Lactating Animals*

## 1. Introduction:

An Expert system is a computer program that uses knowledge to solve complex problems. AI provides not only new paradigms for problem solving but also new representation formalisms which allow the explicit representation and use of the knowledge of the domain, mainly by rule-based and constraint-based representation of knowledge. In Expert system knowledge is acquired and represented using various knowledge representation techniques rules, frames and scripts. The basic

advantages offered by such system are documentation of knowledge, intelligent decision support, self learning, reasoning and explanation. Expert systems are systems based on the methods and techniques of Artificial Intelligence. Their core components are:

- Knowledge base
- Acquisition mechanisms
- Inference mechanisms

Knowledge Base Systems (KBS) goes beyond the decision support philosophy to indicate the expert system technology into the decision making framework. Expert Systems (ES) have been the tools and techniques perfected by artificial intelligence (AI) researchers to deduce decision influences based on codification of knowledge. The codification of knowledge uses the principles of knowledge representation. Typically such codification uses rules like IF-THEN rules to represent logical implications.

In an expert system development, knowledge base development is the most important part. The quality of an expert system depends on its knowledge base. Knowledge Base is developed with the help of domain specific expert in this expert system. The steps for developing knowledge base in this system are identification of the input problem, knowledge acquisition and representation of knowledge into the knowledge base. Through this expert system researchers have utilized the expert's knowledge for developing rules in variety of animal health care issues with special reference to lactating animals as per veterinarian's decisions.

**2. Diagnosing Methods:**

First the veterinarian has to select the symptoms found in the animal from the given symptom list, from the symptoms selected the system shows the probable diseases.

While user selects symptoms, the process scan symptoms to search diseases for the selected symptom. If same symptom is available in more than one disease, multiple diseases are added in disease list.

When user selects additional symptoms, the new diseases based on selected symptoms are added in disease list otherwise list remains same if disease is already available in the list. When symptoms are selected by user and diseases get added into list, count matrix is generated against each disease which contains count of total symptoms selected for each individual disease available in the list.

Finally when user wants to predict Disease, the disease having highest count will be predicted as Probable disease. If more than one disease is having same count, system prompts additional symptoms which are not provided by the user from symptom matrix for each disease having same count. Based on the additional symptoms selected, count matrix is regenerated. This process will be

repeated till a single disease with highest count is available as probable disease. Further symptoms selected and probable disease is stored as disease history for the animal brought for diagnosis.

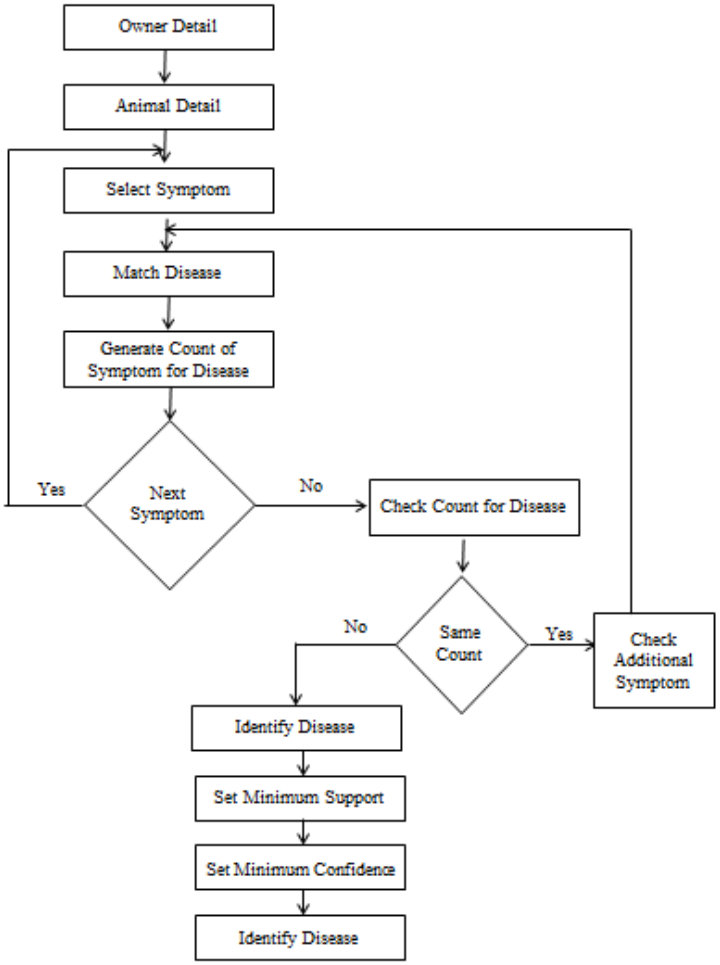


**Fig. 1 Flowchart showing Diagnosing Method**

## 4. Apriori Algorithm for Association Rule:

Rules are a type of the most human-understandable knowledge, and therefore it is most suitable for deciphering new rules corresponding to data associated with medical applications. Association rule mining is a general purpose rule observation scheme that has been widely used for observing rules in medical applications. The Apriori association algorithm exploits the downward closure property, which states that if an itemset is infrequent, all of its supersets must be infrequent. Each itemset has an associated statistical measure called support. For an itemset $X \subset I$, support(X) = s, if the fraction of transactions in the dataset D containing X = s. The classic framework for association rule mining uses support and confidence as thresholds for constraining the search space. The confidence or accuracy of an association rule X => Y in D is the conditional probability of having Y contained in a transaction, given that X is contained in that transaction: confidence (X => Y) = P (Y | X) = support(X Y) /support(X).

After detecting the disease, text file with name apriori generated for the same disease with all the possible rules for the selected disease. The file contains support and confidence for each rule. The stored data in the database would provide a basis for the diagnosis of the disease. For example, veterinarians can diagnose the disease by finding the symptoms and their patterns associated with occurrence of disease. This method has been common practice in evidence-based medicine, which is an approach where veterinarian is aware of the evidence in support of disease diagnosis and its associated strength with symptoms.

The objective of Apriori Rule is to propose for a data mining process, which can be used for storage & assessment of data for animals suffering from different diseases and observe associative rules based on clinical diagnostic parameters. The database being designed in this study for storage of clinical data, should be able to render the data in appropriate structures, to mine the data for observing new rules. Based on the associative clinical parameters, researchers propose for a predictive model which can be used for prediction of disease in suspected patients to support the results from expert system.

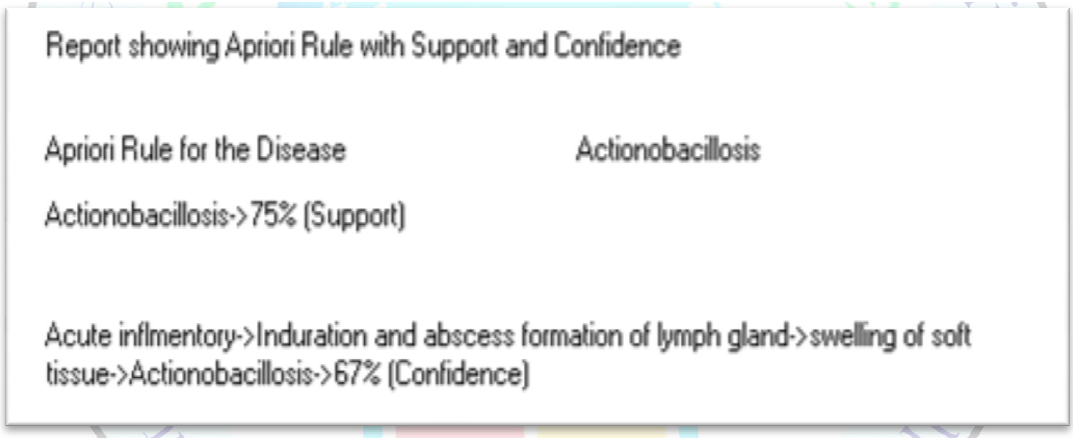


**Fig. 2 Report Showing Apriori Rule**

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**4.Conclusion**

The main purpose of this expert system is to implement information technology through expert knowledge. Definitely this system is very important to identify diseases affecting cattle (and there by the livelihood of the poor), to provide appropriate dissemination methods to deliver information on these diseases to the cattle owners and to evaluate these methods. The animal health care expert system is knowledge based system having the feasibility and the benefits of applying knowledge based systems methodology to diagnosing the diseases found in cows and buffalos. Applying association rule mining to a given clinical data set has the potential to confirm the diagnosis made by veterinarians that could potentially lead to improved clinical health care.

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