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"Cattle Disease Auxiliary Diagnosis System Based on Data Analysis"

Chandana K, R. Dharani, Vidya Pavithra H V, Vidyasagar K, Dr. Nandini M S,

Student, NIE Institute of Technology Mysore, Karnataka
Student, NIE Institute of Technology Mysore, Karnataka
Student, NIE Institute of Technology Mysore, Karnataka
Student, NIE Institute of Technology Mysore, Karnataka
HOD and Assistant professor, NIE Institute of Technology, Mysore, Karnataka

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ABSTRACT:
Background/Objectives: Because animals cannot communicate their difficulties or pain, it is difficult to manage the symptoms and disease kinds of cattle diseases in real time. Finding the signs and symptoms of cattle diseases is a difficult challenge in the medical field. The primary goal of the proposed system is to identify the symptoms of cattle diseases and then forecast the relationship between symptoms, diseases, and treatments. Given the current system, it is challenging to both diagnose and administer the appropriate medicines for cattle diseases.
The suggested method uses data science techniques to recognise the signs of cattle sickness and forecast patterns. The proposed method employs the "eclat algorithm," a data science approach, to identify the patterns.The system is intended to be developed as a real-time application that helps veterinarians treat cattle diseases. We utilise SQL Server as our back end technology and Visual Studio as our front end technology because they both support more libraries and tools for use with real-time applications.

I. INTRODUCTION

Data analysis and mining are being employed more and more frequently in animal husbandry as a result of the big data and artificial intelligence industries' rapid development. In this system, a sizable amount of electronic medical records from various cattle species are gathered, analysed, and mined to create an intelligent system for diagnosing bovine diseases. The manual procedure for diagnosing and treating cattle diseases is excessively complicated, time-consuming, and expensive. These systems do little more than gather data, store it in a database, and retrieve it later; they do not extract any information that might help medical professionals treat the cattle disease more effectively. The more well-known, well-known, and simple data science technique is association (or relation).In order to find patterns, we construct a straightforward association between two or more elements, frequently of the same sort.

For instance, using market-basket analysis, which tracks consumers' purchasing patterns, we may discover that a client consistently buys cream when they buy strawberries and advise them to do the same the next time they buy strawberries.

The "Eclat Algorithm" is employed in our project's Association Learning Algorithm to forecast the link between various objects utilising data sets.

Related Works
Survey Paper1
Title: "Developing Mobile Intelligent System For Cattle Disease Diagnosis and First Aid Action Suggestion"
Author: WiwikAnggraeni,A.Muklason, A.F.Ashari,Wahyu A. and Darminto
Year of Publications: 2013
Description
The purpose of this paper is to outline the work that has gone into creating a mobile intelligent system for diagnosing cattle ailments and providing first aid action suggestions. Fuzzy neural networks are used in the system's basic intelligent engine's development. Because smartphones are so common, the user interface was created as a mobile

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application running on the Android operating system.

Methodology
fuzzy neural network

Limitations
- Android app developed, visualisation issue on training data-sets;
- only suited for first aid intervention; not suitable for complex condition.
- Doesn't make predictions about how symptoms, diseases, and therapies relate to one another.

Survey Paper2
Title: "Cattle health monitoring system using Arduino and LabVIEW for early detection of diseases"
Author: Kunja Bihari Swain, SatyasopanMahato, Meerinapatro,sudeeptakumarpattnayak
Year of Publications: 2017
Description
Farmers who regularly struggle because their cattle are in bad health and there are no reputable veterinarians in the area can benefit from effective online cow health monitoring. In this study, we provide a tool that enables farmers to track and contrast the current health parameters of the cattle with the typical reference healthy parameters, allowing them to detect any decline in the cattle's health.

Methodology
Arduino UNO, Arduino NANO, Xbee module and different types of sensors for taking the cattle body parameters have been used.

Limitations
- Only used to keep tabs on the health of the animals.
- Sensors for monitoring produce less precise findings.
- Doesn't make predictions about how symptoms, diseases, and therapies relate to one another.

Survey Paper3
Title: "Identification of Super-Spreaders of Foot-and-Mouth Disease in the cattle transportation network: The 2018 outbreak case in Cesar (Colombia)"
Author: Francisco Gomez, Jeisson Prieto, Juan Galvis, Fausto Moreno, Jimmy Vargas
Year of Publications: 2019

Description
One of the main dangers for the spread of foot-and-mouth disease (FMD) is cattle transportation. The description of this intricate transportation network could be useful for surveillance and management duties. For FMD epidemiology in particular, network centrality may offer pertinent data. For the network of cattle transportation, a number of centrality measures can be calculated, and each one may offer insightful data on the dynamics of animal movement.

Methodology
cattle transportation network (ranking nodes).
Limitations
- Small data sets are only utilised to track the "foot-and-mouth disease."
- The results produced were less accurate.
- Doesn't make predictions about how symptoms, diseases, and therapies relate to one another.

Survey Paper4
Title: "Identification of Acidosis Disease in Cattle Using IoT"
Author: Fatih, Kamil
Year of Publications: 2019

Description
Certain illnesses affect cattle's ability to produce milk and reproduce. Digestive issues are one of the other significant causes of this. One example of certain digestive-related disorders in cattle is rumen (tripe) acidosis. One of the things that makes the animal and herd less effective is this sickness. Animal diet and everyday habits can be regularly observed and recorded to ensure disease identification.
Methodology
Internet of Things (IoT) technology used (pH sensor, Waterproof temperature sensors)
Limitations
- Only used to track the condition known as acidosis sickness.
- Sensors for monitoring produce less precise findings.
- More time is needed.
- The link between symptoms, disease, and treatments is not predicted.

II. PROPOSED WORK

Real-time management of cattle disease symptoms and disease kinds is challenging because animals cannot communicate their issues or pain. Finding the signs and symptoms of cattle diseases is a difficult challenge in the medical field. The

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primary goal of the proposed system is to identify the symptoms of cattle diseases and then forecast the relationship between symptoms, diseases, and treatments. Given the current system, it is challenging to both diagnose and administer the appropriate medicines for cattle diseases.

The suggested method uses data science techniques to recognise the signs of cattle sickness and forecast patterns. The proposed method uses a "apriori algorithm" from data science to uncover patterns after using a "lesk based algorithm" to identify the symptoms.The system is intended to be developed as a real-time application that helps veterinarians treat cattle diseases. We utilise SQL Server as our back end technology and Visual Studio as our front end technology because they both support more libraries and tools for use with real-time applications.

Outcome

Disease name	Symptom	Confidence
bruise	The color of the mouth is pale	0.88
Lack of milk	Breast enlargement injury	0.83
Uterine prolapse	Vaginal stench	0.7
gonorrhea	Low urine output and yellow color	0.9
trauma	Wound infection pain	0.83

Disease name	Symptom	Confidence
asthma	Abnormal body temperature, abnormal breathing	0.875
Spleen diarrhea	Abnormal mouth color, foreign matter in feces	0.81
Cold	Abnormal mouth color, loss of appetite	0.84
Ssis	Ruminant anomaly, Depressed	0.96
gonorrhea	Abnormal tongue,Low urine output and yellow color	0.82

Methodology

Association Learning

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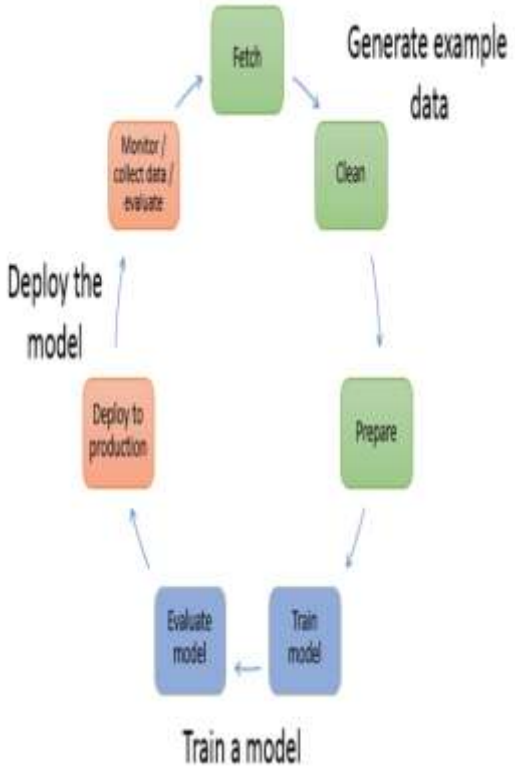

Monitor/Collect Data

The first stage of data processing begins here. Here, we gather training datasets from a variety of websites, including www.kaagle.com, www.dataworld.com, www.data.gov.in, and others. The data is primarily in text format. Information compiled from several sources and combined into one. Excel sheets are used to store training datasets

Fetch

In the next stage of the data processing procedure, we retrieve data from excel sheets. Although training datasets contain all relevant data, we retrieve the necessary data for processing based on our needs. Data containing information on the signs, causes, and treatments of cattle diseases are retrieved and fed into data science algorithms.

Clean

Here, cattle training datasets are cleaned by removing extraneous data and filling in blanks with the "binning approach" of data preprocessing. Data cleaning entails deleting erroneous, useless, and noisy data.

Prepare

Here, the necessary formats are created from cleaned training datasets. We must convert data into numerical representations since some data science algorithms only accept data in numerical formats. Some data science methods require string conversion because they accept data in strings. We refer to this as prepping data for algorithmic input to develop the model.

Train Model

In this case, machine learning algorithms were used to process the data and create the model. After the model was created, it was tested to determine the accuracy and effectiveness of the methods.

Evaluate the Model

Here, machine learning algorithms are used to process the data and create a model. After the model is created, it is tested to determine the accuracy and effectiveness of the methods..

Deployment

The system creates patterns relating to cattle disease symptoms, disease categories, and therapies once the model has been built and evaluated and we are ready to apply it. The term "deployment" relates to the application's use.

III. EXPERIMENTAL RESULTS

Pattern Prediction

Treatments

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VI. CONCLUSION

Real-time management of cattle disease symptoms and disease kinds is challenging because animals are unable to communicate their issues or distress. Finding the signs and symptoms of cattle diseases is a difficult challenge in the medical field. This technique identifies the signs of bovine disease before estimating the relationship between symptoms, diseases, and therapies. Given the current system, it is challenging to both diagnose and administer the appropriate medicines for cattle diseases. Veterinary physicians can better diagnose and treat cattle diseases by using a system that is helpful for the medical industry.

VII. FUTURE ENHANCEMENT

To discover more connected patterns, more training datasets might be used. In order to determine the algorithm that produces the best results, more algorithms can be employed to find the symptoms, illness types, and therapies for cattle diseases.

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