Chapter 1

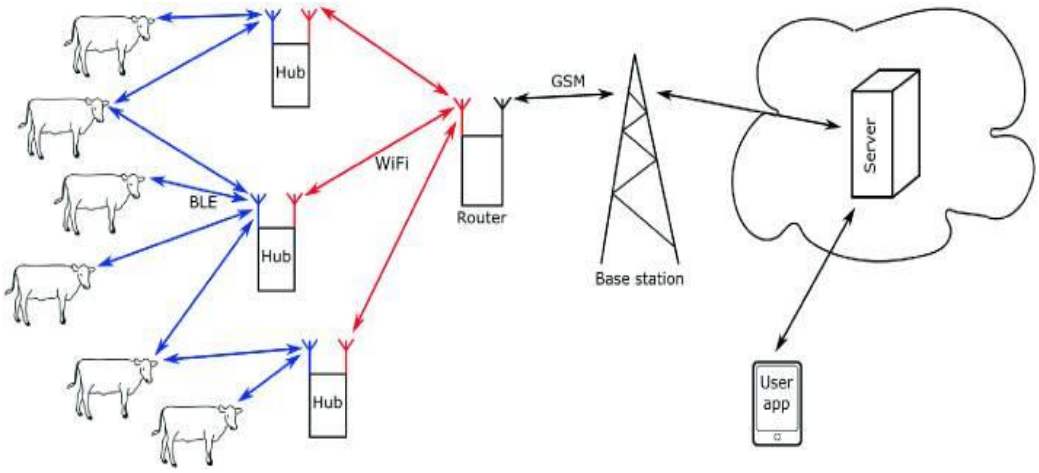
INTRODUCTION

1.1 Overview

Agriculture play crucial role or we can say that its act like backbone of such countries Out of this scale of dairy farming has been changed worldwide over recent year with a move toward larger, more intensive.

Primarily, the main work is to create a data set from video of cattle. In pre-processing step, the data is prepared in structured format for processing. Colour constancy can be used to compensate for variations in outside lighting. During training, a classification model is trained with the data. Given sufficient training data using deep learning (often hundreds or thousands of images per label), a classification model can learn to predict whether cattle health belongsto any of the classes it has been trained on. This process of prediction is called inference. The different evaluation measures such as accuracy, precision, recall, F1-score are calculated to evaluate the performance of the model.

Precision cattle farming monitoring systems employ a wide range of sensor technologies to track many elements of a cattle's life. The cattle's weight is collected using ground weighing scales, the cattle's sound is monitored using a microphone, the cattle's body temperature distribution is monitored using a thermal camera, and the pig's temperature is measured using an infrared thermometer. Furthermore, using RFID technology, each cattle could be accurately and effectively monitored.With the advancement of visual AI, the use of cattle noises and visuals in conjunction with deep learning models is becoming increasingly advantageous in precision cattle farming. There are two primary methods for collecting data using security cameras. The first option is to install security cameras on the cattle's roof, which employs the top-view method to cover the more information about cattle legs trucks. Similarly, sound acquisition equipment is utilised to capture cattle sounds, and then coupled with vision-based AI algorithms to realise monitoring.



Nowadays, the agriculture industry is facing several challenges, including demographics, food waste, and scarcity of natural resources. According to [5], roughly 800 million people worldwide suffer from hunger, and 650 million will still be undernourished by 2030. The publication reports that by 2050 humanity will have to produce 70% more food. To solve the scarcity problem, many complementary actions must be taken. Among them, traditional farm and agricultural methods must be replaced and supported by new advancements in technology, including sensors, devices, robots, and information technology.

Internet of things (IoT), already mature and effective technology, seems to be one of the remedies for low efficiency and productivity in agriculture and livestock. In [8], the following areas of IoT application in agriculture are listed: agricultural field monitoring, greenhouse monitoring, agricultural drones, livestock monitoring, smart irrigation control, agriculture warehouse monitoring, and soil monitoring. The objective of this paper is to present a new IoT-based livestock monitoring system dedicated to the automated measurement of dairy cow health state in a conventional loose-housing cowshed.

Chapter 2

LITERATURE SURVEY

2.1 Related Work

SL NO	YEAR	TITLE OF PAPER	METHOD
1.	2021	Wearable Sensor System for Wireless State-of-Health Determination in Cattle in 2021.	It could allow the persons to identify their animals with the help of electronic identification units. They were mainly of the form of collars, ears tags and bolus in the stomach
2.	2020	Cattle health monitoring using wireless sensor networks in 2020.	The bovine mobile observation operation unit was designed to communicate with a variety of sensors. It used Bluetooth links to send the data back to a farmer, a veterinarian etc
3.	2020	Method and system for manual entry of data into integrated electronic database for livestock data collection.	Invented to monitor the health of cattle using a wireless sensor mote. It used in-network processing algorithm to monitor the data

2.2 Problem Identification

Precision cattle farming monitoring systems employ a wide range of sensor technologies to track many elements of a cattle's life. The cattle's, the cattle's sound is monitored using a microphone, the cattle's body temperature distribution is monitored using a thermal camera, and the pig's temperature is measured using an infrared thermometer. Furthermore, using RFID technology, each cattle could be accurately and effectively monitored.With the advancement of visual AI, the use of cattle noises and visuals in conjunction with deep learning models is becoming increasingly advantageous in precision cattle farming. There are two primary methods for collecting data using security cameras. The first option is to install security cameras on the cattle's roof, which employs the top-view method to cover the more information about cattle legs trucks. Similarly, sound acquisition equipment is utilised to capture cattle sounds, and then coupled with vision-based AI algorithms to realise monitoring.

2.3 Objectives of the Work

- To collect the real-world data of Cattles using IOT.
- To preprocess the data to extract the features.
- To help farmers upgrade their livestock through the production method.
- To provide farmers source of information about the health of cattle, thereby reducing the cost of production and increase farm income.

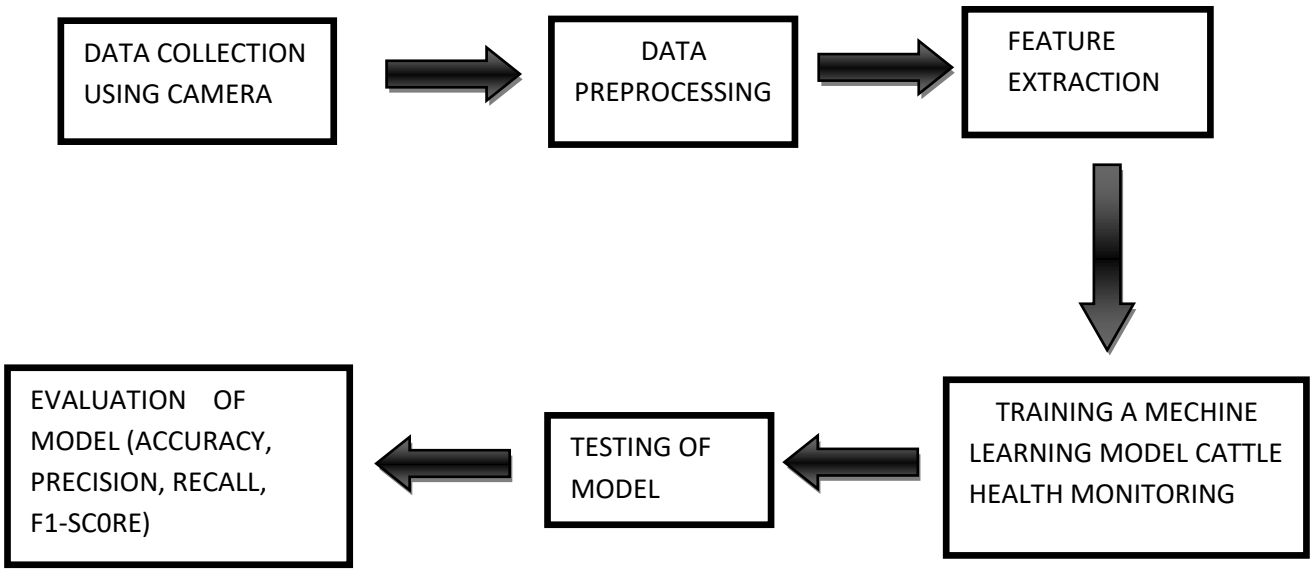
2.4 Problem Statement

To design and develop an application to monitor the cattle health using IOT and machine learning.

Chapter 3

Proposed Methodology

3.1 Methodology



3.1.1 Data Collection Using Camera

With OpenCV, we can capture a video from the camera.it lets you create a video capture object which is helpful to capture images and videos.

3.1.2 Data Preprocessing

Data Preprocessing is a process of converting your raw data into suitable form(it gives great impact over accuracy).

3.1.3 Feature Extraction

Feature Extraction is a method for creating a new and small set of features that captures most of the useful information of raw data.

3.1.4 Evaluation of Model(Accuracy,Precision,Recall,F1-Score)

F1-score is harmonic mean of precision and recall score and is used as a metrics in the scenarios where choosing either of precision or recall score can result in compromise in terms of model giving high false positives and false negatives respectively

3.1.5 Testing of Model

Testing of Model is an application of model-based design for designing and optionally also executing artifacts to perform software testing or system testing

3.1.6 Training a machine learning model cattle health monitoring

Monitoring systems assist farmers in monitoring the health of dairy cows by predicting behavioral patterns

Chapter 4

EXPECTED OUTCOMES

4.1 Outcomes

- It helps farmers to Monitor cattle's health.
- The developed system efficiently and accurately monitors behavior of the dairy cows and allows to detect a particular physiological status.
- This application includes the aggregate behavior indicator, enables us to precisely discriminate cow activities.
- This reduces the minimal health inspection and long term animal health care cost.

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