**COW DISEASE PREDICTION AND EARLY WARNING SYSTEM IN DAIRY FARMS**

**Abstract:**

The project titled "Cow Disease Prediction and Early Warning System in Dairy Farms" is designed to improve animal health management through automated monitoring and prediction of diseases. Using a Raspberry Pi microcontroller, the system integrates various sensors, including a temperature sensor to monitor cow body temperature, a pulse oximeter to measure pulse rates, and a MEMS sensor for detecting abnormal movement or falls. Environmental factors such as temperature and air quality are monitored using the DHT11 and MQ135 sensors, respectively. Data from these sensors is processed using Random Forest machine learning algorithms to predict potential health issues. The system provides real-time updates on an LCD display and triggers sound alerts via a buzzer in abnormal conditions. Additionally, the GSM module sends SMS alerts to farm operators, enabling early intervention and reducing the risk of disease outbreaks. This system enhances herd health monitoring, ensuring timely responses to potential problems.

**Existing Method**

Current disease monitoring in dairy farms often relies on manual observation of cows' physical health and behavior by farm operators. This method is reactive, as symptoms are usually detected only after the disease has progressed, leading to delayed treatment. Additionally, manual monitoring is labor-intensive, error-prone, and lacks the ability to continuously track vital signs or environmental factors. This increases the risk of undetected health issues, late intervention, and greater economic losses due to poor herd health.

**Proposed Method**

The proposed method introduces an automated disease prediction and early warning system using a Raspberry Pi-based setup integrated with multiple sensors. These sensors measure cow body temperature, pulse rate, movement patterns, and environmental factors like temperature and air quality. The data is processed using Random Forest machine learning algorithms to predict potential diseases. Real-time alerts are displayed on an LCD, while a buzzer and GSM module provide immediate notifications in abnormal conditions. This system enables continuous health monitoring, early detection of potential diseases, and timely intervention, improving herd management and reducing the risks of disease outbreaks.

**Proposed Method:**

Raspberry PI

Power Supply

GSM

Dallas Temperature sensor

Buzzer

LCD

MQ135 sensor

DHT11 sensor

Pulse oximeter

MEMS sensor

**Hardware requirements:**

* Raspberry Pi
* Temperature sensor
* Pulse oximeter
* MEMS sensor
* DHT11 sensor
* MQ135 sensor
* LCD display
* GSM module
* Buzzer
* Memory card

**Applications:**

* Dairy farms
* Livestock management
* Veterinary care
* Animal health monitoring
* Smart farming

**Advantages:**

* Automated
* Early detection
* Remote alerts
* Machine learning-based

**Learning outcomes :**

* - Understanding Raspberry Pi pin diagram and architecture
* - Setting up and installing Raspberry Pi OS
* - Introduction to Raspberry Pi IDE and programming environment
* - Basic coding with Python for Raspberry Pi
* - Working with temperature, pulse oximeter, and MEMS sensors
* - Interfacing environmental sensors (DHT11, MQ135) with Raspberry Pi
* - Implementing machine learning algorithms (Random Forest) for prediction
* - Integrating GSM module for sending alerts
* - Power supply requirements for Raspberry Pi and sensors
* About Project Development Life Cycle:
* Planning and Requirement Gathering (software’s, Tools, Hardware components, etc.,)
* Schematic preparation
* Code development and debugging
* Hardware development and debugging
* Development of the Project and Output testing
* Practical exposure to:
* Hardware and software tools.
* Solution providing for real time problems.
* Working with team/ individual.
* Work on Creative ideas.