Autonomous Cattle Feeder

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Abstract- Technology advancement has made our routine life more convenient and easier. With the increased population rate, changing lifestyles and abrupt climate changes are demanding more development in livestock's lifestyle. While milk is not a luxury food for our Indians, it takes a larger portion of the diet. Milk or its products is consumed regularly by every class people. Even the poorest person would love to prefer ghee instead of Vanaspati. So the main action to be taken is to maintain the cattle health by maintaining its body temperature, daily diet. In this approach, the cattle are fed automatically. Whenever they insert their head into the tub, the motion sensor will detect its move so the feeding supplements which are filled in a larger container will automatically get filled in the tub. Their health includes not only proper diet but also its body temperature. The Temperature sensor will be fixed inside the shed with a preset value. Whenever the temperature exceeds the preset value, the sprinkler will turn on automatically. By this, their body temperature is maintained every time. On concentrating and working on all these parameters, the dairy farming will get increased. This mainly saves the price of hiring labour.

Keywords- Motion detection, Preset value, Body temperature, labour.

I. INTRODUCTION

India has the world's largest dairy herd, which composed of cows and buffaloes. The Department of Animal Husbandry and Dairying (DAHD) released a census report of livestock population at about 536 million for the year **2019** on October 16. According to the survey of "Dairy and Milk Processing Market" in India (2018-2023), as of 2018, India is the leading country in the world in the milk production, became a major part for 19% of the global market share. The data revealed that the population of livestock has grown by 4.6% from 512 million in 2012 to about 536 million in 2019. A large number of farmers in India depend mainly on animal husbandry for their livelihood. It is set first in milk production, with 187.7 million tons of milk produced in 2018-2019. Since the population of our country tend to increase day by day, there is issues of lack of labor population have been found in agriculture and livestock farming, which may require large amount of labors for maintaining .This is because adults are having no longer interest to stay in rural areas and that results in facing new challenges in development of agriculture and livestock farming. This issue is happening all around the world not only in India. Traditional detecting for the environmental conditions of livestock farms demands manual control to maintain and control. Such traditional practice may require extra man-hours. But farmers are not rich to pay them high.

With the increased development and growth of automation and control on the agriculture and livestock farming became more comprehensive. Smart controlling over dairy farming is getting accepted in mass scale. Automated dairy farming is one where numerous features are incorporated such as milk collection, water and food distribution, temperature maintenance etc. and it helps to gain a satisfactory profit over cattle farming, Proper hygiene will maintain the cattle healthier. All these actions are done automatically, thus making the dairy farming more profitable and efficient and it may reduce the overall cost by simplifying the maintenance and control of the farmers. This smart farming is the most splendid creations in these modern technologies which are now greatly acquired in different part of the world.

II. LITERATURE SURVEY

Most of the farmers in our country use traditional farming methods in cowshed. This traditional farm tends to lack of proper management in maintaining the health and milk production. All the activities in cattle farming like feeding the cattle, providing water and temperature control inside the shed are done manually. So a huge manpower is needed for all these factors.

A. Body Temperature:

The normal temperature of animal is 38.6°C (101.5°F) [1]. Skin temperature will be about 18 to 36 °F (10 to 20 °C) below the core temperature, depending on the cow's hide. Another factor is climate of the day. A cow's body temperature is lower in the morning, due to the rest the body received and higher at night after a day of muscular activity.Veterinarians usually measure the temperature for detecting and diagnosis of diseases for many years. The

temperature has been normally measured in different positions of cattle like vagina, udder etc. The temperature of body should be maintained within the given limits to sustain its regular physiological processes. From the survey, it has been found and fixed that the temperature should be about 37.8-40.0°C.

B. Feeding Automation:

Poultry farmers in Indian are in lack of human resources for maintenance of the farm. So poultries are implemented with automatic feeding automatic feeding so it will reduce the labor, feed wastage for feeders associated with small/medium scale poultry [2].

Contract and small scale poultry farming are practicing by majority of our farmers [3]. The time demand and workers involvement for these ventured can be minimized for farmers. By invoking the concept of automatic feeding, it is easier to get rid of the problems. This idea greatly aimed at solving the problems of paying higher wages and reduces time constraints, feed wastage for feeders associated with the poultry.

C. Climate Control System:

An exhaust fan or heaters get switched on automatically according to the temperature sensor reading[4]. Depending on the temperature measured inside the farm house, the controller switch on an exhaust fan or heater. This makes comfortable condition to livestock in addition to energy conservation.

D. Location Tracking:

This system proposed the detecting the movement features to detect the behavior of calves [5]. This is done by counting movement features in each frame.

III. PREPOSED SYSTEM

In our country, we can see the increased technology advancement in agriculture especially in poultry industries. But still there are having a traditional pattern of farming in case of cattle farms. The aim of this system is to make practice of advancement farming in cattle farms too.

The features which are likely to implement in the project are followed:

A. Feeding Control:

In the era of busy world, traditional maintenance of cattle farm with a count of more than 10 cows is not an easy task especially feeding. It requires lots of man power and source. In some case there may be wastage of feed due to excess feeding of the cow feed and lack of feed also happens. On considering this case, we are introducing a modern technique for feeding the cow which limits the feed according to the need of the cow (specific quantity). This can be done with the use of motion sensor shown in fig.1. If motion occurs, it will be detected using the motion sensor and the grain dispenser will deliver the grains automatically in the respective buckets.

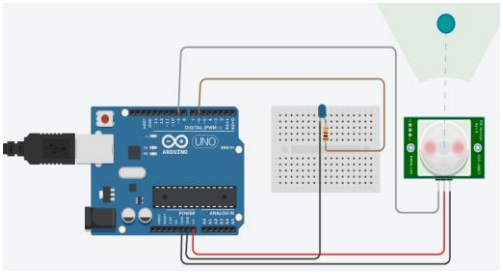

Fig. 1. Motion detection using motion sensor

B. Quantity Improvement:

The milk production depends mainly on the cattle's body temperature. The current temperature inside the shed will be observed from the temperature sensor and the sprinkler will turn on/off depends on the preset value (38.6°C).If the observed temperature exceeds the preset value, the sprinkler will turned on inside the shed until it reached the preset value. There will be a regular observation of the temperature which is displayed with the help of LCD screen shown in fig.2. The regular washing of cows is also a factor for a good production rate. With the use of above technique, the washing can also be performed.

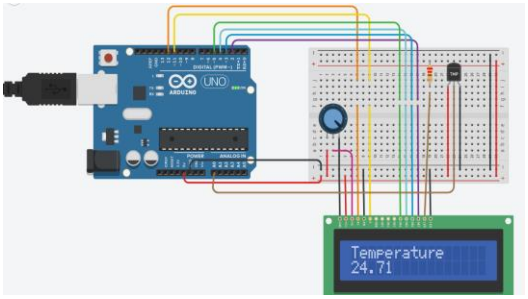

Fig. 3. Temperature Measurement using LM35

IV. SYSTEM DESIGN

Fig. 3 shows a general block diagram of Arduino UNO connected with various sensors such as motion sensor, temperature sensor and LCD display screen.

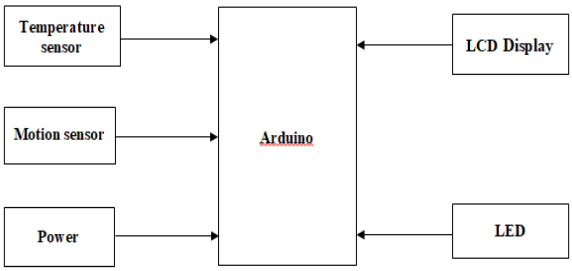

Fig. 3. General Block diagram

V. METHODOLOGY

A. Arduino Uno

Arduino Uno is a microcontroller. It is used to control the sensors and other related electrical equipments that are considered for automation of related factors. In proposed project Arduino Uno plays most important role in automation to poultry farm. It requires 5V power supply. It is used because it is in low cost, easy to use and programming language is simple.

B. Sensor modules :

- *Temperature Sensor:* Temperature Sensor is used inside the cow shed for the regular measuring of the temperature.
- *Motion Sensor:* Motion Sensor is fixed in the feeding tub for detecting the cow's movement.

C. LCD:

The 16 x 2 LCD display is used to display the current temperature.

D. LED:

LED is used as an alert light if temperature arises above the pre-set value.

VI. SIMULATION OUTPUT

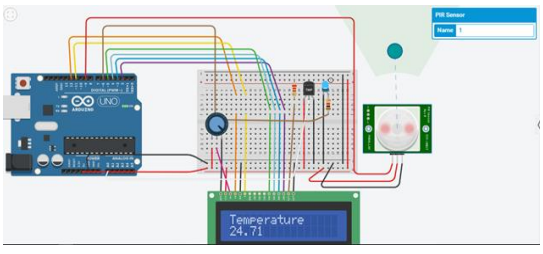

Fig. 4. Simulation Output

VII. CONCLUSION

This idea will provide a control for the cattle farm in the aspects like feeding, temperature maintenance and increased milk production which will help the owner of the cattle farm an ease of approach and it provides every individual an ease of work in handling the farm. It also helps to the efficient use of feed, monitor the health conditions of cows and maintain healthy environment inside the shed for the higher productivity. This farming technique using technology will render successful productivity and increase the quality of the products produced.

VIII. FUTURE WORK

We are working currently in providing an alert through motion sensor and controlling the shed temperature. The end of the valve which is fixed in the grain dispenser will get open for the particular cow where the motion occurs for a short period of time. In near future, if all the actions take inside the poultry shed will be notified to the in charge manager. It will notify if the body temperature of cow exceeds the pre-set value and it prevails even after cooling is done. It might be a health issue of the cow. It will notify the manager if the feed is below the threshold level through technology. It will notice the turning on/off of the heater or cooler inside the shed to prevent unprevailing actions.

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