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Smart Hybrid Climate Control Using Iot for Cow and Buffalo Shade

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Abstract:
In this paper, an attempt is made to research about climate control of cow/buffalo shade. As we know, to develop exquisite animal husbandry & dairying infrastructure in state for improving livestock production & productivity. To preserve and protect livestock through provisioning of adequate health care facility. To strengthen of central livestock farm for developing of superior germplasm for distribution to state. Improvement in dairy product. Disease diagnosis, treatment and their prevention in animals.

Keywords: Temperature Control, Improve Livestock, Improve Milk Production, Maintain Health, Reduce diseases**,** heat stress, hot climate orientation, Cooling efficiency, Micro sprinkles.

I.INTRODUCTION

A major portion of dairy farms contributes to betterment economies of developing countries including India. Production of dairy products is wholesome for food industry worldwide. India, one of the largest populated countries, has the highest milk production every year. Milk is considered to be the major source of income over several decades among all available dairy products. According to that, India's milk production has almost trebled in last 40 years, increasing from 21 million tons in 1968 to 108 million tons in 2008–2009, annually.

Dairy cattle's are homoeothermic and necessary to maintain continuous body temperature, respiration, humidity, heart beat and rumination. The regular temperature of cow is 38.5º-39.5º C. When the temperature is below 38.5º-39.5ºC the diseases arise are indigestion, milk infection etc. and when the temperature is above 41ºC the diseases arises are influenza and anthrax. When the temperature of the animal is very high on that time it may die. Humidity can reduce heat exchange and have enervating impact on the cattle. When the stress will be more on that time milk quality will reduce. So using this technique we can help dairy ranchers to improve milk profit, quality and it will reduce the infection stress on the dairy herd and provide great level of animal security.

In the last decades, an engineering process has deeply transformed livestock houses by introducing fine-tuned climate control systems to guarantee adequate indoor climate conditions needed to express the maximum genetic potential of animals and to increase their productivity. Climate control, hence, has

strong relation with productivity but also with other livestock production domains, outlining a web of mutual relations between them. The objective of this work is to understand the actual role of climate control in intensive livestock houses by unpicking this web of mutual relations through a literature review. Climate Control and Animal Welfare Animal welfare has always been associated with coping with the environment, as highlighted by the definition of animal welfare provided by Broom.

There are many factors and conditions that can contribute to cold stress events in livestock including:

- Wet environments.
- low temperatures.
- Wind.
- Altering behaviour.
- Reducing body condition.
- Increasing nutrient requirements.
- Contributing to lower feed and water intakes.

II.LITERATURE REVIEW

Now a day, many advanced technological techniques in real world operations are generated by scientists and engineers. Animal health is most important factor because they are used in farm, secur1ity purpose etc. no one cares or thinks about them. We cannot observe their issues easily. In current era, dairies contain large number of cow's. Therefore, to take of them, monitor them is more difficult. In animal health monitoring system, the major aspect is to monitor health of individual cow. So that we can easily observed and give treatment to sick cows. In our system we used various type of sensors like temperature, accelerometer and GPS. The statues of animal can be send to the animal health centre[1].The key point to increase the farm productivity is health of cattle. Many dairies contain large number of cattle's. Therefore, it is too difficult to take care of them and to monitor routinely the health of dairy cattle. So this work is very adamantine to the owner of dairy and regional authorities. The main aspect of health monitoring system is to check continuously the health of individual of cattle, easily diagnosis and treatment of sick cattle as early as possible. In that system we use sensor technology which maps the special aspects of animal behaviour like temperature, heart rate etc. this data is aggregating and reporting to the health care centre. This reduces the minimal health inspection and long term animal healthcare cost [2].A prototype of smart animal health monitoring system based on IoT for real time monitoring of the physiological parameters such as body temperature, heart rate and rumination with surrounding temperature and humidity has been developed. Various sensors mounted on the body of animals gives the information related to their health status and user can be easily access those data using the internet. We have used raspberry pi3 as core controller which has inbuilt Wi-Fi, it processes the data sensed by various sensor and displays on the monitor and forwards to the cloud. User can access the information from anywhere using internet and an android app. III. METHODOLOGY This project aims at developing a system which gives patient environment temperature, Humid[3].Heat stress is a significant challenge in dairy farming systems. Dairy cows under heat stress will encounter impaired welfare leading to production losses. As the frequency and magnitude of heat stress events increase in the coming decades, a focus on heat stress reduction studies becomes important. Modelling and on-farm experiments have been used to assess the effects of heat stress on livestock over the last few decades. Mitigation solutions including optimal shed structure, ventilation, feeding regimes, farm management and genetic selection have all been explored. However, under different farm conditions, the heat tolerance and coping ability of dairy cows can vary

significantly. Recommendations are then given for developing a framework to enhance the measurement, assessment and mitigation of heat stress. Robust monitoring systems, big data analyses and artificial intelligence algorithms are needed for the future development of dynamic, self-calibrating model-based systems, which could provide real-time assessment and minimisation of heat stress[4].Internet of things (IoT) and data-driven techniques are creating greater opportunities for smart dairy farming. Positive demand for milk is continuously increasing due to increasing population of the world. positive consumption of the dairy products is more in developed countries as compared to developing countries. To meet this increased demand for milk products, better technological techniques for improving milk yield are required. It is expected that the use of IoT and different AI techniques can assist a farmer to overcome different traditional farming challenges and increase the milk production. In this research, the authors address different challenges that a dairy farmer has to face in daily life. Brief introduction of smart dairy farming (SDF) is presented with respect to the innovation in production and the processes of smart dairy farming.
[5].

III. PROBLEM STATEMENT

- When the temperature goes greater than 35°degree Celsius. It's directly effect on the milk production it will be reduces by 10-20 % per cow.
- When the temperature goes less than 20 degree Celsius. It's directly effect on the milk production & also it reduce the growth of cow's calf.
- In evening after 6 o" clock huge number of Mosquito enter in shade. Due to Mosquito diseases occur like Lumpy, Dengue , Malaria etc. According to farmers approximately yearly one cow die due to Mosquito.

IV. METHODOLOGY

When the temperature goes greater than 35°degree Celsius, then fogger will on .and in other side When the temperature goes below 20°degree Celsius our heater will on. In evening after 6 o" clock huge number of Mosquito enter in shade. To control this situation, we use mosquito killer. when any fault occur framer will alert through GSM calling system.

V. BLOCK DIAGRAM

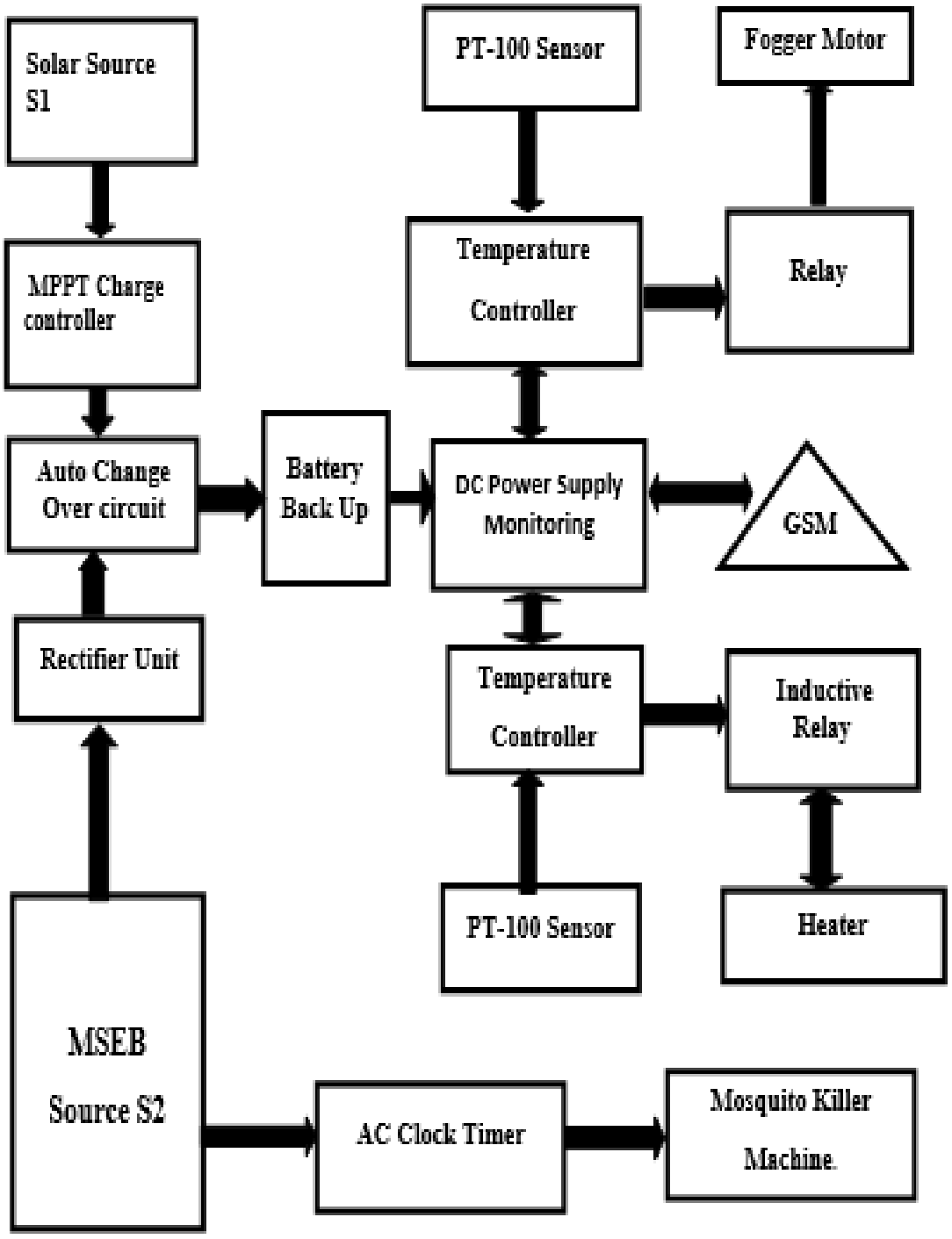

Fig. Block Diagram Of Cow / Buffalo Shade Smart Hybrid Climate Control System Using IOT

Flowchart

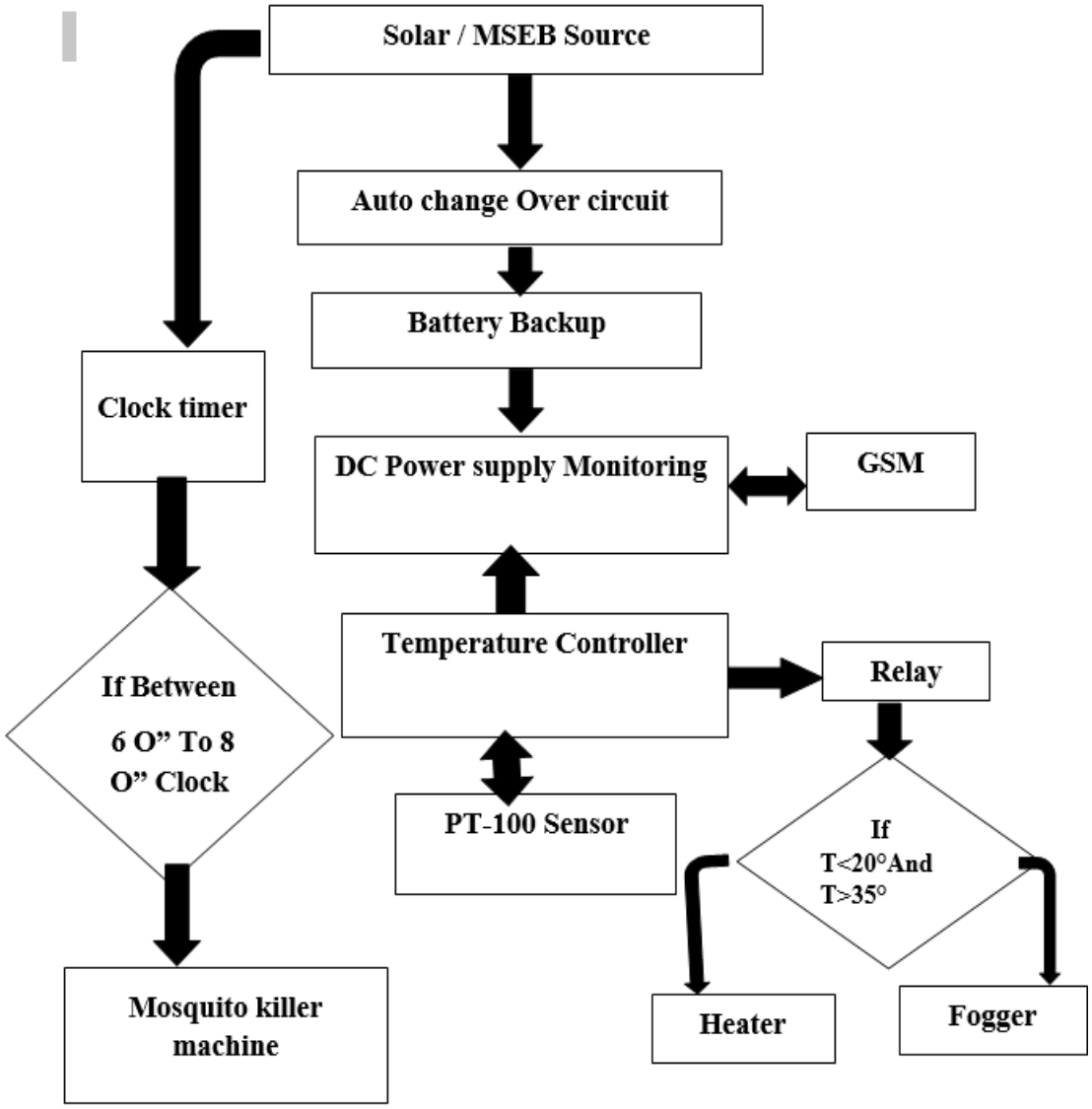

Fig. flowchart

➢ **Working**

- In this paper there are two types of sources, one source is a natural source that is a solar energy and second source come from MSEB (In AC form). Mainly project is run on solar source.
- Solar panel capture sunlight as a source of radiant energy ,which is converted into electric energy in the form of direct current electricity. MSEB Source used in emergency situations, like when rainfalls solar panel doesn't work. In this condition we use AC supply. Ac input supply passes through rectifier circuit. The rectifier circuit convert AC supply into DC supply After that source 1 and source 2 as input sources connected to auto change over. When supply is sufficient to charge the battery. Remaining continuously sources is cut by auto-change over circuit is safe battery life.
- Battery Backup: We use 12 V, and 4 AMP Hour battery for store the energy supply. This backup is used, when solar source is unavailable for long period. When battery get discharge we apply their MSEB supply to charge the battery get discharge we apply their MSEB supply to charge the battery in emergency situation .

- DC power supplying is receive input from Battery backup this device compare real time data with specified data. There is two part, first is fogger and second is heater.
- For fogger in this circuit when temp goes to above 35°degree sensor detect the increase in temperature and temperature controller give command to relay for trip the circuit when relay trip, then fogger will start automatically. In this system PT-100 type relay is placed to sense the temperature.
- In heater: In this circuit when temp goes to below 20 degree sensor detect the decrease temperature and then temperature controller give command to relay for trip the circuit .when relay trip, then heater will start automatically. In this system we use PT-100 type relay to sense the temperature.

➢ **MPPT:**

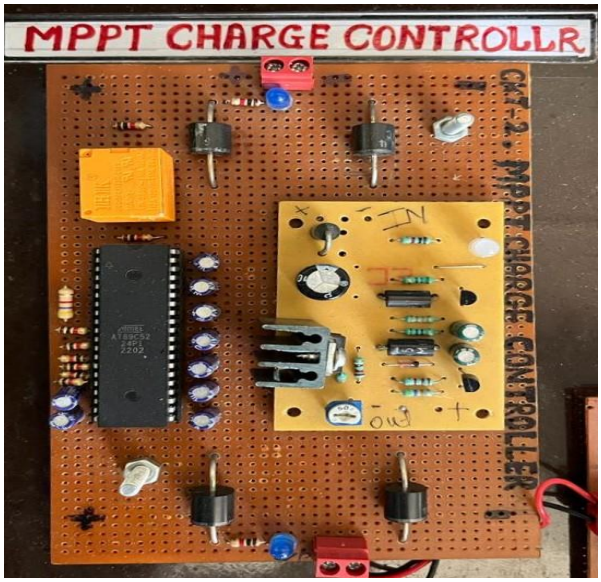

Fig. MPPT

Specifications:

- PID Based maximum power point tracking system.
- I/P voltage-6v to 48v
- O/P voltage-12V-24V

➢ **AUTO CHAGE OVER CIRCUIT:**

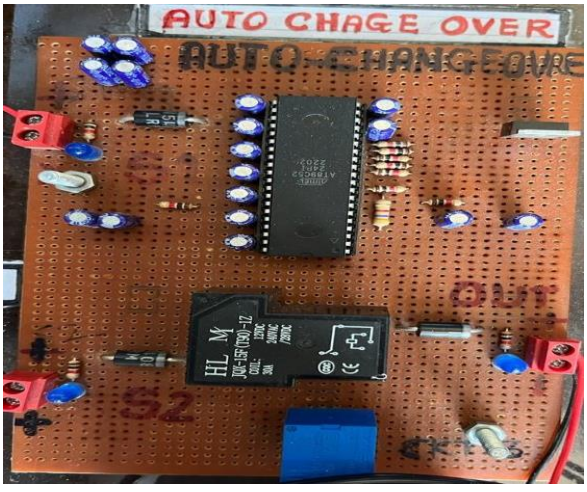

Fig..Autochange Over Circuit

Specification:

- voltage rating: 12V,
- current rating: 5A
- tap copper winding.

➢ **Temperature Controller:**

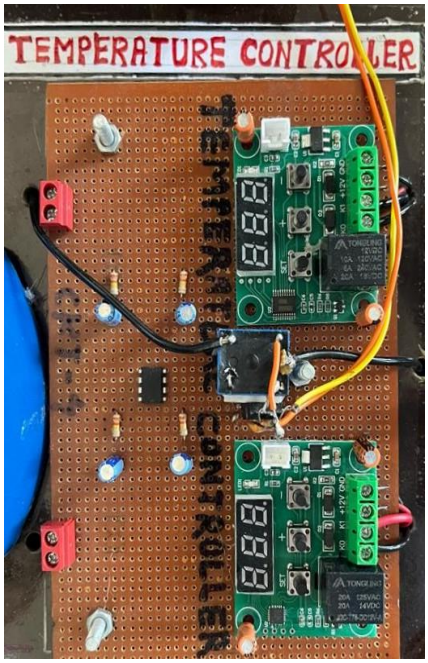

Fig . Temperature Controller

Specification:

Fully Automatic PID Controller Based 0-100°c Capacity Temperature Controller Unit.Devices that can handle sensor signals other than for temperature, such as humidity, pressure, and flow rate, are called Controllers. Electronic controllers are specifically called Digital Controllers.

➢ **GSM:**

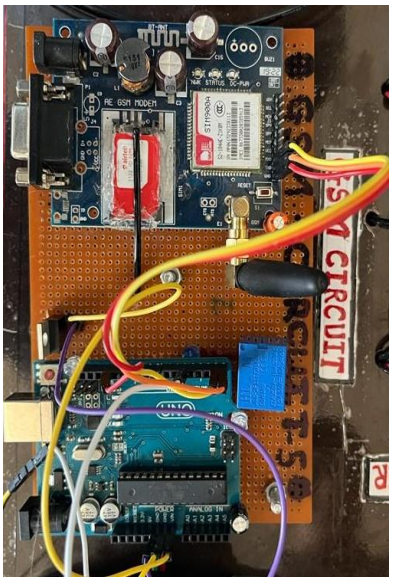

Fig.GSM

- GSM was developed using digital technology. It has an ability to carry 64 kbps to 120 Mbps of data rates.

  Listed below are the features of GSM that account for its popularity and wide acceptance.
- Improved spectrum efficiency.
- International roaming.
- Low-cost mobile sets and base stations (BSs).
- High-quality speech.
- Compatibility with Integrated Services Digital. Network (ISDN) and other telephone company services.

VII.RESULT

Sr.no	Parameter	Season	Heater	Fogger
1.	Temperature above 35° c	Summer	OFF	ON
	Temperature below 18° c	Winter	ON	OFF
		Rainy	ON	OFF

1.	GSM	Fault occur (short circuit, over loading)	Notification through Calling
2.	Mosquito Killer	All season	Only evening period

VIII.CONCLUSION

Dairy milk production is depend on the management of animal husbandry. After the implementation of this system climate will control and the good climate is help to improve immunity of animal's. The main advantage is improve milk production by 1-2 liter per day. This system work for good atmosphere of animal husbandry shade, it also improve the reproduction of cow's. In healthy atmosphere the growth of baby calf's is also improve & it also helps to maintain respiration rate of animal. Increase in revenue of dairy farms are the most exciting benefits of this technology.

ADVANTAGES

1. After the use of this project climate will control and the good climate is help to improve immunity of animal's.
2. the main advantage is improve milk production by 1-2 liter per day.
3. We Use this project for good atmosphere of shade it also improve the production of cow's.
4. In healthy atmosphere the growth of baby calf's is also improve.
5. Maintain respiration rate.

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