



Review On Automatic Feeding System For Animal

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Abstract

Conventionally the feeding of the cattle is manual which is time consuming. In this project, an automatic cattle feeding system is introduced where food feeder follows the path through a pre-determined distance and places the feed to the cattle by the side of the feed fence. The prototype is developed using screw conveyor mechanism for the operation of feed mechanism with certain time space. The motors are interfaced to operate in either direction. A belt conveyor is operated by a DC motor to feed the cattle at certain time space. This mechanism is basically controlled by motor

1.Introduction:

Animal feed distribution systems are a very common item and are used greatly both on a domestic scale as well as on a larger scale in commercial applications. Animal feed distribution systems come in many different forms with different ways to control how the feed actually gets distributed. Whether it is a manual system, an automatic system on a timer, or a sensor-based system; there are many different ways to accomplish the same end outcome, with some of the routes being more efficient than others. Many users are looking for a system that is not only capable of running on its own, but also one that is visually appealing. In today's college culture, many young adults are looking for a new experience, and one of these experiences is bringing a pet of some sort home. Whether it be a dog, cat, hamster, or any other sort of pet, these animals need to be properly cared for and nourished. Often times, a source of stress for these animals can be not getting fed the proper amounts of feed or not getting fed on time. This is a sad reality that leads to malnourishment and eventually abandonment of these animals. In addition, many times feed will come in an airtight bag that pet owners can forget to close up completely after feeding pets. This leads to things like growing mold spores and bacteria cultures in the feed itself.

All these reasons come together to pose the question of: “Is there a better way to do this?”, and the answer is yes.

In certain regions of rural area, cow feeding is done conventionally by hand and periodic time stamps by human interference. This process is really hectic and time consuming, the cattle need to be fed. It is a simple statement, but one that resonates with every cattle producer. To make this necessary task easier for farmers, the concept of automatic cattle feeding system came into existence. Automatic Cattle Feeding System is a robotic feeding system which consists of a battery-operated robotic vehicle that is capable of feeding an equal amount of feed. The feed is manually loaded in the feeder and it follows the feed fence through a pre-determined route until it reaches the feeding fence at a pre-determined distance where it places the feed through a moving bogie. Fully automatic feeding systems for pigs or poultry are already in use. The process of milking cattle using automated milking systems is also sufficiently mastered. An interesting trend is the installation of automated feeding systems for cattle feeding.

1.1 Objective

The objective of this project is to minimize the human efforts.

1. To feed the cattle with periodic time steps in a day.
2. To minimize the time of human.
3. To remove the conventional time-consuming process.

1.2 Problem Definition

The main problem farmers facing now is feeding the cattle with conventional and time-consuming method. This conventional method is really hectic task for the farmers

1.3 Scope of Project

Best Healthy Feed for Beef Cattle: 1. Grain Supplement. Grain can get cattle growing quickly and can help cattle get fat. 2. This can provide every important nutrient for cattle, but it has to be picked at the height of its nutrient richness — that is, before it becomes too dry. 3. Pasture and Forage. 4. Concentrates

How do farmers feed the cow? Commercial gains farmers feed to cows are often composed of corn, oats, barley or a mixture. While barley is the least expensive, oats are often the preferred grains because they are easily digested by cattle due to the high fiber content How many times a day should you feed a cow? The study also found that steers fed three times/day consumed more feed and had greater daily gains and heavier slaughter and carcass weights than steers fed once or twice daily. Feed-to-gain, dressing percentage and USDA quality and yield grades were not affected by feeding frequency.

2.Literature Review

Vikram Mali and et al., presented the feeding of the cattle is manual which is time consuming. In this project, an automatic cattle feeding system is introduced where food feeder follows the path through a pre-determined distance and places the feed to the cattle by the side of the feed fence. The prototype is developed using Arduino circuit for the operation of feed mechanism with certain time space. The motors are interfaced to operate in either direction. A rail bogie is operated by a DC motor to feed the cattle at certain time space. This mechanism is basically controlled by pulling mechanism by winding the rope around the motor operated shaft.

S. A. Hingonekar and et al., robotic feeding system which consists of battery-operated robotic system that is capable of feeding an equal amount of feed. The feed is manually loaded in the feeder After the feed is mixed in the mixer, it falls onto the conveyer belt and follows a predetermined path until it reaches the last cattle in the fence. To ensure the precise, timely and adequate feeding of each cattle, this project is applicable in an agricultural country where the lack of manpower is there in cattle farming. Due to less man power there is an adverse effect on dairy production. The main objective is to design an automatic cattle feeding system that it moves around the fence to distribute the feed uniformly. With the application of following robotic system , remarkable changes can be brought to this field. . The use of PIC microcontroller helped to control and switch off the whole system whenever there is any issue in the hardware. With the application of Automatic Cattle Feeding system uniformity and hygiene in feed distribution can be maintained.

M. Parthasarathy and et al., presented the difficulties due to labor shortage and to increase the white revolution. AFS is an automated feeding machine with proper technique of refilling the fodder at correct interval. The primary benefit of this machine is to do the work more efficient in order to suffice the manual source. The AFS relies on the programmable logical Control method. The basic work to be performed by the AFS machine is to grab the fodder from the stockyard to cutting machine through conveyer and then the feed which has to be given to the cattle is cut as per the required conditions, then the feed is directed to the feed distributor chamber through conveyer. This system also serves the cattle at proper interval of time.

Historical Technological Developments of Dairy Cattle Feeding Systems Naturally cows, like other herbivores, consume native vegetation. However, through domestication, the methods of feed access by cows have evolved tremendously (Vermeulen, 2015). The domestication process led to human-cow co-dependent relationship whereby cows provide draft power and/or animal products such as hide, meat and milk, and humans provided feed, water, and safety from predators (Hodgson, 1979). In the agrarian and industrial revolution periods, the demand for food due to increasing human population necessitated the improvement of dairy management systems to produce sufficient dairy products to feed the growing population (Capper et al., 2009). Growth in herd sizes, increased production per cow, and the shift from

subsistence farming to commercial dairy farming required more efficient cattle handling systems (Hodgson, 1979). This led to the development of feed supplements for dairy cows as well as the mechanization of dairy farms (Ma et al., 2012; Medeiros et al., 2022). In the United States, growing herd sizes and improved understanding of nutritional requirements led to the development of total mixed rations (TMRs), which are complete rations containing a blend of forages and concentrates that are formulated to provide all the required nutrients by cows. The use of TMRs for lactating cows dates to the 1950s. Prior to their use, cows were typically fed forages that were top dressed or supplemented with feed concentrates (Bickert and Light, 1982; Schingoethe, 2017). The development of TMRs significantly changed feed management systems by increasing the ability to control particle size distribution and moisture content. It also increased the need for feed mixer wagons to optimize TMR mixing. The first feed-mixer wagons were developed in the late 1960s. TMR feeding became the conventional way of feed management in the United States and many other countries (Schingoethe, 2017). As of 2014, 90% of large dairy (500 or more cows) farms feed TMRs (USDA, 2016). Today, most TMRs are delivered to cows using driven or pulled mixer-feeder wagons that facilitate dumping feeds along the cow feeding fence (Buckmaster et al., 2014). Total mixed rations must ideally be homogenous to ensure that nutrients are dispersed equally within a ration and are accessible to all cows along the feeding fence. Additionally, their proper particle distribution enables the cow to receive all the feed ingredients in a single mouthful of feed since cows can sort long particles out of feed (Leonardi and Armentano, 2003; Feng et al., 2013), which may lead prevent consumption of nutrients required for maximum health and productivity (Miller Cushon and DeVries, 2017). Total may also allow farmers to incorporate unpalatable but nutritious ingredients (Coppock, 1977). In other circumstances, partial mixed rations (PMRs) may be fed instead of TMRs. A PMR contains the majority of the diet fed within a complete mix, but an additional animal-specific proportion of concentrate is provided separately, that is designed to fit the performance potential of the high producing cows (Winnicki et al., 2010). Partial mixed rations are commonly used in dairy farming systems that have adopted the automated milking system (AMS) with free flow parlor visits, since the AMS have pellet dispensers that motivate milking visits (Bach and Cabrera, 2017; Menajovsky et al., 2018). To obtain homogeneity, rations are formulated using batch mixers which are designed to effectively mix the forages, concentrates, mineral salts, byproducts, and vitamins for dairy cows (Buckmaster, 2009). The development of feed batch mixers (or feed mixer wagons) improved efficiencies and uniformity in feed mixing and delivery. In a study comparing different mixing feeding wagons, the standard deviations (SD) for mixer feeder wagons using horizontal augers were shown to be 33.7% while mixers with vertical augers 61.3%, suggesting that use of mechanized systems were more efficient feeding options (Vegricht et al., 2007). Improved feeding equipment also enabled capturing of feeding data as farm operations were growing, and ways to manage large herds were needed (Jordan, 2001). The three main basic designs of feed mixers available in the market include auger mixers, reel mixers and tumble/drum mixers (Turner, 1990; Kammel, 1998). Auger mixer wagons have two or more vertical or horizontal augers that counter-rotate to optimize mixing of feed ingredients. Reel mixers have augers with knife edges that cut long forages, and reels that lift and tumble the feed to provide a mixing action. Tumble mixers also provide

lift and tumble action around the circumference of the drum as the spiral action moves the feed towards one direction for remixing or exiting into delivery equipment. In the event of large herds, farmers require larger mixer equipment or more mixing units. Features of feed mixer wagons vary depending upon brand, which may be designed to incorporate different forms, shapes, and sizes of feed ingredients to obtain a desired feed mix. Other factors that may determine the type or design of feed mixers include power requirements of the unit, cost of unit or parts of it, maintenance, and repair services as well as after sale services offered by distributors. Portable feed mixers are more flexible and best used with flat silos whereas stationery mixers are better with vertical silos and require a conveyor equipment (Buckmaster, 2009)

3.Construction & Working of Project

Parts used in the project

Motor: 12vdc,

Digital timer

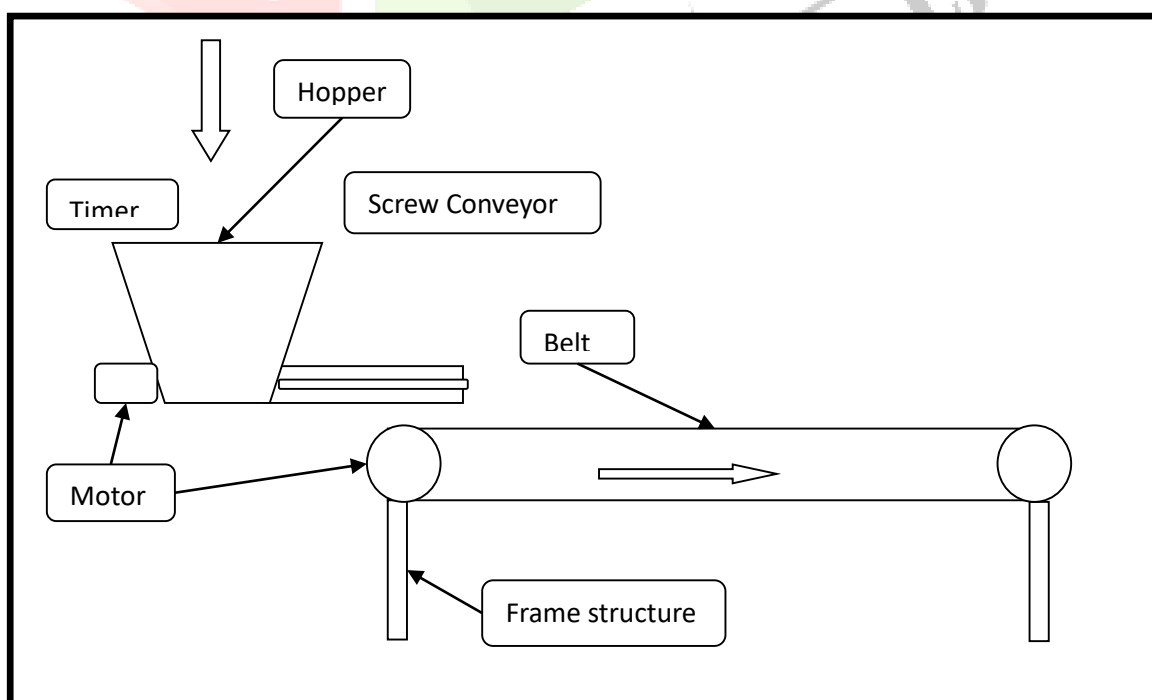
Power supply: 12vdc, 3amp

Square pipe: 1 inch

conveyor

Bearing

Diagram of the project



3.1 Working of the project:

In this project, an automatic cattle feeding system is introduced where food feeder follows the path through a pre-determined distance and places the feed to the cattle by the side of the feed fence. The prototype is developed using screw conveyor mechanism for the operation of feed mechanism with certain time space. The motors are interfaced to operate in either direction. A belt conveyor is operated by a DC motor to feed the cattle at certain time space. This mechanism is basically controlled by motor

Basic concept of project design:

Decision making comes in every stage of design. Consider two cars of different makes. They may both be reasonable cars and serve the same purpose but the designs are different. The designers consider different factors and come to certain conclusions leading to an optimum design. Market survey gives an indication of what people want. Existing norms play an important role. Once a critical decision is made, the rest of the design features follow. For example, once we decide the engine capacity, the shape and size, then the subsequent course of the design would follow. A bad decision leads to a bad design and a bad product.

Design may be for different products and with the present specialization and knowledge bank, we have a long list of design disciplines e.g. ship design, building design, process design, bridge design, clothing or fashion design and so

Types of project design:

1. Adaptive design

This is based on existing design, for example, standard products or systems adopted for a new application. Conveyor belts, control system of projects and mechanisms or haulage systems are some of the examples where existing design systems are adapted for a particular use.

2. Developmental designs

Here we start with an existing design but finally a modified design is obtained. A new model of a car is a typical example of a developmental design.

3. New design

This type of design is an entirely new one but based on existing scientific principles. No scientific invention is involved but requires creative thinking to solve a problem. Examples of this type of design may include designing a small vehicle for transportation of men and material on board a ship or in a desert. Some research activity may be necessary.

3.2 Product development process

A product development has to go through the following concepts of product engineering which are given as under.

Product functions

Product specifications

Conceptual design

Ergonomics and aesthetics

Standards

Detailed design

Prototype development

Testing

Simulation

Design for manufacture

Design for assembly

Drafting

Advantages

Advantages of the project as per following like as:

Feeding Automation: The automatic cattle feeder can be programmed to dispense feed at pre-determined intervals or times. This helps ensure that the cattle receive their feed regularly, even when human supervision is not available. It can be particularly useful in large-scale cattle farming operations where manual feeding may be time-consuming.

Automation can provide feeding based on production level, reduces feed cost, labor cost and wastage of feed. It increases feed efficiency and optimize productivity

Disadvantages of the project

Dis-advantages of the project as per following like as:

This type machine v to initial costing higher.

Application of the project

Our project should use for following various applications like as:

The machine is used for animal in large farms

Future scope

The future scope of an automatic cattle feeder using the microcontroller can involve several advancements and enhancements. Here are some potential areas of future development: 1. Integration with Automated Weighing Systems: Combining the automatic cattle feeder with automated weighing systems can enable real-time monitoring of weight gain. This integration can provide valuable data for growth analysis, feed conversion rates, and identifying any health issues at an early stage. 2. Mobile Application and Cloud Connectivity: Future automatic cattle feeders can be connected to mobile applications, allowing farmers to monitor and control the feeding process remotely. Cloud connectivity can enable centralized data storage, analysis, and access to historical feeding records for efficient management and decision-making. 3. Enhanced Robustness and Durability: Future developments can focus on improving the robustness and durability of automatic cattle feeders, ensuring they can withstand harsh environmental conditions and the physical demands of livestock operations. These are just a few potential areas of future development for automatic cattle feeders using the microcontroller. As technology continues to advance, there will likely be many more possibilities for improving efficiency, animal welfare, and overall management of cattle farming operations.

Conclusion

The use of automation in cattle feeding offers numerous benefits. It reduces labor-intensive manual feeding tasks, allowing farmers to allocate their time and resources to other important aspects of animal husbandry. Moreover, automating the feeding process enhances feeding consistency, which is crucial for the health and productivity of the cattle. By maintaining regular feeding schedules, the automatic cattle feeder helps promote optimal growth and development while reducing stress among the animals.

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