Microcontroller Based Efficient Automated Cattle Fodder System

P S Raghavendran, T Logeswaran, M Ambayeram , T Hemasree, S Keerthana, J Naveen

Abstract : An automatic fodder system Was developed that automatically feed the cattle food (sorghum) at a predetermined time without the need of labour . In a way, it is to control the cattle feeding activity by using a system that is generally combined with the mechanical system and electrical systems to form an automatic fodder system (AFS) instead of manually feeding. The cattle owners whom are away for a long time will have troubles about knowing the situation of the feeding cattle. Thus, this automatic cattle fodder device is very convenient, and easily monitorable. The device will consist of a gear motor, wiper motor, circular saw blade, conveyor and Microcontroller8051.The cutter is used to cut the sorghum into small pieces a to fed the cattle. This improves the animal digestion and prevents animal from rejecting any part of their food. A timer is used to control the number of cutting time at an interval of time. Plus, there is an IR sensor to sense the cattle feed. With this, the user or the owner can be away from home get benefited through useful data that are receivable through communication. Further future development may be done by including the load cell to measure the exact weight of the chaffs for the analysis purpose which is helpful for efficient cattle fodder system.

Keywords : Automatic fodder system, cattle food -sorghum, IR sensor, microcontroller

I. INTRODUCTION

In this modern era, many people in developing countries still uses the hand driven techniques for cutting cattle feed and distributing it manually [1]. These machines become less safe to the person while operating the cattle feed hand in hand and it also requires more skilled manpower for operating the machine. In this manual feed cutting process the farmer or the operator who operate the machine should hold the cattle food (sorghum) and slowly insert it into the machine for cutting process, the blade inside the machine cut the cattle feed into small pieces which gets spread randomly.

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After that the spread cattle feed should made to be distributed manually. The main barriers in this are the requirement of huge manpower and blockage of grass in it creates feed interference [3].lack of access to organize the market and meager profits distract farmers from investing into improve technologies [6].

In recent years, efforts have been made to trend towards the automation especially in cattle feeding systems. The proposed work focuses to automatically feed the cattle food (sorghum) at a predetermined time using micro controller [2]. In a way, it is to control the cattle feeding activity by using a cattle feeder that combined the mechanical system and electrical system to form a automated system[5] instead of manually feeding. Cattle owners whom are away for a long time will have trouble knowing the situation of the feeding cattle [7]. Thus, the automatic cattle fodder system is very convenient. The automated cattle fodder system will cut the cattle food (sorghum) into small pieces and distributing it automatically without the need of manpower. This improves the animal digestion and prevents animal from rejecting any part of their food and increase milk productivity [4]. A timer is used to control the number of cutting time at an interval of time. In addition, there is an IR sensor to sense the cattle feed [2].

II. LITERATURE REVIEW

Mihaela hnatiuc, mugurel caracostea, developed an automatic calf feeder system. In this automatic calf feeder system it uses a screw conveyor and a mixture which is not suitable for solid cattle food like sorghum and it is very expensive and not suitable for smaller farms.(8)

Andrea pezzuolo, luigi sartori developed an automatic feeding system in dairy farm, which is using self propelled mixing unit system with wagon distribution, this is also suitable only for liquid cattle food, which requires expensive investment.(9)

III. METHODOLOGY

The various components present in the proposed automated cattle fodder system are shown in the figure .The system consists of a battery power supply which acts as an energy source for supplying electricity to the system. Wiper Motor and gear motors which helps for operation of the conveyor ,blades and lever mechanism respectively.

The blades which cut the cattle food (sorghum) into small pieces, which then fall in upper conveyor that carry the chopped sorghum, from that it moves to the lower conveyor which is provided with a lever mechanism that push the sensed cattle food to the box which kept in front of the cattle by the help of sensing unit (IR sensor) and helps the entire system to be in the closed loop,

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Control unit which consist of 8051 micro controller, this is used to control the number of cutting time at an interval of time and integrate all these system together and make the entire system as the closed loop system.
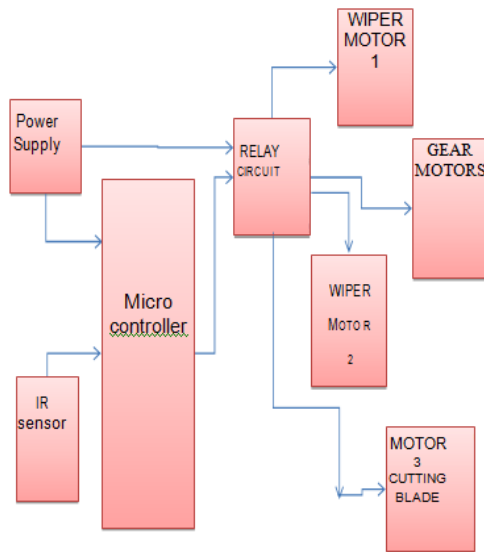
COMPONENTS REQUIRED:

HARDWARE:
- Conveyor
- Wiper motor
- Gear motor
- Battery
- IR sensor
- Relay circuit

SOFTWARE:
- Microcontroller coding
- C Language

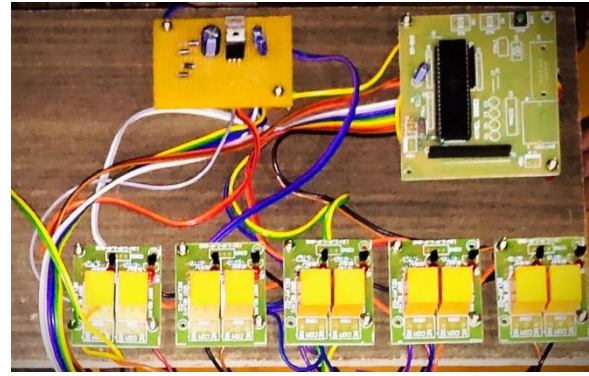**Block Diagram Of The Model:**

Fig 1: Block diagram of Automated Cattle Fodder System

IV. HARDWARE DESCRIPTION

Fig 2: Hardware model of fodder system.

The proposed mechanical setup is shown in the above figure. As mentioned earlier it consists of two conveyors and a blade setup to cut the cattle food and distribute it without the involvement of manpower


Fig 3: Electrical configuration of fodder system

The proposed electrical setup is shown in the above figure. It consists of filter circuit to give a pure dc supply and relay circuit for proper operation of motor and micro controller for controlling the system. The low voltage(LV) coils are used for driver circuit.

V. FLOW DIAGRAM OF PROCESS

This is the flow diagram of our proposed work micro controller program, and it gives a clear view of operation of our automated cattle fodder system (AFS).
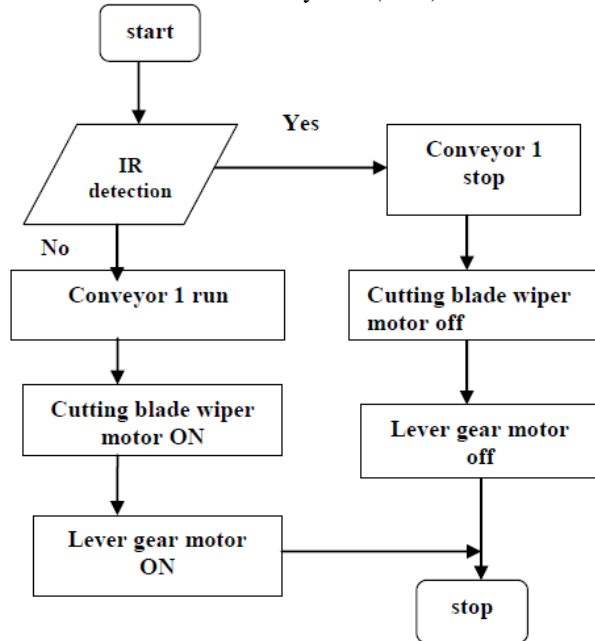
Fig 4: Flow chart describing operation of system

This is the flow diagram of our proposed work micro controller program, and it gives a clear view of operation of our automated cattle fodder system

In this automated cattle fodder system an Infrared (IR) sensor starts to sense whether the amount of feed present in the feed box before the cattle gets filled or not. If the amount of feed present in the feed box reaches the fixed level then the conveyor 1 stops its operation, then operation done by the following cutting blade and lever system gets stopped. otherwise the following conveyor 1, cutting blade, lever system continues its operation until the feed reaches a desired amount in the feed box of the cattle..if all the sensors are sensed at same time the entire process of the system will be stopped

VI. CONCLISION

(Results Based on Testing)

Parameters	Traditional Method	Proposed Project
Man Power Requirement	100%	50%
Time of operation	20 min (Approx)	10 min (Approx)
Cattle Productivity	60%	85-90%
Wastages of chaffs	20%	5%
Safety Operation	Less safety	Comparatively high

The developed model investigated the design of a hand driven existing feed cutters for the developing world with older system and presented a novel solution to the problem. The design incorporates the following innovations:

This system is developed in order to feed more than a calf in the same time and reduces the assistant activity.

It is provided with automatic cutting unit driven by the high torque wiper motor. This system is provided with automatic distribution unit for distributing the chaff with the help of conveyors. If all the sensors detects at the same time the entire process of the system will be stopped

REFERENCES

1. International Journal of Advance Engineering and Research Development (IJAERD) Volume 2,Issue 7, July -2015, e-ISSN: 2348 - 4470 , print-ISSN:2348-6406 . Navaneeth B S and A K Murty developed an Automatic poultry feededr
2. Turnell, D.J. de Fatima, Q.V. ;Turnell, M. ; Deep, G.S. ; Freire, R.C.S. ―FarmWeb- an integrated, modular farm automation system‖, Systems, Man, and Cybernetics, 1998. 1998IEEE International Conference Publication Year: 1998, Pg.: 1184- 1189 vol.2
3. John Weaver ; Sue Weaver; ―Livestock Feeder‖,Hobbyfarms, Web H. Goto, Y. Hasegawa, and M. Tanaka, ―Efficient Scheduling Focusing on the Duality of MPL Representation,‖ Proc. IEEE Symp. Computational Intelligence in Scheduling (SCIS'07), pp. 57-64, Apr. 2007,doi:10.1109/SCIS.2007.367670. (Conference proceedings).
4. Dearing, J., J. E. Hillerton, J. J Poelarends, F. Neijenhuis, O. C. Sampimon and C. Fossing,2004. ―Effects of automatic milking on body condition score and fertility of dairy cows‖, In: Automatic milking; A better understanding. Wageningen Academic Publishers, Wageningen, the Netherlands.
5. Yeoh, F.S Taip, J. Endan, R.A. Talib and M.K Siti Mazlina. "Development of automatic Feeding Machine for Aquaculture Industry". Department of Process and Food Engineering, Faculty of Engineering, UniversitiPurta Malaysia, 2009.
6. Government Of India, Ministry Of Agriculture, Department Of Animal Husbandry Dairying and Fisheries, Annual Report, 2011-2012, http://en.Wikipedia.org/Wiki/Animal husbundary in India.
7. PezzuoloA.,MagrinL.,CozziG., MarilelloF.,Sartori L. Precision and efficiency of a mechanized delivery system of solid feeds for veal calves. Paper presented at the " 7th European conference on precision livestock farming" ,september 15-18, 2015 Milano,Italy, pp.465-472.
8. International journal of modeling and optimization, vol. 7, No. 4, August 2017. Mihaela Hnatiuc and mugurel caracostea developed an Automatic calf feeder system.
9. Andrea pezzuolo, Alessandro chiumenti, Luigi Sartori, Francesco Da Borso. Automatic Feeding System: Evaluation of energy consumption and labour requirement in north-east Italy diary farm. University of padova , Italy, University of Udine, Italy andrea.pezzuolo@unipd.it

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