



## Local Telecommunication Policy en route a Wireless Feeder

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### Abstract

Inclinations towards the environmental friendly, conventional mechanisms of rearing and feeding the livestock in the want to nail off the ill-effects of the traditional manual feeding have generated the requirement for precision farming. Precision farming is a new emergence in which the efficient management of feed, time and excess feed are on the road to an effective production as whole in terms of the entire elements concerned. On par with that, effective livestock farming is in a strict enough observation and control, which is ordinarily taken into account by electronic systems of wireless version. More often than not, same idea is useable across to variegate farming quite so as to level up the stocking effect than would with traditional methods. Most likeable, novel, wireless food dispenser is in the conception of this research, in that the control communication occurs over air. This system entails of conveying out the wirelessly contacted quantity of food plus often the fosterer can wirelessly request the present remaining amount of food bowl. The thought experiment accommodates the farmer via wireless infrastructure in order that to manage the conveyors in a largely efficacious platform by means of which it results into better output. The testing can elevate the positive pragmatic utilisation of the system upon the verisimilitude. On the whole, such design ventures into as being from the elemental existence on the solenoidal actions in lends of the satisfaction. The Mental satisfaction acclimates in the middle of the right handling of conveyors centred on the entities of the peas.

**Keywords:** Feeder, Distant Air Control, Optimal Agriculture

### Background

The earth is on the episode of an enormous feud sphere in connection with the concrete needfulness for the food and other agriculture based substances derived from the population explosion. Better yet, the conventional adage-like procedures of agrarian context which produces a comparatively lower makes while the replacement is in place by the substitutions of new dexterities so well as to woo the exponentiation of the demand. In view of the

boorish consequences of animal agriculture, quite recent time wanted mean significance passion over a collected amount of feed centred one co-friendly animal production plus good rearing that manipulates the utilisation of the conventional earthly manure and the same conventional elements of insecticides and further the components of pesticides. All said the points in exactitude; these largely in a way to hinder the mass of makings. The concentrated convergence is to



fabricate likeable livestock agricultural effects unto elicit sphere-friendly pattern as whilst efficacy of noticeable output survives to the desirability. It is not esoteric Levelled Agriculture exists a modus operandi in that the enhanced idea is to put out the optimal quantity of resources at the right place around the right time [1, 2]. In other words, the application of not only the water, fertilizer, pesticides and insecticides but also the labour in right amount, at the right place and at the right time would yield a better production. The animal agriculture is a positive mechanism in order to go into conformity of this need for environmental condition's sake and further better rateo flive stock production. Albeit with all, this is in a strong need for careful planning and solely monitoring and control. Up on to provide this care, quite a few of the elements are depending heavily on the electronic sensing and control in the agricultural fields. Therefore, wired and wireless sensor networks and control networks are very common in today's agricultural fields.

All the same, animal farming is a sub-discipline in agriculture which is producing both meat and milk. As a division which attracts relatively large profits, most of the farmers have gathered around agriculture farming. In this instance, employing the magnitude concrete agriculture with automatic monitoring and control can provide appealing results and the tight monitoring and control demands the heavy use of physical electronics.

Sri Lanka has been of a land with an agro-contextualisation beamed economical elements for good number of years and it is substantial with traditional mechanisms and resources to lean towards proper viable agriculture. Animal farm in times has often been a non-profitable backyard industry for

a long time. In a good recent time, the open economy has boosted the need for it to rise as a branch of commercial agriculture within Sri Lanka. All said, neither the use of electronics nor the optimal agriculture is visible in Sri Lankan animal farming.

If installed, the optimal agriculture concept together with electronic monitoring and control would increase the animal based produce while being eco-environmental. In this research, we focus on developing an animal feeding system in which the key idea is the optimal concept with the use of electronic control. Moreover, this system provides a remote control feature which is vital in its application. The currently available automatic livestock feeder systems are discussed and later the proposed remote animal feed system is introduced. In texts below, test results on a model are explicit and eventually in an early plug that concludes the paper with highlighting possible futuristic further ments.

### **Problem Statement**

Busy feeding farmers are at a difficulty in timely delivery of foods to their livestock, then wastage of feed and obesity of animals is of likelihood. The subsequence is answerable by means of this design, in the context of telecommunication policy.

### **Objective**

The design of this research would enable the farmers feed their animals at the right time and the amount wherever the former physically present, lowering the food wastage and obesity of the latter en route the telecommunication policy satisfaction of the farmers.



## Methodology

So as to get over the difficulties under specification in the aforementioned, the said wirelessly exerted animal feeder encompasses through a good number of sub stages as to inclusion of afar distant mechanism via an earthly global system for

mobile communication (GSM) communication network. The next cardinal cascaded segments entail feeding channel cylinder structure along the line that the food is conveyed out, a weight measuring unit in the element to measure the obtainable food quantity in the feed tray and to a degree notably a control entity which pedals the overall operation.

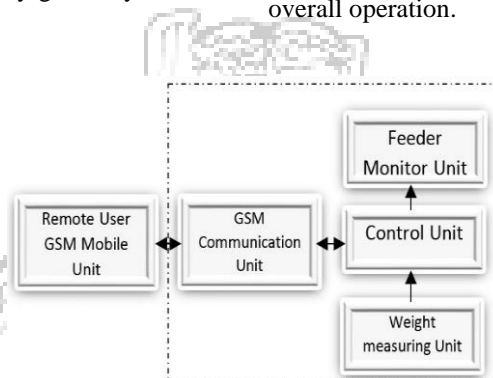


Figure 1- The Whole Feeder Unit

Furthermore, a questionnaire set was circulated among the farmers for animals in the Monnankulama Division over their mental happiness and satisfaction about the practicum of the being-said-unit.

## Wireless Communication

GSM communication unit is consisting of a GSM modem and is capable of sending and receiving short message service (SMS) messages are found to be communicative must take care on the values in the typing. Both in and out messages are decoded in order that the control unit to easily handle them. We refer to the messages transferred from the remote user mobile to the control circuit as inward messages and the messages transferred from the circuit to the mobile as outward messages. The available

message set ought to be in the farmer's table. Furthermore, in this work we make out a presumption over a perfect SMS communication architecture such that there are insignificant errors embedded to the Short Message Service text during the communication.

It is very appreciable to observe that in the proposed algorithm, there are two paths to choose from, whether the farmer wants to issue the food immediately or later. If it is to be put forth later after the given number of minutes, the request is placed waiting and a timer starts. Once the timer expires, the given amount of food is dispensed.

Furthermore, the proposed system has a facility for the feeder to air an SMS to the feeder and request the presently existing food mass in the feed plate which will



enable him to issue only the remaining amount required. This control unit is implemented with a microcontroller circuit chip and the control algorithm is agile in its actions.

### Feeder Mechanical System

One of the main sections of the animal feeder is the feed cylinder inside which a set of helically Grooved metal plates are hammered to the shaft. These metal plates are welded to a centre shaft and this shaft is attached to a voltage DC motor. As The feeder cylinder channel encompasses of an entry point at the left side corner which is connected to a food reservoir. This reservoir is capable of holding animal feed for a number of feedings and can be reloaded as and when the handler is present. Everything is told well, at the right hand side corner there is an exit point in order that a clockwise rotation of the motor moves down the food entering from the left to the right and – at last - exits from this right exit point. The metal tube arrangement fixed to the exit point of the feeder cylinder guides the exiting food to the feed tray. With the external cylinder

and the internal shaft diameters being  $D$  and  $d$  respectively, the weight of food dispensed with a  $l$  distance of food movement is of quite a mathematical equation.

### Control Application Unit

Control unit is onerous for the overall control of the food releasing and get-back functions. Such electronic control gives ease of life to the farmers. It has been of verisimilitude to the animal feeders to positive degree as ought to be across the regions. The numerous wireless technologies are widely available across the planet in the geographical territory of the globe. Nonetheless the GSM of bombastic commensurate technology contends the world. Thus, and thus, the control exerts a better performance in terms of delivering the right amount, at the right time en route for the better livestock productivity whereby enabling an efficient overall farming system. This is useable regardless of the geographical locations wherever and whenever you place the system.

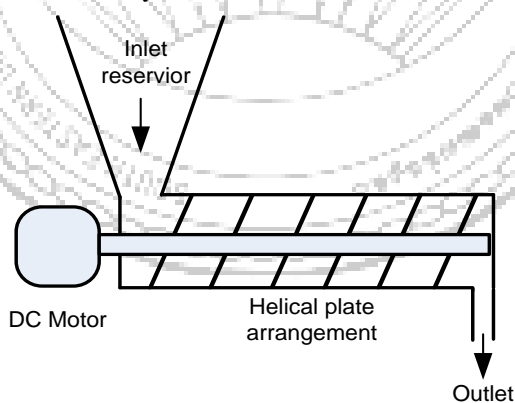


Figure 2- Feeder cylinder



Here  $C$  is a constant accounting for the volume occupied by the helical metal plates and  $\rho$  is as the density of food.

Furthermore, motor revolutions ( $n$ )  $\propto l$  which results in  $n \propto m_l$  while the proportionality constant being  $K = \left(\frac{\pi}{4}(D^2 - d^2) - C\right)\rho\Delta$  where  $\Delta$  being the pitch of the screw. However, in the practical deployment the proportionality constant is to be estimated by evidential tests. Moreover, the number of revolutions is counted using an electronic encoder fixed to the shaft.

### Feed Weighing and Reaction

A querying facility is very agile in the proposed system. In order to accommodate this facility, the proposed animal feeder system consists of a weight measuring mechanism to find the current weight of the food tray. The primary idea behind this measuring unit is the use of a load cell. This load cell circuit arrangement assumes low enough the effect of temperature variations on the weight measurement [9, 10].

The resistors marked Tension of one and Tension of two pulls in strain gauges that are placed in tension when the load is influenced to the load cell as while the resistors are felt with compression one and compression two holding strain gauges which are positioned in compression force when the load is applied. The input plus and input minus leads are referred to as the plus Excitation and minus Excitation leads through which the electrical power is applied to the load cell.

Upon the application of weight, it is applied to the load cell; gauges compression one and compression two that are of compression. The gauge line becomes shortened and its diameter increased. This lowers the impedances of compression one and compression two. All the same, gauges tension one and tension two is elongated. This lengthens making extension and decreases the diameter of tension one and tension two, whereby increasing their resistance values. These changes in resistances cause more current to flow through compression one and compression two and less current through tension one and tension two. Now a potential difference is felt between the outputs or signal leads of the load cell. The signal obtained from the load cell is then boosted with an instrumentation amplifier to boost the voltage signal to a comparable range before feeding it to the as a form of the one to digital converter inbuilt in to the microcontroller.

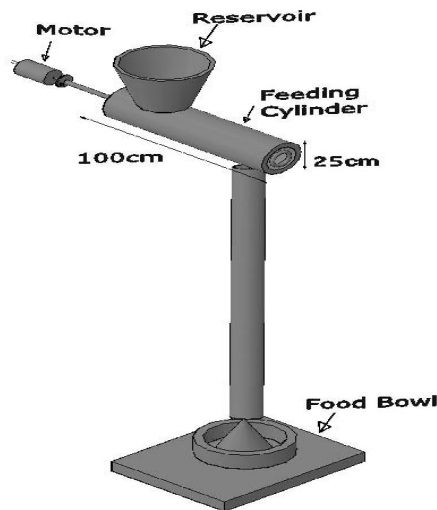
### Policy Practicum and Excitation to Animal Feeder

The proposed animal feeder system contains of a voltage direct current motor at the feeder and the voltage is to be excited to the load cell. That being said, the control circuitry operates on a 5V regulated direct current supply. Hence, an in-built step down transformer and a switch mode power supply unit are employed to convert 230V commercial Sri Lankan alternating power to 12V and 5V dc power. As the 230V AC power is supplied to the feeder system and with that as the motor can be dangerous to the living animals, as a safety measure the system is fixed near the roof of the livestock shed. At the same time the animals may step on to the food tray and the weight measuring



balance arrangement. As done in conventional animal farming, in order to avoid the spilling of food, the feeder tray

arrangement is fixed to the floor. Overall assembly and the installation can be shown as in Figure 3.



**Figure 3- Practical implementation**

### Literature Survey

The use of automatic feeding systems is very common in any livestock farming [3, 4, and 5]. All above, electronic control is implemented to increase the efficiency in these automatic feeders [6]. The electronically controlled, automatic feeder systems such as the deluxe automatic feeder [7] and the automatic feeder for dogs and cats [8] in the area of pet care can too be adopted with modifications for poultry feeding. That being said, rabbit feeder, general feeders, food controllers in farm context plus et al were surveyed in terms of Literature en route to be utilised for my new emergence and the conception in account of this wireless feeder design as

to be one of the best elemental push-over. Howbeit, even with all these systems, the farmer is required to be considerably involved in the operation and his presence in close vicinity of the feeder is required.

### Result and Discussion

For the verification of the functionality of our proposed animal feeder system, in this section we present the results of the tests conducted on a viable system. A numerable voltage direct current motor and a helical arrangement with the pitch of desirable are selected. Quite equally, a feed cylinder of external diameter and internal diameter are gauged. Remote control is established with a model of



GSM modem [11] and an appropriate microcontroller is devised for the implementability. Moreover, in this test setup we use medium size feed matter which one would find as a common animal feed material in Sri Lankan rural context especially Monnankulama and it is found out that the proportionality constant is some applicable substitutive significant figure through pragmatic experiments, rather than using a theoretical calculation, in the policy context.

First of all, we do observe the linearity between the weights and the corresponding output voltages at the weight measuring unit's load cell arrangement. Results are as shown in a apparent lucid manner. Linear behaviour is present, which is a requirement of the weight measuring unit. Second, the accuracy of delivery of food is tested and the results shown in Table 1 clearly releases ideas on an average accuracy of only *a number of grams* for the tested value set. Above all, the SMSed value and food weight really dispensed are shown around which again demonstrates a very small difference; out of policy.

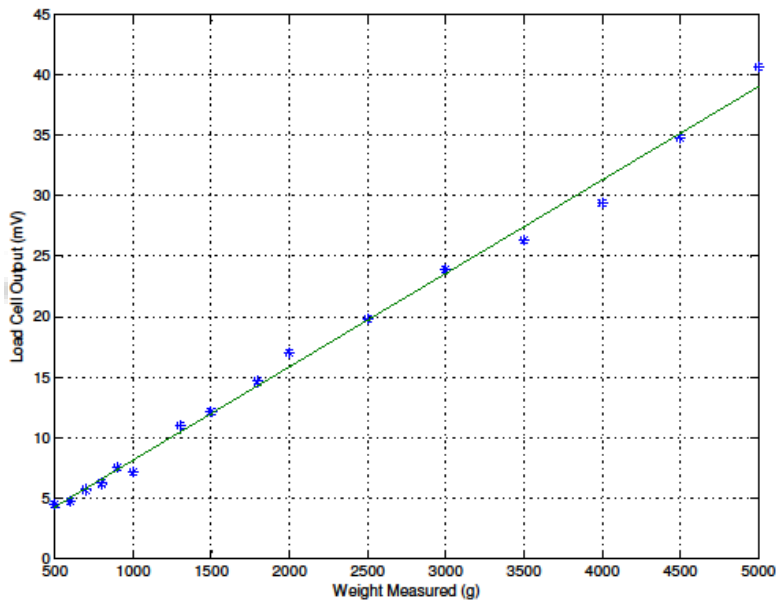


Figure 4. Accuracy Performance



**Table 1: Texted Values with the Real Weight out**

SMSed (grams)	value	Real weight dispensed (grams)	SMSed (grams)	value	Real weight dispensed (grams)
500		470	2000		1880
600		560	2500		2350
700		660	3000		2830
800		750	3500		3300
900		840	4000		3770
1000		940	4500		4240
1300		1220	5000		4710
1500		1410	2000		1880
1800		1690	2500		2350

### Conclusion

The conceptualised wirelessly controlled animal feeder places distant control through air about utilising the feeding unit to the best degree. This is found of well significance in terms of its use a very handy system in today's commercial poultry farming where farmer's presence at the farm is not always possible. The results on a model in the like manner apparently say out an excellence in terms of accuracy of delivering food. The system carries some aesthetic sense too from the perceptivity out from the farmers.

The users of this design are of no any telecommunication antipathy to the bad portion, rather conforms into the product specification in an amalgamated way, out of context. This policy system can yet more be subjected to enhancement towards the animal feeding with foods of appropriate size and , more into feeding the eaters whence the animal owners are given the liberty to leave their animals moving away while they travel along.

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