# Design and Fabrication of Automatic Cattle Feeding Machine

M. Parthasarathy[1], K. Mohanprasanth[2], P. Ganesh pandi[3], M. Kishorprasanth[4]
[1] Assistant Professor, P.A. College of Engineering and Technology, Pollachi-642-002, Tamilnadu, India
[2, 3, 4] Students, P.A. College of Engineering and Technology, Pollachi-642-002, Tamilnadu, India

***Abstract*: The AFS is a new practical and completely modern *concept* to overcome 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.**

***Key words Automatic feeding machine, fodder, program, and conveyor.***

## I.INTRODUCTION

The history of agriculture records the domestication of plants and animals and the development and dissemination of techniques for raising them productively. Agriculture began independently in different parts of the globe, and included a diverse range of taxa. At least eleven separate regions of the Old and New World were involved as independent center's Agriculture is one of the very old human occupation, but it is not a stranger to automation. The world population is increasing exponentially and with it comes the need to produce more food. In foreign countries they were developed many more automation to make high production in agriculture. In India on 1960s the Green revolution was introduced by government to increase the food crops. And then continuously in the period of 1970s the White revolution was introduced to increase the milk production and then to fulfil the needs of people. In cattle farming there we should employ more workers to make a chain cycle of process. In modern days there was huge population increase and then less level of cattle farming and low confident in the involving of agriculture farming may cause reduction in milk production. In our project make a study about that the feeding the major problem faced by most of big farms. So we have to overcome that difficulties by adopting the automation technique in cattle farming feeding. There are different systems of feeding cattle in animal husbandry. For pastured animals, grass is usually the forage that composes the majority of their diet. Cattle reared in feedlots are fed hay supplemented with grain, soy and other ingredients to increase the energy density of the feed.

## II. OBJECTIVE

The main objective of the project is to increase the growth rate of the cattle's and then to modernize the farm and reduce human involvement.

## III. PROBLEM IDENTIFICATION

Agriculture is world-wide occupation where many people did farming to make food and by products to satisfying the general need of people. In India the farming type and cultivating methods are differ from western countries. And then our soil is best suited for farming and to grow cattle. In our project we identify that the feeding to cattle by manually contains more difficulties and labor force needed. And then there was a compulsory need of a labor to feed the cattle at regular interval of time. And then, more amount of energy is wasted by transferring the fodder from the field to gosala. And then fodder is prepared to required size.

## IV. PROBLEM RECTIFICATION

Agriculture is world-wide occupation where many people did farming to make food and by products to satisfying the general need of people. In India the farming type and cultivating methods are differ from western countries. And then our soil is best suited for farming and to grow cattle. In our project we identify that the feeding to cattle by manually contains more difficulties and labor force needed. And then there was a compulsory need of a labor to feed the cattle at regular interval of time. And then, more amount of energy is wasted by transferring the fodder from the field to gosala. And then fodder is prepared to required size.

## V.METHODOLOGY

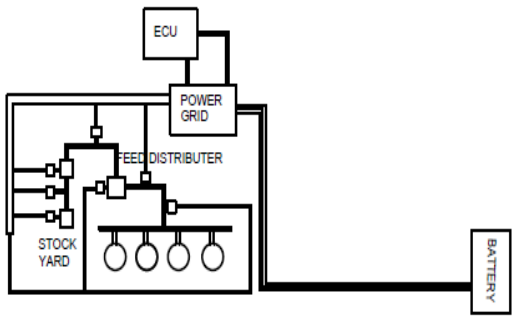
## VI. SELECTION OF MATERIAL

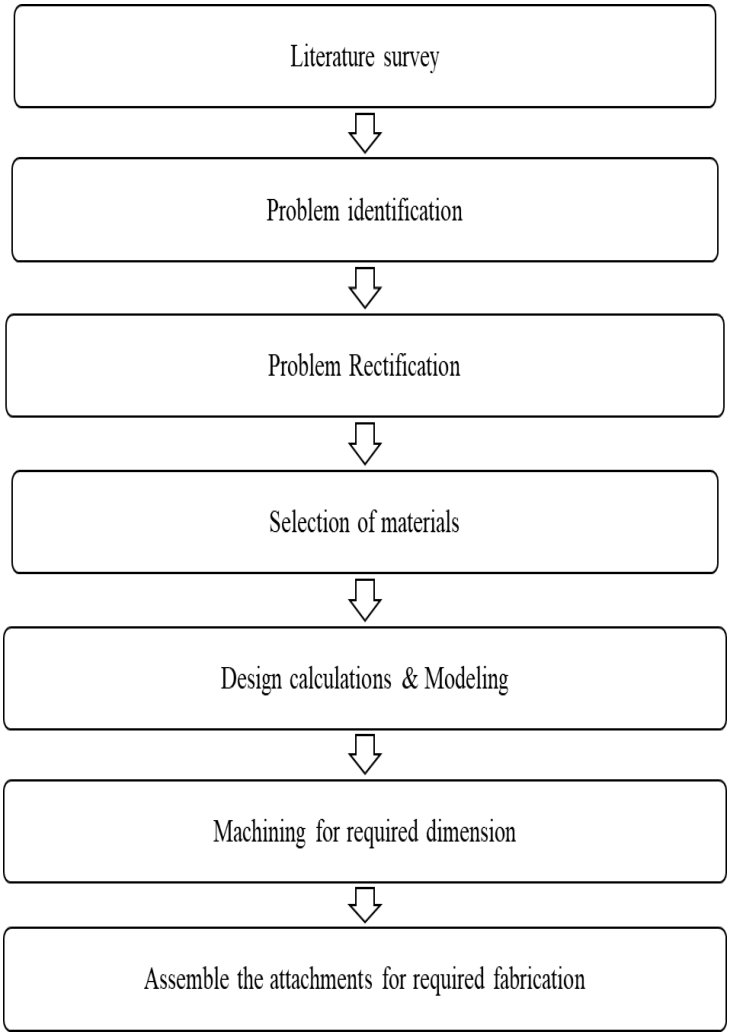
The number of materials used in this system. They are

- steel frame,
- fodder containers,
- belt conveyors,
- screw conveyor,
- D.C motors,
- servo motors,
- PCB board, STM 32 circuit chip,
- fasteners,
- IR Sensor.

## VII.DESIGN OF THE COMPONENT

The design shows the systemic view of our process, whether how it to be described. And then there was a detailed description of the operation which was performed in the system.




## VIII. AFS PROGRAMING

```
void loop() {

  int ir1=digitalRead(PA0);
  int ir2=digitalRead(PA1);
  int ir3=digitalRead(PA2);
  int ir4=digitalRead(PA3);

  if(ir1==LOW)
  {
    servo1.write(0);
    digitalWrite(PB12,LOW);
    digitalWrite(PB13,LOW);
    digitalWrite(PB14,LOW);
    digitalWrite(PB15,LOW);
    digitalWrite(PB6,LOW);
    digitalWrite(PB7,LOW);
  }
  else
  {
     servo1.write(180);
    digitalWrite(PB12,HIGH);
    digitalWrite(PB13,LOW);
    digitalWrite(PB14,HIGH);
    digitalWrite(PB15,LOW);
    digitalWrite(PB6,HIGH);
    digitalWrite(PB7,LOW);

  }

   if(ir2==LOW)
  {
    servo2.write(0);
    digitalWrite(PB8,LOW);
    digitalWrite(PB9,LOW);
```

```
int ir1=digitalRead(PA0);
int ir2=digitalRead(PA1);
int ir3=digitalRead(PA2);
int ir4=digitalRead(PA3);

if(ir1==LOW)
{
  servo1.write(0);
  digitalWrite(PB12,LOW);
  digitalWrite(PB13,LOW);
  digitalWrite(PB14,LOW);
  digitalWrite(PB15,LOW);
  digitalWrite(PB6,LOW);
  digitalWrite(PB7,LOW);
}

{
   servo1.write(180);
  digitalWrite(PB12,HIGH);
  digitalWrite(PB13,LOW);
  digitalWrite(PB14,HIGH);
  digitalWrite(PB15,LOW);
  digitalWrite(PB6,HIGH);
  digitalWrite(PB7,LOW);

}

 if(ir2==LOW)
{
  servo2.write(0);
  digitalWrite(PB8,LOW);
  digitalWrite(PB9,LOW);
}

 if(ir3==LOW)
{
  servo3.write(0);
  digitalWrite(PB8,LOW);
  digitalWrite(PB9,LOW);


}
else
{
   servo3.write(180);
   digitalWrite(PB8,HIGH);
   digitalWrite(PB9,LOW);

}

   if(ir4==LOW)
{
  servo4.write(0);
  digitalWrite(PB8,LOW);
  digitalWrite(PB9,LOW);

}
else
{
   servo4.write(180);
   digitalWrite(PB8,HIGH);
   digitalWrite(PB9,LOW);

}

}
```

## XI. FABRICATION PROCESS

The fabrication process involves cutting, grinding, drilling, assembling, wiring and then riveting process. The most important fabricated process is we have to merge the software components with hardware components at the correct way and then regulate the signals at proper manner.

## X. CONCLUSION

In conclusion, results obtained, may indicate that a very high feeding frequency disturbs the cows during their resting periods and this may influence both animal comfort and milk production. High feeding frequencies should be avoided to allow cows to distribute both their lying time and their utilization of AMS more evenly over the course of the day. So, it is necessary to find a feeding frequency that is high enough to distribute the feeding time of cows over the course of the day, yet not so high that it disturbs the pattern of lying behaviour and long-duration lying bouts. Further studies concerning feeding places, feeding and aggressive behaviours, and individual feed intake in farms with AFS would be useful to help explain some of the other associations we observed and to improve feeding management and the productivity and comfort of lactating dairy cows.

## REFERENCE

[1] LfL-Information “Automatisches Füttern im rinderhaltenden Betrieb”. Informationstag. Ed. Baye rischeLandesanstalt für Landwirtschaft. 18 February 2014, Grub.
[2] Tagungsband der 11. Tagung Bau, Technique und Umwelt in der land wirtschaftlichen Nutztierhaltung, 24. – 26. September 2013, Vechta.
[3] Antworten zur Automatischen Futtervorlage beim Rind (2012). Ed. DLG-Verlag GmbH, Frankfurt am Main.
[4] Mäntysaari, P.; Khalil, H.; Sariola, J. Effect of Feeding Frequency of a Total Mixed Ration on the Performance Of High-Yielding Dairy Cows. J. Dairy Sci. 2006, 89, 4312–4320.
[5] Phillips, C.J.C.; Rind, M.I. The Effects of Frequency of Feeding a Total Mixed Ration on the Production and Behaviour of Dairy Cows. J. Dairy Sci. 2001, 84, 1979–1987.
[6] DeVries, T.J.; von Keyserlingk, M.A.G. Time of Feed Delivery Affects the Feeding and Lying Patterns of Dairy Cows. J. Dairy Sci. 2005, 88, 625–631.
[7] DeVries, T.J.; Von Keyserlingk, M.A.G.; Beauchemin, K.A. Frequency of feed delivery affects the behaviour of Lactating dairy cows. J. Dairy Sci. 2005, 88, 3553–3562.
[8] Crossley, R.E.; Harlander-Matauschek, A.; DeVries, T.J. Mitigation of variability between competitively fed Dairy cows through increased feed delivery frequency. J. Dairy Sci. 2018, 101, 518–529.
[9] Munksgaard, L.; Jensen, M.B.; Pedersen, L.J.; Hansen, S.W.; Matthews, L. Quantifying behavioural Priorities—Effects of time constraints on behaviour of dairy cows, Bos Taurus. Appl. Anim. Behave. Sci.2005, 92, 3–14.
[10] Hart, K.D.; McBride, B.W.; Duffield, T.F.; DeVries, T.J. Effect of frequency of feed delivery on the behaviour and productivity of lactating dairy cows. J. Dairy Sci. 2014, 97, 1713–1724.
[11] Haley, D.B.; Rushen, J.; Passillé, A.M. de Behavioural indicators of cow comfort: Activity and resting behaviour of dairy cows in two types of housing. Can. J. Anim. Sci. 2000, 80, 257–263.
[12] Foregoes, J.A.; Leaver, J.D. Behaviour, performance and health indicators of welfare for dairy cows housed in strawyard or cubicle systems. Livest. Prod. Sci. 2001, 68, 205–216.
[13] Lidgerwood, D.N.; Winkler, C.; Tucker, C.B. Evaluation of data loggers, sampling intervals, and editing techniques for measuring the lying behaviour of dairy cattle. J. Dairy Sci. 2010, 93, 5129–5139.
[14] Fregonesi, J.A.; Tucker, C.B.; Weary, D.M. Overstocking Reduces Lying Time in Dairy Cows. J. Dairy Sci.2007, 90, 3349–3354.
[15] Fregonesi, J.A.; Vera, D.M.; Von Keyserlingk, M.A.G.; Weary, D.M. Effects of bedding quality on lying behaviour of dairy cows. J. Dairy Sci. 2007, 90, 5468–5472.
[16] Ito, K.; Chapinal, N.; Weary, D.M.; Von Keyserlingk, M.A.G. Associations between herd-level factors and lying behaviour of free stall-housed dairy cows. J. Dairy Sci. 2014, 97, 2081–2089.

[17] DeVries, T.J.; von Keyserlingk, M.A.G. Feed Stalls Affect the Social and Feeding Behavior of Lactating Dairy Cows. J. Dairy Sci. 2006, 89, 3522–3531.
[18] Ito, K.; Weary, D.M.; von Keyserlingk, M.A.G. Lying behaviour: Assessing within- and between- herd variations in free-stall-housed dairy cows. J. Dairy Sci. 2009, 92.
[19] Porto, S.M.C.; Archidiaconal, C.; Anguzza, U.; Cascone, G. A computer vision-based system for the automatic detection of lying behaviour of dairy cows in free-stall barns. Bio syst. Eng. 2013, 115, 184–194.
[20] Attaching, G.; Riva, E.; Bisaglia, C.; Pomp, J.C.A.M.; Provolone, G. Methodology for quantifying the behavioural activity of dairy cows in free stall barns. J. Anim. Sci. **2013**, 91.