“GORAKSHAK : AN AUTOMATED FARM VIA IOT”

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COLLEGE : JAWAHARLAL NEHRU NATIONAL COLLEGE OF ENGINEERING, SHIVAMOGGA

BRANCH : DEPARTMENT OF TELECOMMUNICATION ENGINEERING

GUIDE : PROF. MADHUSUDHAN G.

STUDENTS : MS. AISHWARYA B.R
MS. KAVYA K.R.
MS. PAVANI K.G.
MR. PRAKASH B.R.

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Introduction:
With the advent of technology, the world around us is getting automated. Automatic systems are being favored over manual systems, as they are energy efficient and minimize the need for tedious manual labor. With agriculture being the primary economic sector of India and other developing countries, it is essential to automate it in order to increase efficiency. A typical farm requires a lot of labor. Automation can proficiently moderate the amount of manual labor, and make farming easier and faster, leading to more agricultural growth. The concept of automation is extended to the agricultural farms and farm houses. Numerous aspects of the farm are automated, which include auto-irrigation cycles and secure temperature controlled enclosures for livestock and farm products. In our paper, we implement automatic lighting system, auto-sprinkler system, in-house temperature control and security for farm houses. As temperature and motion sensitive devices will only work when required, such a system conserves energy effectively. The product also presents features to enhance the security of the farm. Energy efficient farm automation is the need of the hour in an agro-based economy.

BLOCK DIAGRAM:

Fig1: Architecture of the system
Hardware specifications:
- Microcontroller [arduino uno]
- Temperature sensor
- Humidity sensor
- GSM module
- LCD display
- Relay
- fan
- flashing light
- Motor driver IC
- buzzer
- inlet valve
- sprinkler
- other electronics components

Software specifications:
- Arduino uno
- MC Programming Language: Embedded C

Proposed system (objectives):
Features of the farm house automation system are:
1. Farm security and Automatic Lighting System
2. Climate control system
3. Fire and smoke detection system
4. Pre-set washing system
5. Feeder control system

Methodology:
Farm security and Automatic lighting system
The above system (Fig: 2) reflects the use of farm security and automatic lighting concept. Here when the user enters the password given, if the applied password matches with the password in the program, the latch of the key will be opened which implies the servo motor position will be changed. That means the door is opened now for the user to enter into the farm. Now the photodiode will sense the presence of light, if there is no light, the LED will be ON which is indicating that the lighting system of the cow farm will be activated. If * or # key is pressed again by the user, servo motor will come to original position indicating that the door of the cow farm being closed.

Fig.2. Block diagram for automatic light switching
Climate control system

An exhaust fan or a heater will get switched on automatically depending on real time readings from a temperature sensor. Depending on whether cooling down or heating up is required inside the farm house; the microcontroller decides to switch on the exhaust fan or the heater respectively. It provides comfortable conditions for livestock without tedious manual monitoring, along with energy conservation. The system can also be used for storage of farm products like milk and eggs, which require ambient temperature conditions to prevent spoilage.

Fig3: climate control system

Fire and smoke detection

It has a single independent input to detect any fire or smoke indication from the sensor unit, and sets an alarm or an indication to alert people. The sensor will detect presence of smoke and generate an interrupt to the microcontroller. This will switch on the exhaust fan and a sound alarm with flashing light. A GSM module is interfaced, so that the owner can be easily intimated about the fire in his mobile phone via an SMS.

Fig4: fire and smoke detection system

Preset wash times

A timer based sprinkler system will be installed in the pastures. The regular watering will ensure greener pastures. This will provide good quality food supply for the cattle. A similar system can be implemented inside to clean the farm house and animal enclosures at fixed times.
Feeder control

It is hard to feed animals on schedule, yet livestock thrive when fed on time. Timed setups coupled with an automatic grain dispenser are used in this automated system. A galvanized steel, battery-operated feeder is engineered to deliver individual flakes of hay up to configured number of times.

Advantages:
1. It performs multiple task in one system at faster rate.
2. Minimizing manual labor and improving the living standards of the livestock.
3. This will improve the quality of the poultry, dairy and other farm products.
4. Our control system requires no maintenance cost, if placed in a safe location.

Challenges:
1. Maintenance of raw materials and water is tedious job
2. Whole farm architecture need to be modified

Results and conclusion:
The whole system can be integrated as shown in Fig 7. It thus gives the controlling of the farm in all the mentioned aspects which will provide the owner of the cow farm an ease of accessibility. It is thus providing every individual a ease of work in handling cow farms.
Future work:

We are working currently in making the complete hardware system being integrated with the concept of IoT so that the user can get the information regarding the cow farm from remote place and can control the actions if the user get the sensor inputs to his mobile phone. A website is being built in the concept of IoT which user can access it by android phone. It is thus enabling the user to keep an eye on the cow farm from remote places respectively.

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