American International University- Bangladesh (AIUB)

Department of Computer Science & Engineering

Software Development Project Management

Your Cattle Your Solution in One Place!!

Submitted To

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Introduction:

In our daily lives, livestock firms are a new business model. It is an emerging industry that can earn more profit from this livestock firm. Monitoring the entire herd of animals is a significant challenge for a farm owner attempting to keep the cattle. Day-to-day monitoring of animals' conditions, health checkups, and insemination periods are the most challenging parts of this industry. It is very difficult for a single farm owner to monitor all of the livestock. To address this issue, we are designing a digital, automated, IoT-based cattle farm management system in which we are attempting to address the issue through the use of an IoT component. A farm owner or manager may manage all of the cattle by utilizing a machine learning or data science algorithm to determine the pre-insemination day or period.

We're attempting to fix this issue since it's quite tough for a farm manager to maintain track of all the cattle's insemination times. It is really tough to remember the date and time. As a result, if the farm manager misses the right day and time for the cattle, they must wait until the following insemination date. It is not the most important goal of our project. To be aware of any major health concerns with the cattle, we must forecast the health data utilizing data analysis and data filterization. As a result, a farm manager or owner can take the required precautions to avoid the situation. One of the issues in the livestock company is the loss of livestock. One of them is a failure to provide effective treatment and make timely judgments. In our project, we are attempting to use the cattle mortality rate and control the entire herd in one location in order to improve the control of the animals' information and activities.

Objective:

1. To secure the safety of the livestock.
2. Cattle tracking that is automated and on-going.
3. As a safety net in the event of a medical emergency.
4. Pregnant women should have access to medical care at all times.
5. Make sure each cow has a great medical report.
6. Improving the organization of our farm.

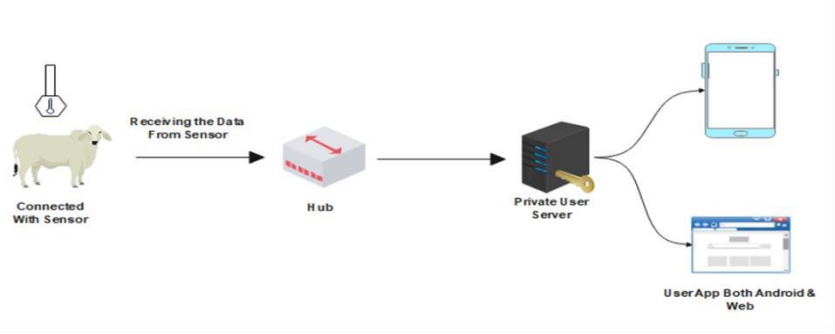
Justification:

How can users benefit from the approaching project systems? Our solutions can assist users since we are attempting to employ IoT components to provide a better and more advanced service with extremely accurate outcomes. Some system aspects highlight how our systems can help users.

- Inseminations Date or Period Detection through AI/Machine Learning approach.
- User Friendly UI
- User App Has Multiple Language for User (Especially Local Language). As a results, user can easily connect with the systems by their own language.

- Voice Control System or voice input commands for taking the updated of the whole farm.
- Recording Daily Activity reports to the farm manager.
- Health Condition Measurement by detecting the data analysis. • Monitoring All Animals in One place Or Individuals
- Android or Web Based application.

Our target audience is made up of young entrepreneurs and farm owners. so that they might attempt to connect to the system as a result, they're attempting to digitize the life-stoke fields.



Stakeholders' analysis:

There are two sorts of stakeholders recognized for this project's development.

- **Primary Stakeholders or Positive Stakeholders:** A positive stakeholder or primary stakeholder perceives the good aspects of the project and benefits from its success. These stakeholders contribute to the project management team's success.
- **Secondary Stakeholders or Negative Stakeholders:** A negative stakeholder or secondary stakeholder experiences the project's unfavorable consequences and may be negatively influenced by the project. This sort of stakeholder is less helpful in completing the project.

Primary Stakeholders or Positive Stakeholders:

- Farm Owner
- Farm Manager
- Firm Employee

Secondary Stakeholders or Negative Stakeholders:

- Livestock Doctor
- Customer
- Animal Organization
- Field level Workers

Feasibility study:

1. **Technical Feasibility:**

Sensor-based automated health monitoring is required to track the movement of individual animals and to keep tabs on their health problems in order to enable this. The use of digital storage and communication is on the rise as the cost of these technologies continues to fall and their availability continues to rise. Until recently, it was impossible to keep tabs on the health of a single animal in great detail.

Mobile WSNs make it easier and more reliable than ever to keep an eye on people's well-being on the go. In order to assist farmers, make better decisions, GPS-enabled collars track the duration of the grazing time of cattle. Real-time communication, on the other hand, has a number of drawbacks, especially when it comes to warnings about potentially harmful circumstances, such as degradation and energy conservation. Several researchers have utilized GPS-enabled collars for monitoring cow behavior, according to published studies. Sensor networks are made up of a large number of low-cost, self-organizing ad hoc devices.

A sensor network has been used to monitor the health of cattle and transmit information to other nodes. The node's sensed data is sent to the sink in a hop-by-hop fashion. Static or mobile deployments of WSNs are options. Animal movement and soil moisture are monitored using static WSNs. Each animal has a set of mobile WSNs installed to keep tabs on their body temperature, overall health, and behavioral patterns. Instead of active leg tags or active collars, cheap ear-tags are now often utilized. Instead of using sensors, passive tags are often employed to identify cattle for the purposes of tracking and tracing.

To track cattle over greater distances, active RFID sensors may be employed, however passive RFID sensors are more often found in cow collars. Not only can early and precise diagnosis of cattle illnesses minimize treatment costs but it also helps to avoid productivity losses. Rectal temperature is often used to estimate the core body temperature since it is difficult to collect for accurate livestock monitoring purposes. Animals may experience stress as a result of the manual collecting of rectal temperatures. Because this is the case, a more exact approach is required that does not need any human intervention.

2. Financial Feasibility:

It is important to know the financial health of a firm by looking at its financial statements. Assets, liabilities, and shareholders' equity are all represented on the balance sheet at a single point in time on the balance sheet.

Maintaining legal compliance for tax and payroll reasons and being aware of your financial status in the event that you seek a loan to expand your company necessitate an understanding of farm financials.

Farm Receipts: milk, cattle sales, products	10,0000/=
Farm Expense: labor, monitoring team salary, medicine, monitoring cost, update cost	78,0000/=
Earnings Before interest, taxes	22,0000/=
Interest cost	20,000/=
Less family living and income taxes: OWNER drawing, living expense and taxes	13,0000/=
Net Income	**70,000/=**

3. Development Feasibility

We focus primarily on the health of our livestock. Our sensors are updated on a regular basis, and we keep this in mind. The improvement of the farm should be our ultimate objective. Strong, prolific calves and heifers depend on a well-maintained herd. Diarrhea in calves may develop to calf scours, which can be fatal, if not detected in the first 30 days of life.

Cattle scours symptoms, treatment, and prevention are all covered by our sensors. Rare symptoms or illnesses might appear in your cow herd from time to time. The signs of an iodine deficiency are difficult to identify since it is so uncommon.

The mineral is essential for the health of the thyroid gland in cattle. This service explains in detail how and when to provide iodine supplements to cattle. Choosing the finest cow feed is also an essential concern for cattle ranchers. Early spring is the ideal period to maximize pasture productivity.

Addition of beans might offer nutrients throughout the dry summer months if you already have a stand. Keeping track of a pasture's history and activity throughout the year might assist identify the ideal time of year to graze cattle and the most efficient fertilizer treatments.

Systems component:

Software Component:

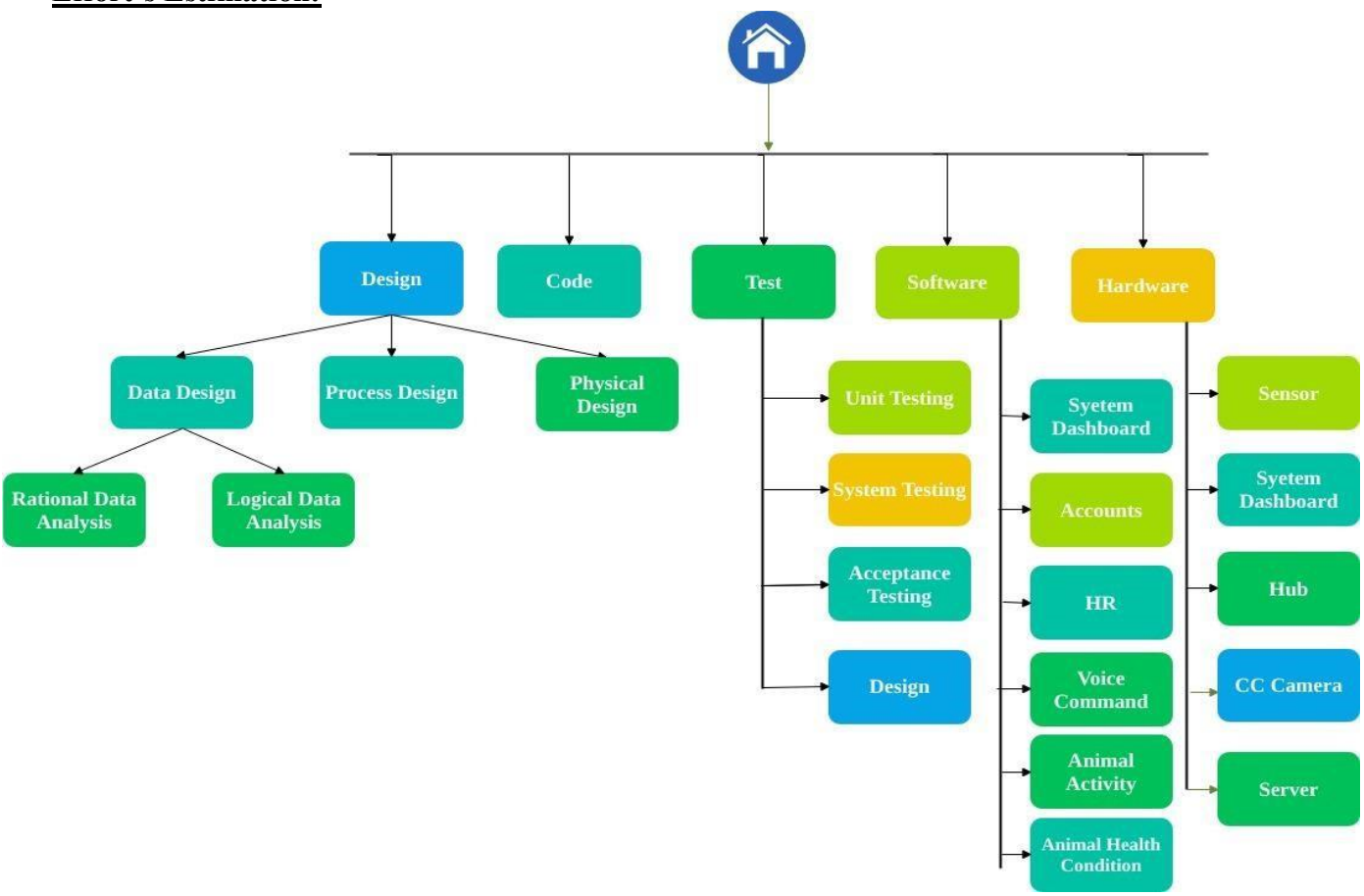
1. User Registration
2. User Log In
3. Dashboard
4. Accounts
5. Human Resource
6. Productivity
7. Live Visibility
8. Voice Command
9. Animal Fertilization Details
10. Animal Activity
11. Animal Health Condition

Hardware Component:

1. Sensor
2. Hub
3. Server
4. Computer
5. CC Camera

12. Contact Livestock Doctor
13. Plants Component

Effort's Estimation:



In our project, we can assume that SLOC is 7000. Our project is semi-detached project.

Effort= PM= Coefficient <Effort Factor> * (SLOC/1000) ^P

= 3.0 * (7000/1000) ^ 1.12

= **26.52 persons-months**

Development Time = DM = 2.50*(PM) ^ T

= 2.50 * (26.52) ^ 0.35

= **7.87 months**

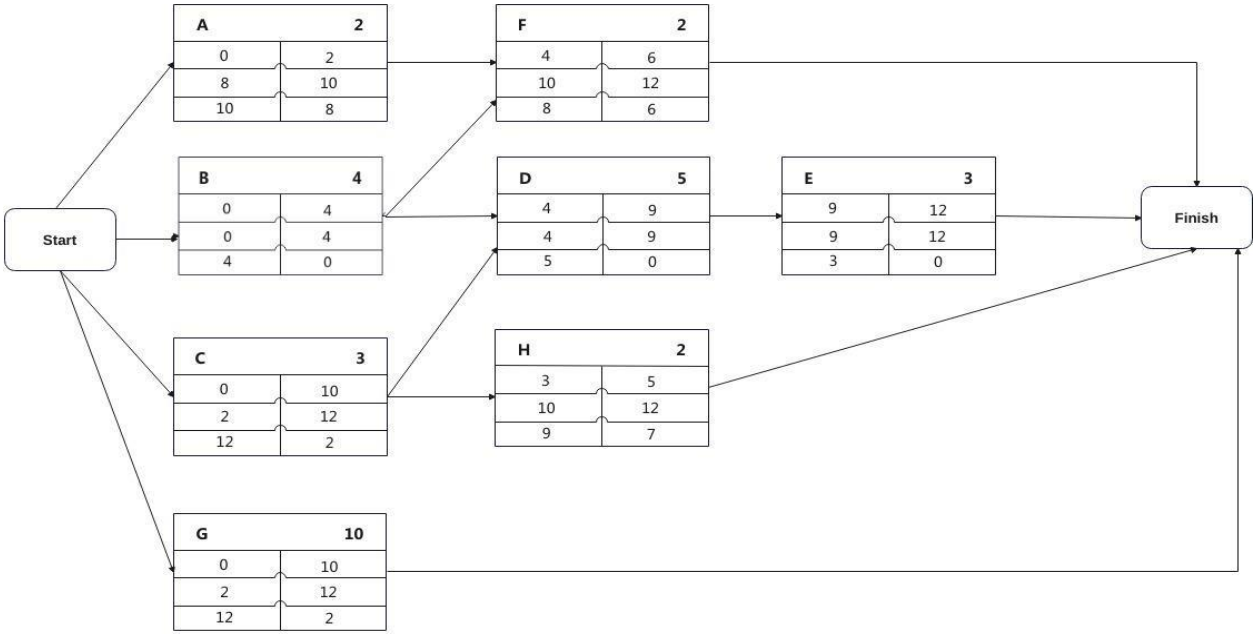
Required Number of people = ST = Effort (PM)/Development Time (DM)

= 26.52/7.87

= 3.36 ~ **4 persons**

Activity Diagram:

Activity	Duration	Precedence
A. Hardware Selection	2	
B. Software Selection	4	
C. Design	3	
D. Code	5	B, C
E. Test	3	D
F. File Take On	2	A, B
G. Write User Manual	10	
H. Install	2	C



Cortical Activity Finding:

Path 1: Start – A – F – Finish

Path 2: Start – B – F – Finish

Path 3 Start – B – D – E – Finish

Path 4: Start – C – D – E – Finish

Path 5: Start – C – H – Finish

Path 6: Start – G – Finish

Here the Path 3 is the critical activity duration.

UML Diagram & UI Design:

Fig1; System UML Diagram

Fig2: Sample System Dashboard UI

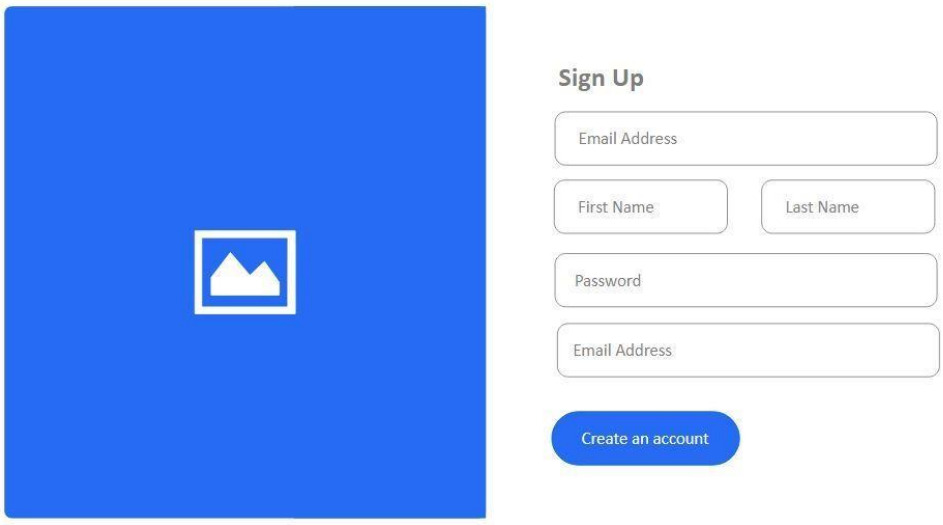


Fig3: Sample System User Registration UI

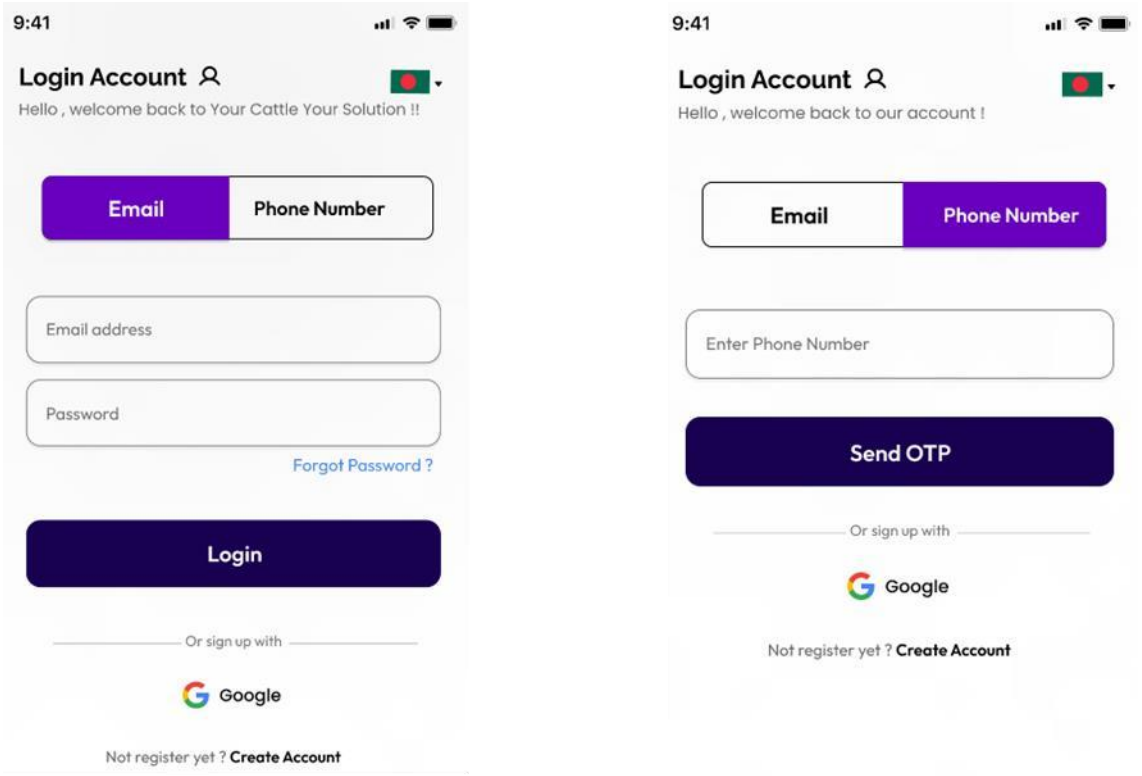


Fig4. Sample System User Log In UI

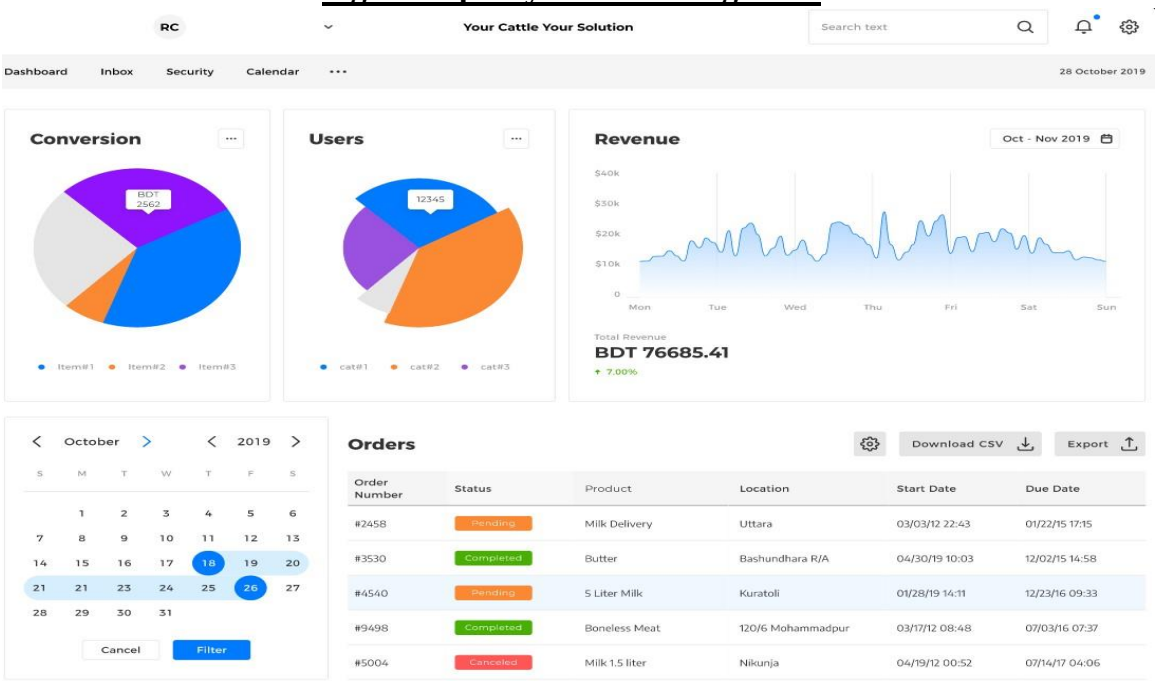


Fig5: Sample Accounts Componet UI

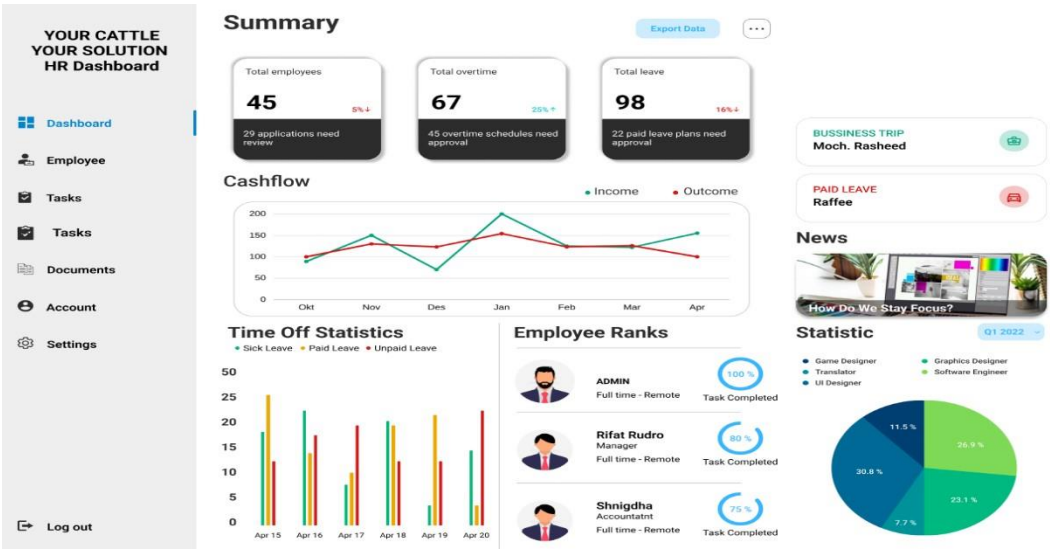


Fig6:Sample HR Component UI

Risk Analysis:

A project's risk is the potential for an unexpected occurrence to occur. A risk analysis is critical after obtaining the requirements since it helps identify potential problems that may arise during and after development of the project. There are a certain number of specific hazards that come with any undertaking. Cattle farm management systems are the focus of our research. We need to know the categories of risk in which it is necessary to identify the probable unknown occurrences of the future and their causes and consequences in order to examine the risk factors. In terms of potential danger, the following are the most significant classes:

- **Actor:** Related to stockholders of the project.
- **Technology:** Availability and performance of the technology. For example: We have to know about the availability percentages of IOT basics and automated system as we are using them to complete the project.
- **Structure:** Management structures and systems which includes affecting planning and control.
- **Task:** The common danger in here is that underestimating the amount of work required to complete the activity.

Risk refers to the potential of an unknown occurrence happening in a certain situation. Under each category, there are some risk components. We must include the risk associated with our project into the risk component.

- **Risk of non-conformance:** The requirements may not be satisfied. Risk Example: While the program estimates the weight of food consumed by each animal, it is unable to detect specific illnesses by scanning or sensors.
- **Cost Risk:** Our project may go over budget. Risk Example: The project may be finished on time and under budget, but user representative training may go beyond budget.

- **Support Risk:** the risk associated with system updates. Risk Example: When upgrades are required, the development team may experience turnover. The new squad will have a tough time keeping up with the old team.
- **Schedule Risk:** The risk of not delivering the product on time. Risk Example: There maybe delay in our project critical path for stuff turnover, technology problem and so on which will affect the project completion time.

The risks associated with a project are not equal. Risk varies depending on its nature. The risk might be

1. Catastrophic,
2. Critical,
3. Marginal, 4. Negligible.

Additionally, there are some odds that a certain danger may occur or the risk is certain, but we must assess the risk's consequences.

Additionally, we will quantify the risk exposer, which is a quantitative way to determining the possible loss of a corporation. Risk monitoring, mitigation, and management are all terms that refer to the same procedure.

Possible Risk	Category	Likelihood	Impact	RE
Resource uncertainty	Development environment (DE)	5	7	35
Output uncertainty	Business Impact (BU)	4	10	40
Increasing number of unfathomable end users.	Project size (PS)	6	6	36
The System cannot detect the problems more than 5 km area.	Technology to be built (TE)	8	4	32
Late changing on requirement.	Project size (PS)	5	9	45
Lack of training the sources	Development environment (DE)	6	3	18
Delivery date may exit	Business impact (BU)	5	8	40
Less users than planned	Project size (PS)	4	7	28
High rate of stuff turns over	Stuff size and experience (ST)	7	9	63
Low estimation of the size	Project size (PS)	6	6	36

The likelihood and impact have been graded on a scale of 1 to 10. The higher the rating, the more serious the hazards; the lower the rating, the less serious the risks. The term "risk exposure" refers to the unknown commercial consequence of our undertaking.

As we are done with identifying risk, we have to plan our risk. There are some steps of planning where we will decide what to do with risks.

Risk acceptance: There is no other ways to accept the risk rather than prevent the risk.

- **Example for Project:** In the system testing it may show that the software detecting the problem the firm animals but before publishing the problem system crashes sometimes but there is no time left to fix the problem. So, we need to accept the risk for the first release of our project and will try to develop it in another updated release.

Risk avoidance: Avoiding the activity which could bring risk.

- **Example for Project:** We are considering 12 developers are working in a team to build the project. One of the experienced team members could have got some problem and failed to complete the critical path activity in time. But involving another member who is eligible to handle the same work we could involve him with the project from the starting period by maintain same or moderately high employee cost.

Risk Reduction: The actions to reduce a particular risk.

- **Example for Project:** We have discussed a risk about the system crash in the risk acceptance steps. We could have developed a way which will save the data of unshown result so that the system doesn't need to take the data from the very first even though crashing the system.

Risk transfer: Transferring the risk prevention responsibilities to another team or organization.

- **Example for our Project**: We have identified the risk that our system will not sense the activities of the animals if the area is greater than 5 km and our developers may supposed to fail to solve the problem. So, we can transfer the risk prevention responsibilities to other organization in a basis of contract.

Risk Mitigation: Trying to reduce the post impact of a risk.

- **Example for our Project:** We could have the high rating of stuff turn over and, in this situation, we can hire some excellent fresh graduates with enough salaries until the project completion time.

Sometimes there is a confusion among the whole team about the risk prevention or acceptance. To solve this confusion there is a term called "Risk Reduction Leverage".

We're making the assumption that rural communities have suddenly become more interested in our system.

We can save 0.5 percent of this loss by paying 10,000 taka to teach some individuals for remote regions, but there are no end-user trainers, thus there is a 1.5% possibility of losses of 50,000 taka. We'll appreciate the RRL's value if it costs more than one.

$RRL = RE_{before} - RE_{after}$/ Risk reduction cost

= (1.5% of 50000) – (0.5% of 50000)/10000

= 0.05

As the RRL< 1 so the step is not worth of doing. These are the possible risks and prevention for our cattle farm management project.

Conclusion:

In the conclusion part of this proposal, it could be said that there is an intention behind the development of a software or system. It is true that most of the people of rural areas have several animals. Instead of that a group of people used to do farming business with animals and in business this is very important to track every product or animal of the farm. There are farm managers who use to take care of those animals and this is very normal impossible thing to notice every movement of an animal. Our proposed system is the system which will have all the data of animal characteristics. Like animal diseases, gestation period of an animal and so things. With this system there are less possibilities of to reduce animal death. Our system will also detect that what should be food quantity in a day which will keep them healthy as well. By going through the requirements analysis, preparing SRS document, design, coding with machine learning approach and testing hopefully we will success to prepare a good software and software model for our proposed system.