

**AN ANALYSIS OF SMART DAIRY FARM DATA FOR
BETTER MANAGEMENT**

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This project titled “**SMART DAIRY FARM MANAGEMENT SYSTEM**”, submitted by Md. Mehdi Hasan (ID:172-15-10132) and Pantho Datta (ID: 172-15-9817) to the Department of computer science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in computer Science and Engineering and approved as to its style and contents. The presentation has been held on April, 2021.

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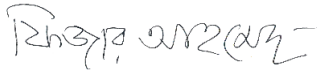
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This is to certify that this project entitled “**SMART DAIRY FARM MANAGEMENT SYSTEM**” has been done by us under the supervision of **Dr. Fizer Ahmed, Assistant professor, Department of computer science & Engineering, Faculty of science and Information Technology, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted else where for award of any degree or diploma.

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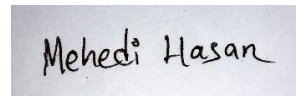


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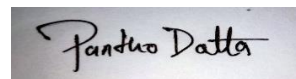
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ABSTRACT

Survey data told that 46% of the total population of Bangladesh is raising cattle and nearby 20% of present population does it for a living.[1] In foreign countries, the Internet of Things (IoT) is going to bring revolutionary transformation in dairy farming sector .But there is lack of digital livestock management farms in Bangladesh. As our country has associate acute shortage of milk production. So there could be no other alternatives to utilization of IoT based smart technology in dairy farming. By adopting improved technologies in dairy farming management system, it will be easier for secondary and higher educated farmers or farm manager to manage and control of hole farm. For the assistance of dairy rancher or supervisor and for the expanding of milk production, appropriate taking care of fed and health care management, we proposed and design a smart dairy farm management system. In the smart dairy farm management, there will be a chip for every cow and that will be attached to the neck or ears. Those IoT devices will be connected with internet and those chips (IoT device) can collect all the physical and surrounding information of those cows. As example, total number of cows and their per week cow feeding ratio, feed cost, total milk collection, quantity of sold milk etc. It gives accurate information about every cow. We have already made a website for better management. Through the IoT devices, all data will be store in our website and through the website the farm supervisor can view each and every cow's details information. The website helps to compare, so that the farm supervisor can easily understand, what kind of nutrients a cow needs, which kind of health care it needs and even the time when the cow is ready to milk. A dairy farmer or supervisor can easily know all from the information that will come to his Pc or mobile phone through our website and internet which is connected to the base station.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Mainly cows are considered as dairy animals in Bangladesh. Dairy farming is an important and potential agricultural sector in Bangladesh. In Bangladesh, nearly 85% of the population are engaged in agriculture and livestock sector. Cows are the main source of milk. About 90% of the produced milk in the country comes from cows [2]. Annual milk production in Bangladesh is 9.4 million metric tons and about 95% milk comes from cattle [3]. However, Bangladesh has associate acute shortage of milk. In present, the produced milk can fulfill nearby 13.6% of the entire requirement in Bangladesh [4]. Among the total of six million milking cows, 85-90% of them are indigenous and 10-15% are crossbred [5]. Dairying is growing faster in Bangladesh, but all of the traditional dairy farms are not using modern technologies. A few homesteads are utilizing present day innovation in their dairy ranch, however the vast majority of the dairy farms are still currently looked after physically. Generally, dairy farms in Bangladesh follow traditional production and farm management, especially in feed management, disease management and milk production. Around 59% of farmers follow their traditional feeding system. Even they feed concentrates only to the lactating animals [6]. Found that regarding 54% farmers fed their cattle or oxen with concentrate considering the standard daily amount [7]. Still now in Bangladesh, some dairy farmers are not aware of using modern disease management as well as the use of improved insemination for cows. Through our system farm supervisor easily can monitor and gather cows feeding, needed medicines and milk production information which can be the reason for more milk production. This helps the farm owner to save time and money and also increase their income through better milk production. So our proposed system is far better than Manual/Traditional dairy farming.

1.2 Motivation

We need to make the best use of our technologies which is possible by combining with the internet to cope with the digitization of era. By using our smart dairy farm management system, a farm supervisor can control the dairy farm effectively with less men power. As our system provides high facilities with per day update database of each cattle, so a farm supervisor can know all the information (Feeds, diseases, Medicines, milk productions etc) about each cattle needs and requirements. Basically, our system will help people to increase their profit in dairy business and it will be possible with less men power.

1.3 Objective

Our objective is to solve various problems through our system

- By adopting our system, a secondary educated farmers or farm manager can easily control a hole farm and can gather all the information.
- User can access to the system by logging in and can have all the update data about each of the cattle.

1.4 Project Purpose

- Our system based on smart technology, so it can reduce men power from a dairy farm. Less men power will reduce a huge amount of money from the total cost.
- Our system is able to convert a traditional dairy farm to a smart dairy farm.
- It can save time, money and safe from the mistakes.

1.5 Expected Outcome

Most of the dairy farms follow their traditional and indigenous procedure in every operation of farming [8]. This is the reason for the shortage of milk production. It is possible to make changes in manual dairy farm with the help of our proposed management system. In this paper, We proposed a smart dairy farm management system that has all the facility which is capable of safe inspection time, management cost. The motivation of this proposal is to help people manual based dairy farmer, so that can easily convert their manual dairy farming to our proposed Smart dairy farm management system.

CHAPTER 2

BACKGROUND

2.1 Introduction

I have considered a few application and website which is related to my project. I am aiming to portray some applications and their description here.

2.2 Project Scope

As Bangladesh has associate acute shortage of milk, so our proposed project can bring a revolution in dairy farming in Bangladesh.

- Our smart dairy farm management system will be very effective for midrange dairy owner, who has short of budget for manage a whole farm.
- A farm owner can run his dairy farm with less men power. So our system has the ability to reduce some management cost which can be profitable for the dairy owner.
- If the supervisor of a farm can use our system, he will able to know the actual and valuable information about each cow through our website. Which will be an effective way to reduce health problems of those cows.
- A healthy cow means proper milk production. Daily, weekly and monthly monitoring data in our system's database can helps to measure each cow. It will be the reason of better milk production.

2.3 Challenges

When a smart dairy system can change the entire dairy farming industry then it can face many obstacles. If the system can bring a revolution in manual dairy farming, then It will face some challenges:

- Our proposed management system for smart dairy farming based on modern technology. Like: IoT devices, cloud based database, web application. If the farm supervisor or farmer is not enough educate that he can't operate our system.
- Internet is the most important element for the whole system. Without internet capability, the system will not work at all.
- Cost is also a major issue. Many devices are needed to run the whole system. And the cost of those devices are pretty much cost full. So it can be a hindrance for low budget farm owner if they can't effort all the devices and our system.

CHAPTER 3

REQUIRMENTS SPECIFICATION

3.1 Use case Diagram

Use case diagram represent a system's or an application's functionality and requirement by using actors. Mainly it is a model that shows the functions and services that a system needs to perform. It represent high-level functionalities, activities, administrations and capacities that the framework needs to perform.

Use case diagram for admin:

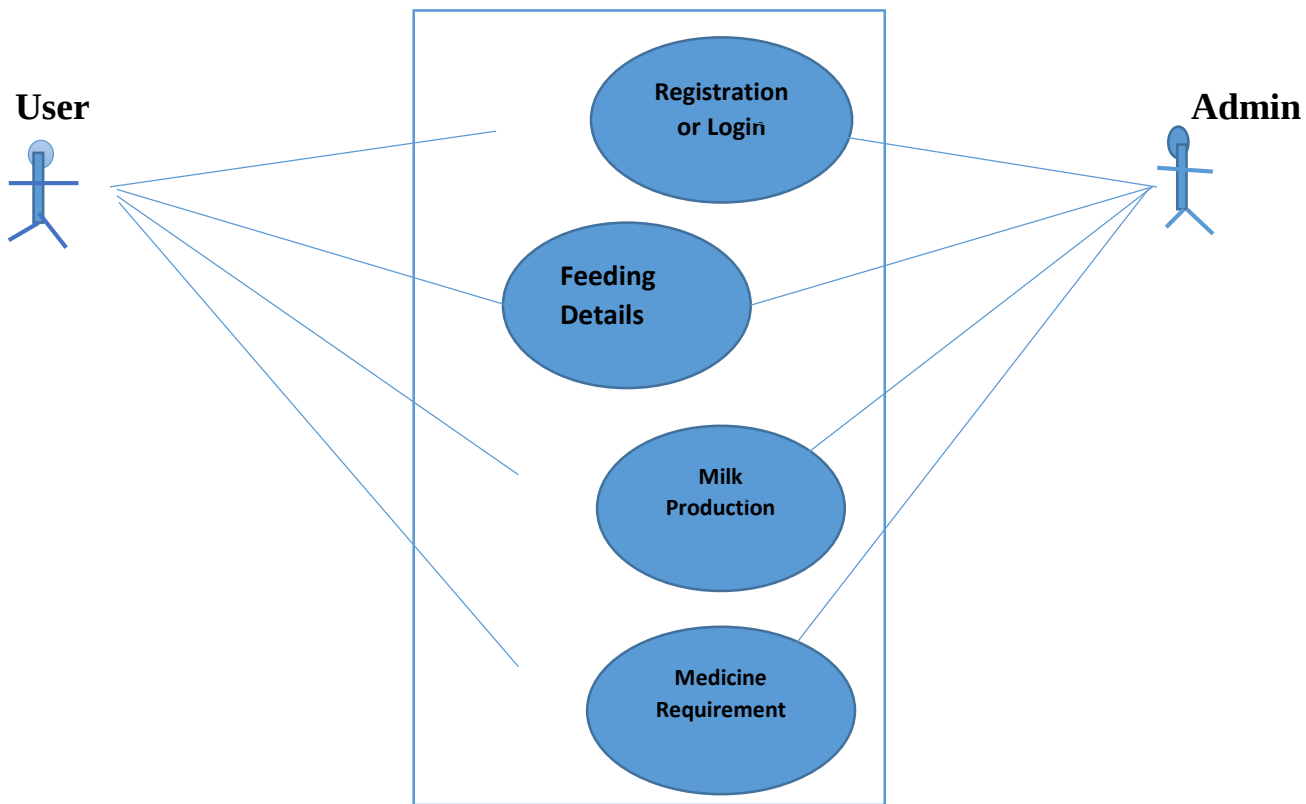


Figure: 3.1 Use case Diagram

3.2 Sequence Diagram

A sequence diagram basically portrays interaction between objects in a sequential order in which these interactions take place. As example: the request where these associations happen. Sequence diagrams descried about the order the objects in a system function. Basically, sequence diagrams are used by web developers, software developers and for business purpose to understand about the requirements for an existing process of a system.

Log in:

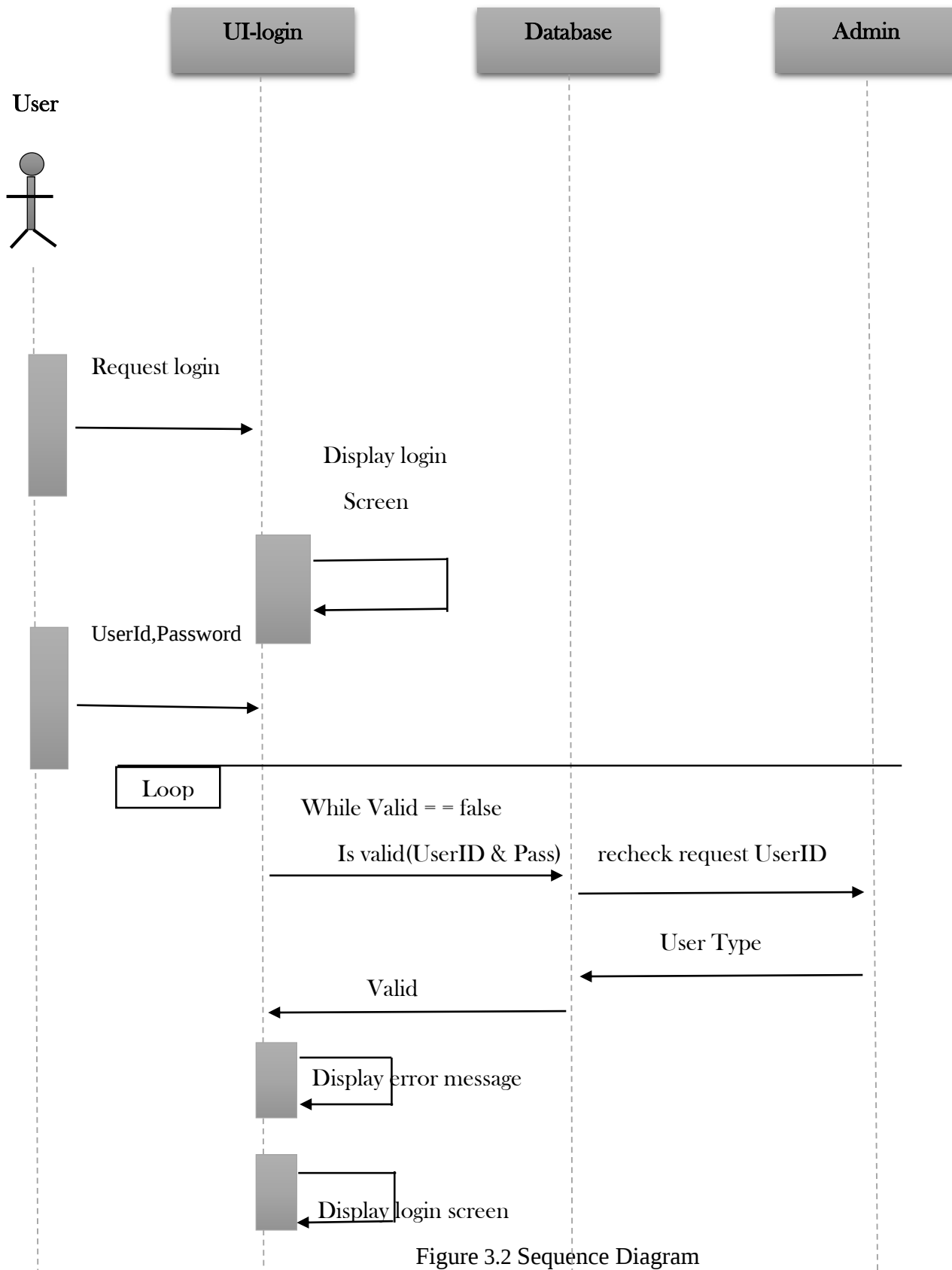


Figure 3.2 Sequence Diagram

3.3. Data flow Diagram

DFD or Data flow diagram shows the planning maps for the flow of information for any application or system. It is a proper diagram for a system which is made of some rectangles, circles, arrows, short text labels, data input-output, storage points etc.

For User:

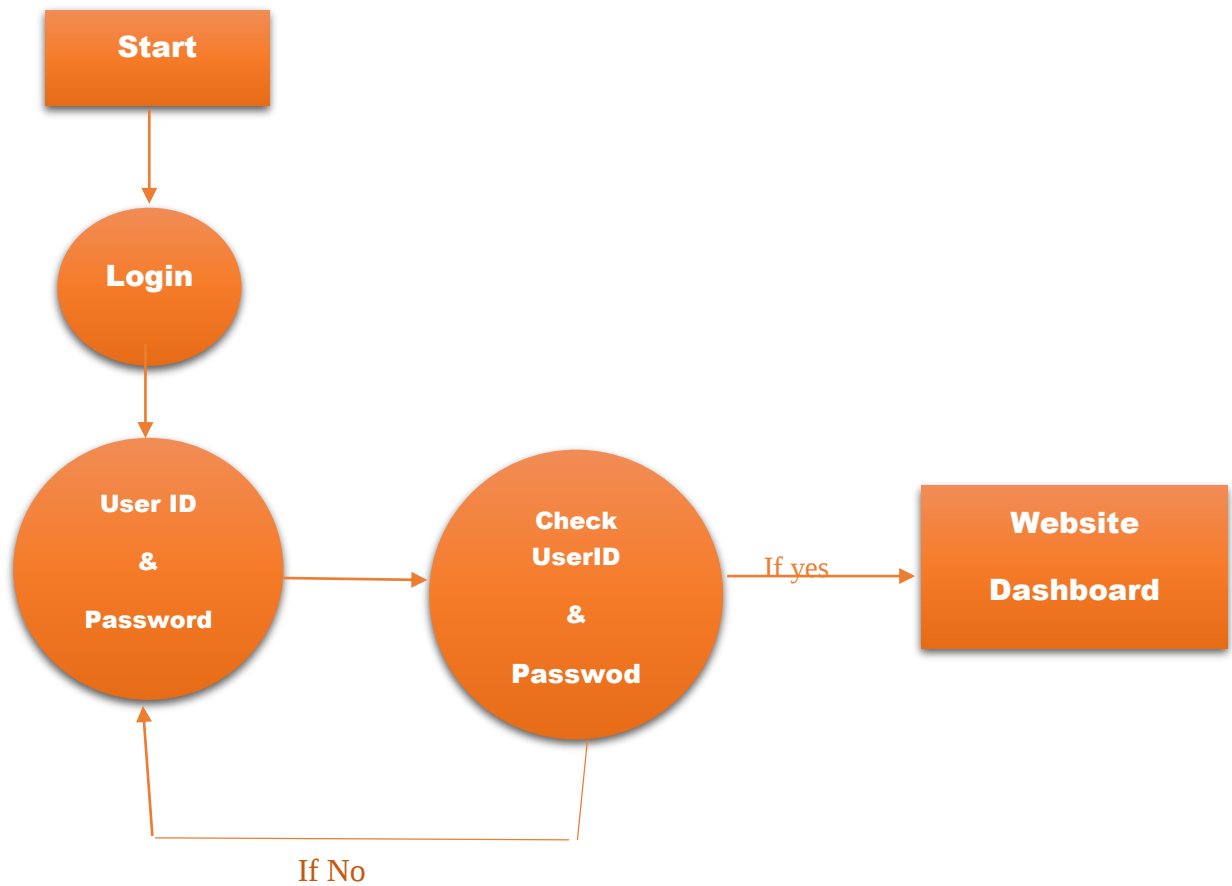


Figure: 3.3.1 Data flow Diagram for User

For Admin:



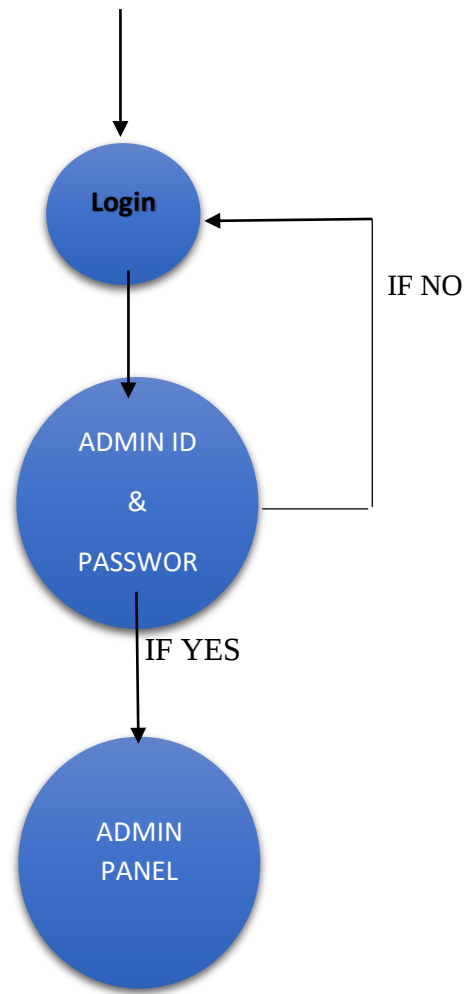


Figure: 3.3.2 Data flow Diagram for Admin

3.4 Activity Diagram

An activity diagram represent the behavior of a diagram. It portrays the conduct of a framework or the behavior of an application. The diagram shows the control flow from start point to a end point showing the various decision paths.

Login Activity Diagram of from management system:

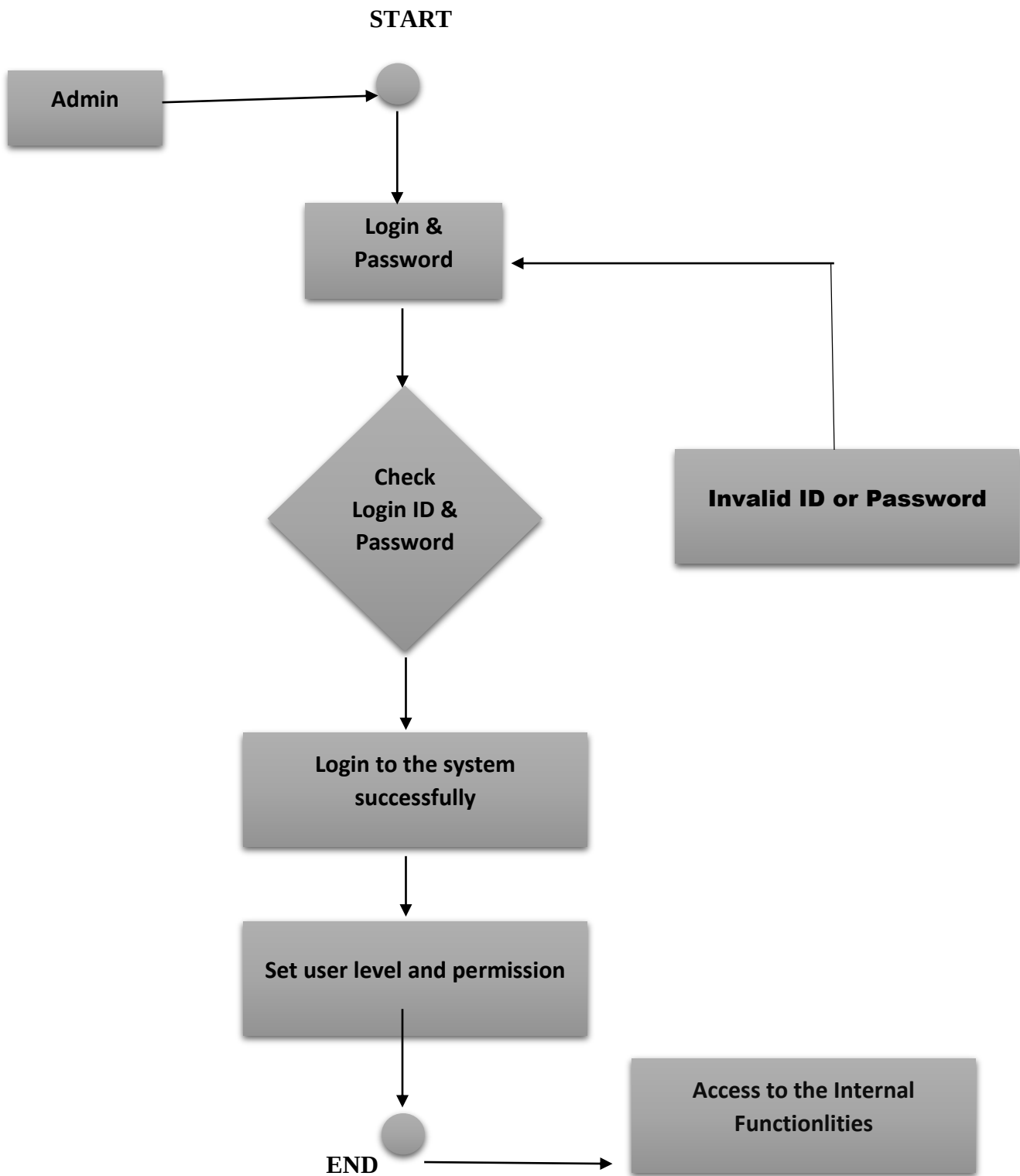


Figure: 3.4 Activity Diagram

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front End Design

4.1.1 HTML

HTML used to structure a web page and its content. For example, a content could be structured within some set of paragraphs, images or using data tables. It allows the programmer to create a structure for web pages and applications.

4.1.2 CSS

CSS is intended to change the segment of presentation and substance, together with format, hues and textual style. This segment will improve content openness, offer a great deal of adaptability and the board inside the determination of introduction attribute, change various kind of web substance to share data by indicating the important CSS during a different [9]. CSS archive and scale back unpredictability and reiteration inside the auxiliary substance.

4.1.3 JavaScript

Javascript use for adding interactive behavior to web pages. Javascript allows programmers helps to create website and allows users to interact with web pages. It helps to creating web and mobile apps. Developers can use various javascript frameworks for developing their web pages.

4.1.4 Laravel Blade Template

Laravel introduce the conception of exploitation Blade, a templating engine to style a unique format and the format/layout designed may be employed by alternative views and includes a homogenous style and structure [10]. When we compared to alternative templating engines, blade is exclusive within the folloing ways in which it doesn't limit the web developer from exploitation plain php code for views.

4.1.5 Localization

Confinement is that the adjustment of an item to satisfy the needs of each languages, culture or wanted populace look-and-feel , with progress local administration or item is one that appears to possess been created inside the neighborhood culture [11].

4.1.6 Frontend Scaffolding

The frontend scaffolding means to create a basic essential structure for any application. The term staging roughly aims for quickly found out for an app / project. The most purpose of staging is to hurry the progress instead of marking it new.

4.2 Back-end Design

4.2.1 Laravel Framework

Laravel might be an incredible php structure, intended for engineers WHO (World Health Organization) might want a simply stylish and trendy tool to shape full-included net applications. . Laravel attempts to take the pain out of development by easing common tasks used in maximum web projects. Laravel is an open platform and source web Mvc framework for php.

4.2.2 Service Provides

Service provides is a help provider could be an advertiser that has IT courses of action just as organizations to finish customers and affiliations. This extensive term intertwines all IT associations that offers items and some plans through organizations that are on demand, pay per use/ crossover models.

4.2.3 Authentication

Authentication is a process if that can identify the user credentials. In web designing and web development, authentication helps to manage the sessions which take the input parameters. As example: Email or userID and password for a user that helps to identify specific user.

4.2.4 Authorization

Authorization is mainly a Laravel middleware that can authorized any actions before the incoming request even reaches routes/ controllers. If the user of any website is not authorized to perform the given action that an HTTP response with some status codes that will be returned by the middleware.

4.2.5 Encryption

Encryption is a process of encoding information in order that solely approved parties will perceive the data. In specialized terms, it's the technique of charging plaintext to encode text. In less confounded terms, encoding takes clear information and adjusts it all together that it appears to be irregular.

4.2.6 Hashing

Mainly Hashing is an approach to adjust security technology for message transmission once the message is intended for chose recipient solely. It is a process that can transfer a string of characters into a shorter value that is fixed or a key that represents the original string.

4.2.7 Query Builder

Database query builder of laravel provides a convenient and interface to creating or running database queries. It can be used to perform most database operations in an application

4.2.8 Migrations

Movements are reported changes information and made all improvements lifecycle of an application that we will simply re-run at any reason at any time.

4.2.9 Eloquent ORM

An Eloquent ORM is a built-in ORM implementation and it is an object-relation mapper. It allows a user or developer to work with their database objects and relationships using an eloquent syntax and that's why it is called Eloquent.

4.2.10 HTTP Tests

The HTTP chooses a technology that employed to request data concerning of the communication options and that for the target resource. Laravel provides also some helpers for test in JSON and response like `Json`, `Getjson`, `postJson` methods used to issue json request with various HTTP verbs.

CHAPATER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of User

Welcome to our project website. This is our project Login page screen shot. Our project name is “Smart Dairy Farm Management System” in short “SDFMS”.

User can login through his actual Username and correct Password. Then he can sign in. If the user name or password will wrong, It will show wrong username or password.

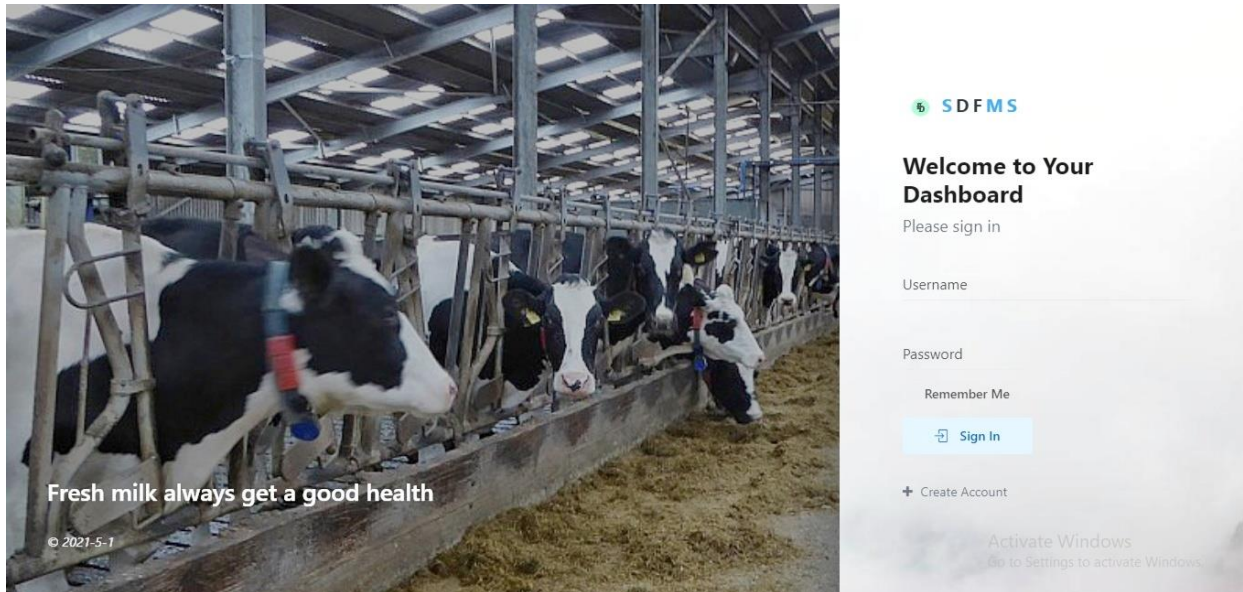


Fig 5.1 Login page

This is our project dashboard. As you can see, All the current updates about the numbers of total cows , total feed cost, the amount of collected milk and the quantity of total sold milk will be shown in the dashboard.

Moreover we use some features in our project that can show the weekly and monthly updates of feeding and weight gain report of cows with live charts.

5.2 Dashboard

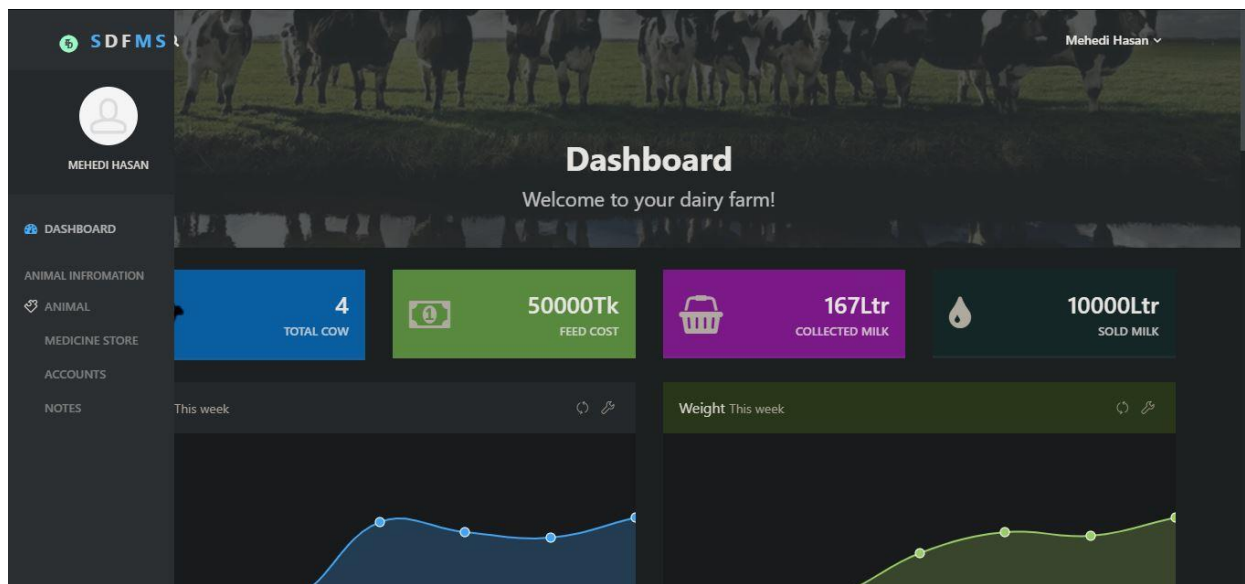


Fig5.2 Dashboard

5.3 Feed Information:

This is our feed table screen shot. The table show each of cow information like, cow numbers, feed quantity, Medicine and their weight details.

The 'Feed Information' screen displays a table with the following data:

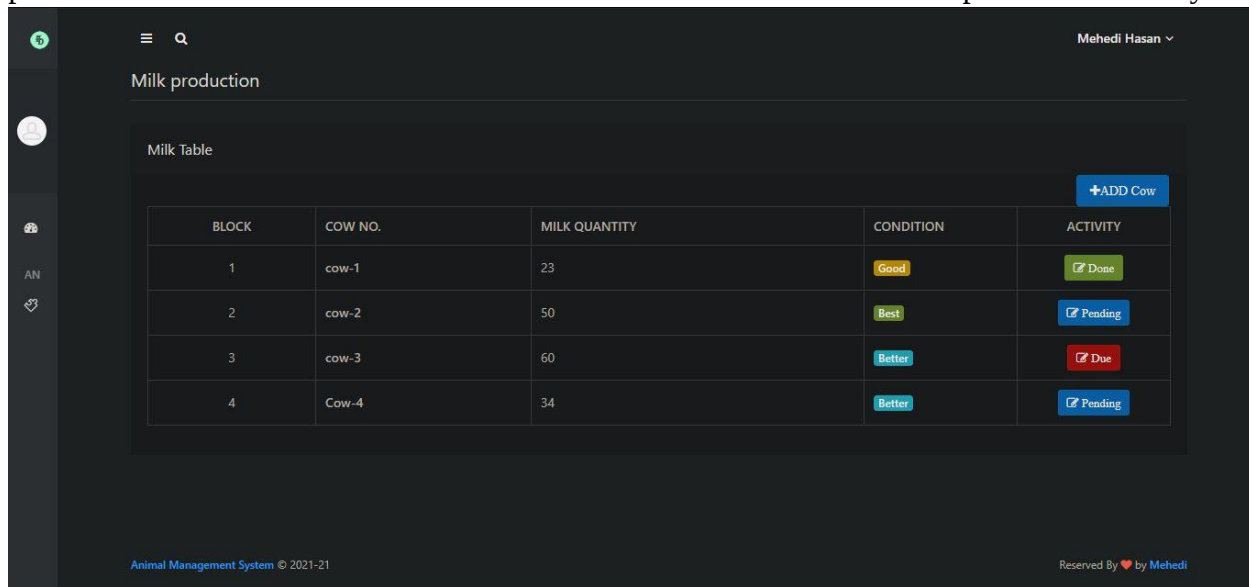
BLOCK	COW NO.	FEED QUANTITY	MEDICINE	WEIGHT
1	cow-1	34	Napa	34
2	cow-2	50	Tory	50

The footer of the screen includes the text 'Animal Management System © 2021-21' and 'Reserved By ❤️ by Mehedi'.

Fig 5.3 Feed Information

5.4 Milk production:

This is milk production page. As you can see, the milk table shows the cow numbers and each of their milk production. It also shows the current condition of each cow and their milk production activity.



Milk production

Milk Table

[+ADD Cow](#)

BLOCK	COW NO.	MILK QUANTITY	CONDITION	ACTIVITY
1	cow-1	23	Good	Done
2	cow-2	50	Best	Pending
3	cow-3	60	Better	Due
4	Cow-4	34	Better	Pending

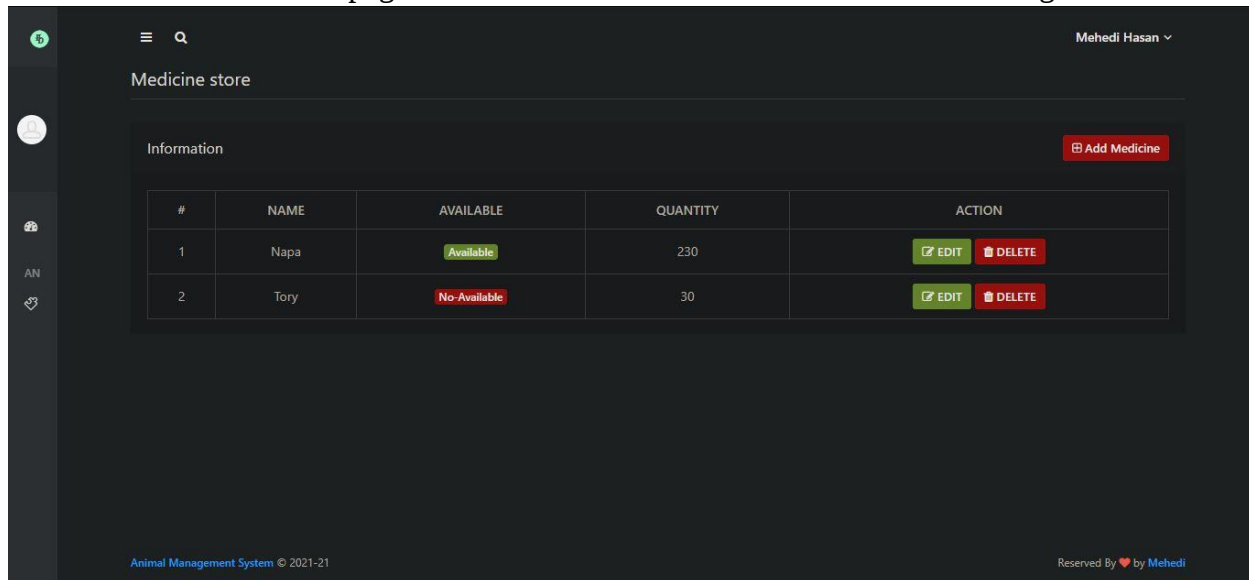
Animal Management System © 2021-21

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Fig 5.4 Milk production

5.5 Medicine Information:

This is our medicine store page screen shot. It shows the information about storage of medicine and quantity.



Medicine store

Information

[Add Medicine](#)

#	NAME	AVAILABLE	QUANTITY	ACTION
1	Napa	Available	230	EDIT DELETE
2	Tory	No-Available	30	EDIT DELETE

Animal Management System © 2021-21

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Fig 5.5 Medicine Information

5.6 Account list :

This is our account list page screen shot. It shows milk sold report and total amount in a specific time.

#	PURPOSE	AMOUNT	COMMENT	ACTION
1	Milk SOLD	500	mnbhbj.b	<button>EDIT</button> <button>DELETE</button>

Fig 5.6 Account list

5.7 Notes:

In this feature user can add notes about any information.

#	DATE & TIME	TITLE	TOPICS	NOTES
1	11-04-2021 , 07:04:25 pm	dddd	ddddddddd	ddddddddd
2	11-04-2021 , 07:04:47 pm	tfgf	Laravel	fghndfxtgnzde

Fig 5.7 Notes

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Conclusion

The digitalization of dairy farming especially in commercial farms requires for better farm management and milk production. In Bangladesh condition, people always neglect modern technologies and IoT mechanization, because they are not familiar with dairy machinery. It seems to them complicated. So they feel better with their traditional and indigenous farming practices. [12].

So through our project, we are trying to relieve their problem in dairy farming and make them more productive. This is our small effort to overcome their obstacles and take all the manual dairy farmers into the era of digitalization.

From all the research papers, we can analyze that the cause of low milk production are lack of proper feeding according to each cattle and the lack of proper monitoring. Our project will fill that gap.

Through our analysis, we can ensure that our proposed smart dairy farm management system is far more better than manual dairy farm.

6.2 Future scope

Our smart dairy farm management system is providing its requirement but adding some more features we wish to make the project more convenient in future. In future, if we want to add some more features in our project then we will work on:

1. We will add some real time dataset, which will show some real time data for each cow.
2. We will use this type of project in a massive infrastructure like a dairy industry (Like: Milk Vita dairy, Agro dairy).
3. With the help of our smart dairy farm management system project, we can manage only a dairy farm. But in future, if we add more features, then our project will be able to handle entire group of dairy farms through one website. Then the owner of a group of dairy farms can monitor his all dairy farms through our website.

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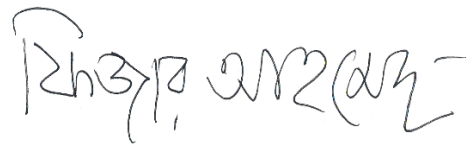
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