PRS proposal final - My project Report

CSIT (Tribhuvan Vishwavidalaya)

Tribhuvan University

Institute of Science and Technology

A Project Proposal

On

Agricultural Product Recommendation System

Submitted By:

Anup Basnet (20935/075)

Paras Vikram Aryal (20956/075)

Sanjeet Bhandari (20967/075)

A Project Report Submitted for the partial fulfillment of the requirement of **Bachelor of Science in Computer Science & Information Technology (B.Sc.CSIT) 7th Semester of** Tribhuvan University, Nepal

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[CSC 412]

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Anup Basnet (20935/075)

Paras Vikram Aryal (20956/075)

Sanjeet Bhandari (20967/075)

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Himalaya College of Engineering

Department of Computer Science and Information Technology

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Chapter 1: Introduction

1.1 Background

Even in countries with poor infrastructure and access to information technology, evidence exists that dynamic enterprises and governments have taken advantages of the possibilities offered by E-Commerce [1] with facing many barriers such as economic, sociopolitical and cognitive factors [2], linguistic, infrastructure market size and E-Business costs [3].

Ecommerce is reasonable to say that the process of shopping on the web is becoming common place. It is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. The terms ecommerce and e-business are often used interchangeably. The main objective of this project is to help seller ensure greater profitability through direct seller to end user communication. Seller can post their product and buyer is able to buy the product by making direct contact with seller. The buyers also get proper recommendation and listing of other products as their interest for product goes on. Our project deals with respect to the seller benefit of getting their products sale at a best price online. Here, the main users of this website are seller, buyer, and admin. Seller will get unique interface where they can perform marketing, get the correct rates of the market, advertise their product get in touch with SMS or Email and gather knowledge of different schemes and get pay online or cash. Agricultural E-commerce enables transparent trading possibility.

The major economic source of majority is involved in agriculture and this sector provides for nearly 40% of the gross domestic products. Our website also helps farmers for getting wider market and recommends buyers to buy efficient agriculture product. If we take a general representative example we see that the enterprise has familial investment, and the products of the enterprise are consumed in the family itself, and the products do not have access to the open markets. Farmers are forced to sell their product to other dealers or even other country for an unfair rate which is affects the life style of a farmer and their family as well as economy of a country. Consumer cannot get to buy their home product but has to buy from off country in high rate. Making the digital platform is a win-win situation for both buyers and sellers. It opens up wide range of marketing for seller which can lead in higher profit form their products and as consumer can get most efficient and quality product online.

1.2 Problem Definition

Marketing access to customers and the lack of knowledge about the market prices are some problems of the agricultural production cycle. Customers cannot get wide list of products to choose from and are forced to buy from limited list of products from their nearest market or area. The seller/farmers have to go to the nearest market to hand over his product to a particular agent where agent sells the product to another agent or a dealer. After a specific time, the agent gives the collected cash out of the sold products to the respected farmer but every Agent tries to cuts his commission out of the earned amount. The whole process is not transparent as there is no way for farmer to know about the deal and the exact amount at which their product was sold & there is no provision for the farmers to know the product rates at different markets where they can sell their products for achieving high profits also there products remains unnoticed from other markets. This motivated us to design & develop a system which is useful for farmers & end users.

1.3 Objectives

The general objective of the project is to develop a website to recommend customers about agriculture products.

The specific objectives of the project are:

1. To list, rank and advertise the agricultural products.

2. To provide a platform for advertising, buying and selling of agriculture products.

3. To recommend efficient agriculture product for buyers.

4. To reach wide range of market.

1.4 Scope and Application:

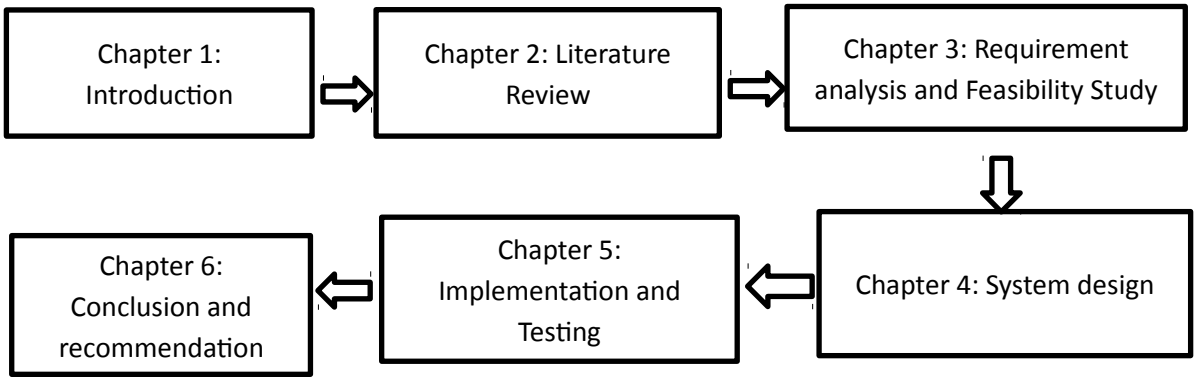
Website for buying/selling agriculture products with recommendation can be very useful. As eCommerce is the major part of internet now. It will not be too long there will be a boom in the trend of eCommerce business soon in Nepal. When the internet and communication took a giant leap with the rise in android phones, computers and cheap internet, e-commerce started to emerge. As it brings the huge benefits on the table like reduce time and effort, recommendations of product, easier to compare the prices, lots of

choices to choose from, feedbacks to know about the product and seller, all time reachable and as sellers can advertise their product and can get the right amount for it. Benefits like this bring huge scope for the project.

1.5 Report Organization:

The following block diagram presents the chapters included in the report present. It shows the total overview and the organization flow of the report.

CHAPTER 1 consists of background portion along with objectives and problem definition with scope and application of project. CHAPTER 2 contains the literature review of the project. CHAPTER 3 contains the requirement analysis and feasibility study with structure system requirement and all the necessary diagrams. CHAPTER 4 contains system design with architecture design, database design, activity design with all necessary diagram. CHAPTER 5 consists of Implementation and testing with development methodology, Functional block diagram, Algorithm and testing process implemented throughout the development along with details about the system testing. CHAPTER 6 presents the conclusion of the project with future enhancements possible for the future of the project.



Chapter 2: Literature Review

E-Commerce and the various aspects of it remained as a heavily researched topic, however, most of the study references are for developed economy countries and regions and there are very little studies for feeble economy countries. Jamaluddin (2013) disclosed that E-Commerce practices of farmers in the study area of Trichy district are still at infant stage. The obstacles and constrains are poor internet connectivity, heavy charges by private internet players, lack of program run by ITC's agri-business division in North India [4]. In the context of Mumbai, Singh (2012) revealed that around 37% of respondents were willing to buy grocery online if the option is given. The remaining percentage of the respondent may or may not buy grocery online due the factors like physical examination and security issues. It also found that most of the respondent thinks that buying grocery is beneficial. They found it is time saving and avoid long queues [5]. In the context of using E-Commerce in landlocked nations, Minges (2000) suggested that those nations should be required to increase sales, generate hard currency, boost employment, welfare gain expertise in information technology, reduce brain drain and urbanization also to lead to better business practices, enhance transparency and efficiency [3]. Barriers of E-Commerce in developing countries were found to be economic, social, linguistic, infrastructure market size and E-Business costs. He found many developing countries suffer from E-Commerce logistical deficiencies such as billing and shipping. A big barrie was the lack of support for credit card payment.

Finally, he suggested Government to Business (G2B) model focusing on rural parts for the nation like Nepal. Along with this model he suggested government should assist E-Commerce applications for farmers product prices, input costs, transport schedules and weather reports. In a case study done in Nepalese background, Press (2000) recommended three projects: a Business-Consumer (B2C) site for marketing Buddhistthanka paintings via the internet, a series of vertically focused workshops bringing together members of the Nepalese IT community and members in industries which may be likely E-Commerce candidates, and the establishment of a village-connectivity pilot project [6].

In another case study - barriers to E-Commerce and competitive business models in developing countries , Kshetri (2007) indicated that economic factors (high ICT access charge, low penetration rate of credit cards), sociopolitical factor (Nepal at level 0 in adoption of digital and electronic signature (DES)) and cognitive factors (related to knowledge, skill and confidence related to E-Commerce usage) play important roles in the adaptation of business models in the context of the developing world. This paper illustrated Thamel.com's influence on its business partners ICT adoption. It provided an overview on Thamel.com's strategy to overcome some E-Commerce barriers and to overcome cognitive barriers, the company provided delivery services as well as delivery confirmation via digital pictures of gift delivery. Descriptive research involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection [7]. It has three types of methods such as observation method, case study and survey method [8]. Among them this study used the survey method with face to face interview and questionnaires and a case study. The study has been conducted in major three districts of Kathmandu valley; Kathmandu, Lalitpur and Bhaktapur. The population of the study were all the professional farmers, agro-product customers, IT experts, and E-Commerce facilitators of Kathmandu valley. The researcher used purposive non- random sampling procedure. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable to answer research questions.

With sample size of forty-four farmers (who grow agro-items professionally), sixty-two Agro-product customers (including experienced in online shopping), twenty-three IT experts, and six E-Commerce facilitators (including agro-product based portals) were selected purposively from three districts of Kathmandu valley. The researcher used questionnaire as data collection tool to elicit required data. The questionnaire consisted of four parts including: Challenges/barriers to E-Commerce, ECommerce development solution/strategies the questionnaire was designed in a LikertScale in first phase of survey. In second phase of survey, the questionnaire is multi-choice type for studding of current issue of online shopping of vegetable and fruit items. Finally, the interview questionnaire for investigating a case of existing portal Metrotarkari.

The data through questionnaires were analyzed utilizing SPSS software. Average, standard deviation, coefficient of variation of different variables were calculated and analyzed. Major factors of challenges of E-Commerce in agriculture were purified by factor analysis. Major factors of challenges of E-Commerce in agriculture were purified by factor analysis. In this study, characteristics of descriptive statistics such as average, exponent, standard deviation and coefficient of variation are used. To determine the appropriateness of the data and to measure the homogeneity of variables that attract farmers to group activities, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test measures were applied. These statistics show the extent to which the indicators of a construct belong to each other. Results were then derived by analyzing the factor load of each variable. Proper names were given to each factor by considering the factor loads. Analysis of current issues of online shopping was done and the case of existing portal was analyzed by decoding the audio of chief operating officer of the portal taken during the interview. The analysis of case study of Metrotarkari again showed partly similar results regarding the solutions where good distribution channel for supplying the ordered items, good network with other vendors from different place, use the local payment systems with option of cash on delivery, providing free home delivery service at current market price, awaring the public by using social medias were identified as practiced solution for implementing E-Commerce in agriculture.

The present study, to some extent, supports the finding of Asadihkoob and Ebrahimi (2014) who studied the challenges and strategies of E-Commerce in Iran's Agriculture and found five major factors of challenges such as infrastructural-technical, social, cultural, agriculture state and educational. This research was conducted with two hundred fifty numbers of random samples and the outcomes of the research was generalized to the whole country where the present research was conducted with one hundred thirty five samples and focused on the capital city of the country. They found infrastructure development, culture and security and confidence production, and internet training to all classes of people as the most important strategies for E-Commerce development in agriculture. In the same context, the finding of present research is not close to the findings of the study by Minges (2000) where he suggested Government to Business (G2B) model focusing on rural parts for the nation like Nepal. Along with this model he further suggested that the government should assist E-Commerce applications for farmers product prices, input costs, transport schedules and weather reports.

In Nepalese context, internet subscribers in Nepal reached 38.78% of whole population[6]. More than two dozen E-Commerce sites are active where Metrotarkari, Chizbiz, Agromart, Kaymu are some existing online groceries from Kathmandu valley. As Nepal is agricultural nation, percentage contribution to GDP by agriculture and forestry sector is 33%[7] which indicates the increasing value of this sector in Nepalese.

Chapter 3: Requirement Analysis and Feasibility study

3.1 Function Requirement:

It describes the activity and service the website must provide to the user.

3.1.1 Login and Sign Up

Users need to create a new account and register into the system. System has to make sure that the user is registered in the site. If the user is logged in then user is able to post his product or see the details and feedback of the sellers if he wants to buy the product.

3.1.2 Search and List of products

Users can search for their products and users are visited with listed products with different categories.

3.1.3 Recommendation and Feedback

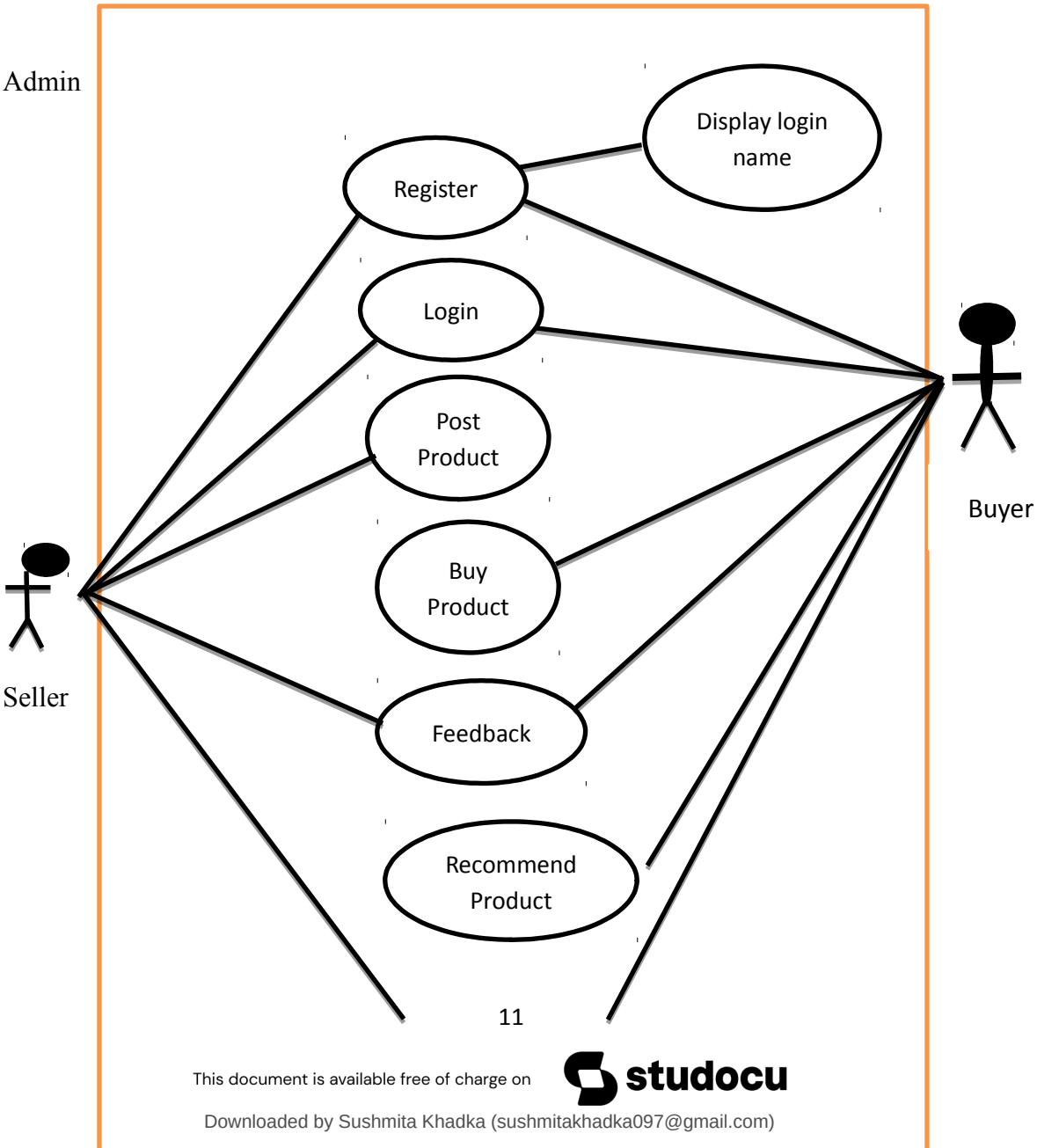
The system recommends the products to buyer according to the price the buyer is looking for. Also buyers can know the feedbacks of the seller before making a deal also leave the feedback for seller.

3.1.4 Show seller Information

After buyer is interested in a product buyer can access to the contact details of particular seller which sellers has registered in the system while posting their product for making a deal.

3.2 Use Case Diagram

Use case diagram is a dynamic or behavior diagram in UML. Use case diagrams model the functionality of a system using actors and use cases. Use case are a set of actions, service and functions that system needs to perform. In this context, a system is something being develop or operated, such as Agriculture Product Recommendation. The actors are people or entities operating under defined roles within system.



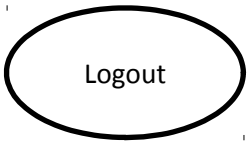


Figure 3.2 Use Case diagram of Product Recommendation System

3.3 Feasibility Analysis

3.3.1 Technical Feasibility:

This project is technically feasible as it uses technology that are presently used by people in their day to day life commonly. Our system is able to run on any mid range or low range device having browser and internet access only. As our system deals with reccomendation, promotion, advertisiment of agriculture product for both buyers and sellers. So it is technically feasible.

3.3.2 Operational Feasibility:

The website provides a proper list of all the products as well as reccomends products which makes users easy to find their products. Website provides a user friendly User Interface and can be easily operated by the people with basic computer knowledge. So, it is operationally feasible.

3.3.3 Economic Feasibility:a

The proposed website does not required much of a high skilled programmer or expertise and can be easily applicable without any expensives resourses as it provides a platform for sellers to advertise their product and gets buyers in contact with seller for the products. Somehow possibilites of website crash or server down can lead to few hits on financial issues. So it is economically feasible.

3.4 Structure System Requirment

3.4.1 Data flow Diagram:

A data flow diagram(DFD) is a graphical representation of the flow of data through an information system. It shows how information is input and output from the system, the sources and destination of that information, and where that information is placed.

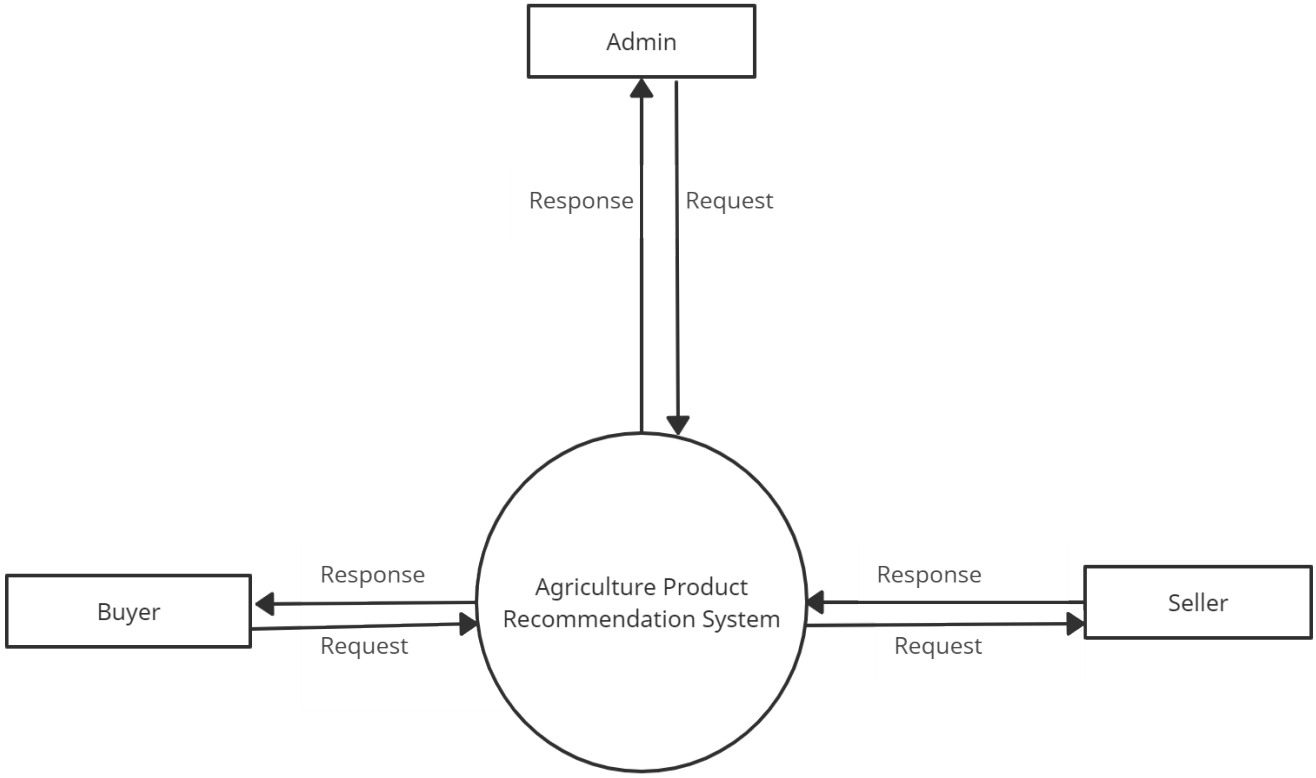


Figure 3.4.1 DFD Level 0

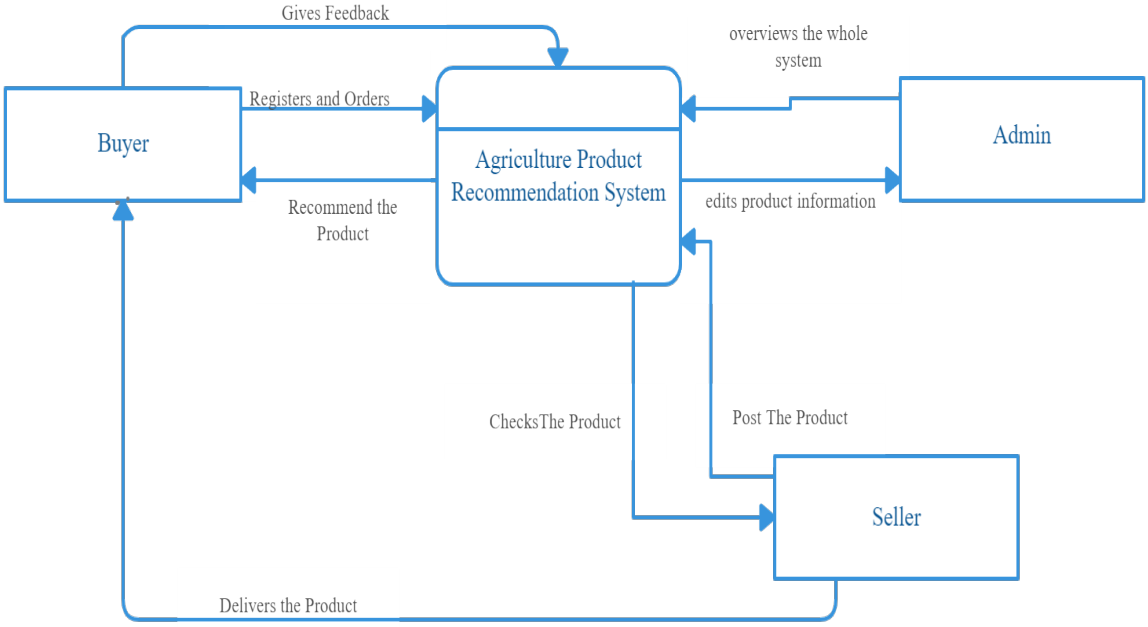
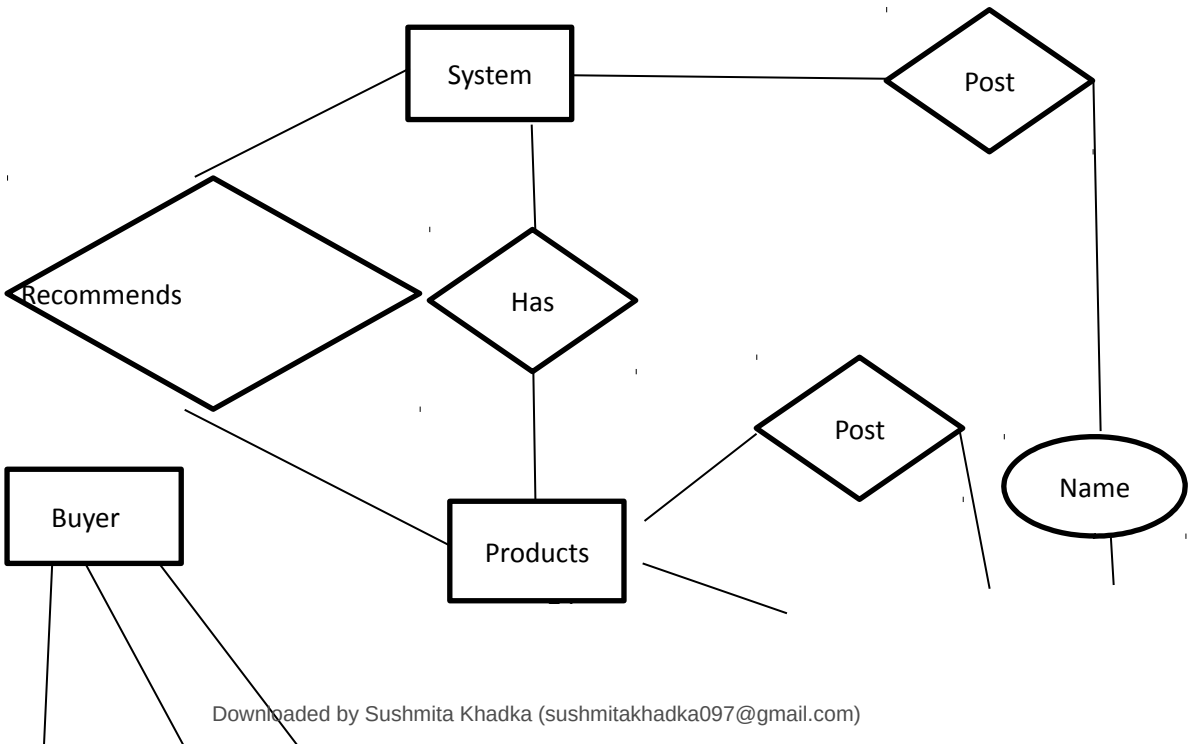


Figure 3.4.1 DFD Level 1

3.4.2 ER Diagram

An entity-relationship (ER) model describes interrelated things of interest in a specific domain of knowledge. It is composed of entity types and specific relationships that can exist between entities.



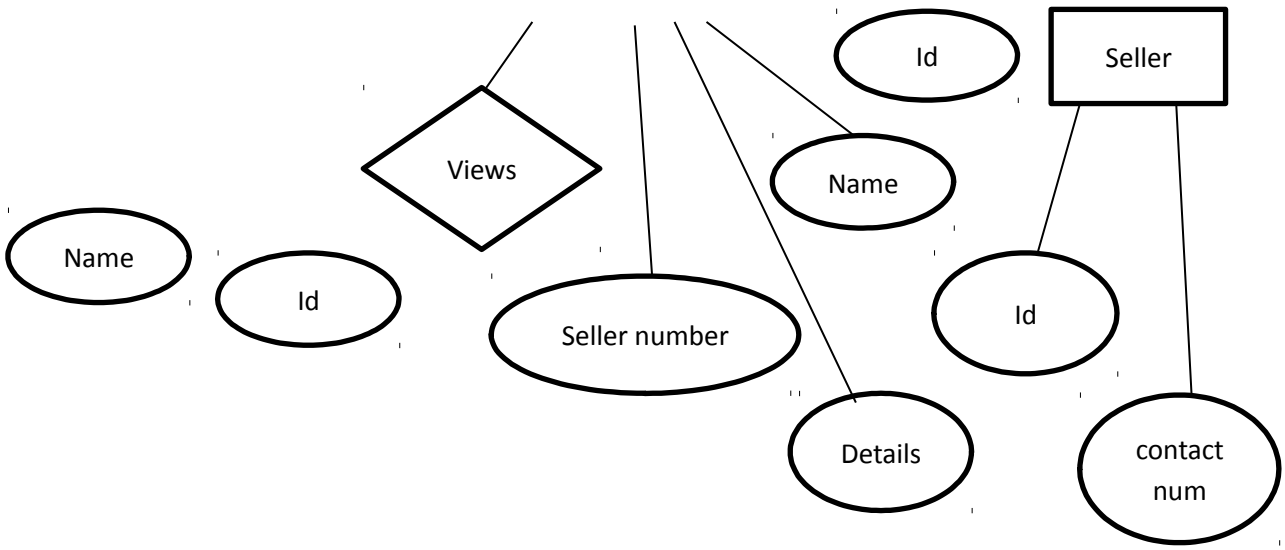


Figure 3.4.2 Entity Relationship

3.5 Software and Hardware Requirements

Software: Windows 10,8,7 64-bit or 32-bit, Web browser.

Hardware: Windows computer, smart phone, stable internet connection.

3.6 Tools Used

Front End: CSS, HTML, JS

Back End: Php

Chapter 4 System Design

4.1 Architectural Diagram

The system needs architecture diagram to represent the functionality of the system. It is the concept that focuses on components or elements of the structure.

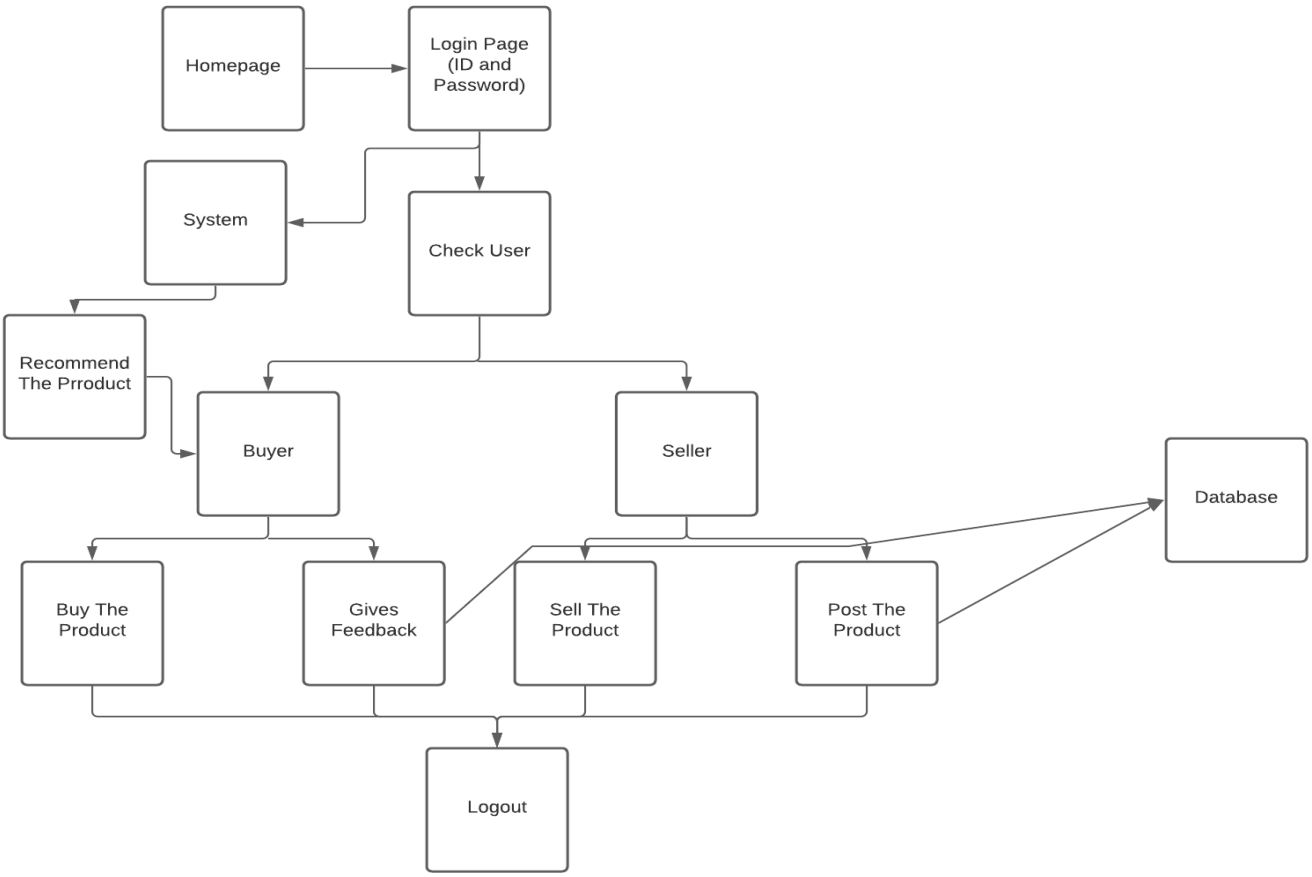


Figure 4.1 Architecture Diagram

4.2 Activity Diagram

An activity diagram is a graphical representation of an executed set of procedural system activities and considered a state chart diagram variation. Activities diagram describe parallel and conditional activities, use cases and system functions at a detailed level.

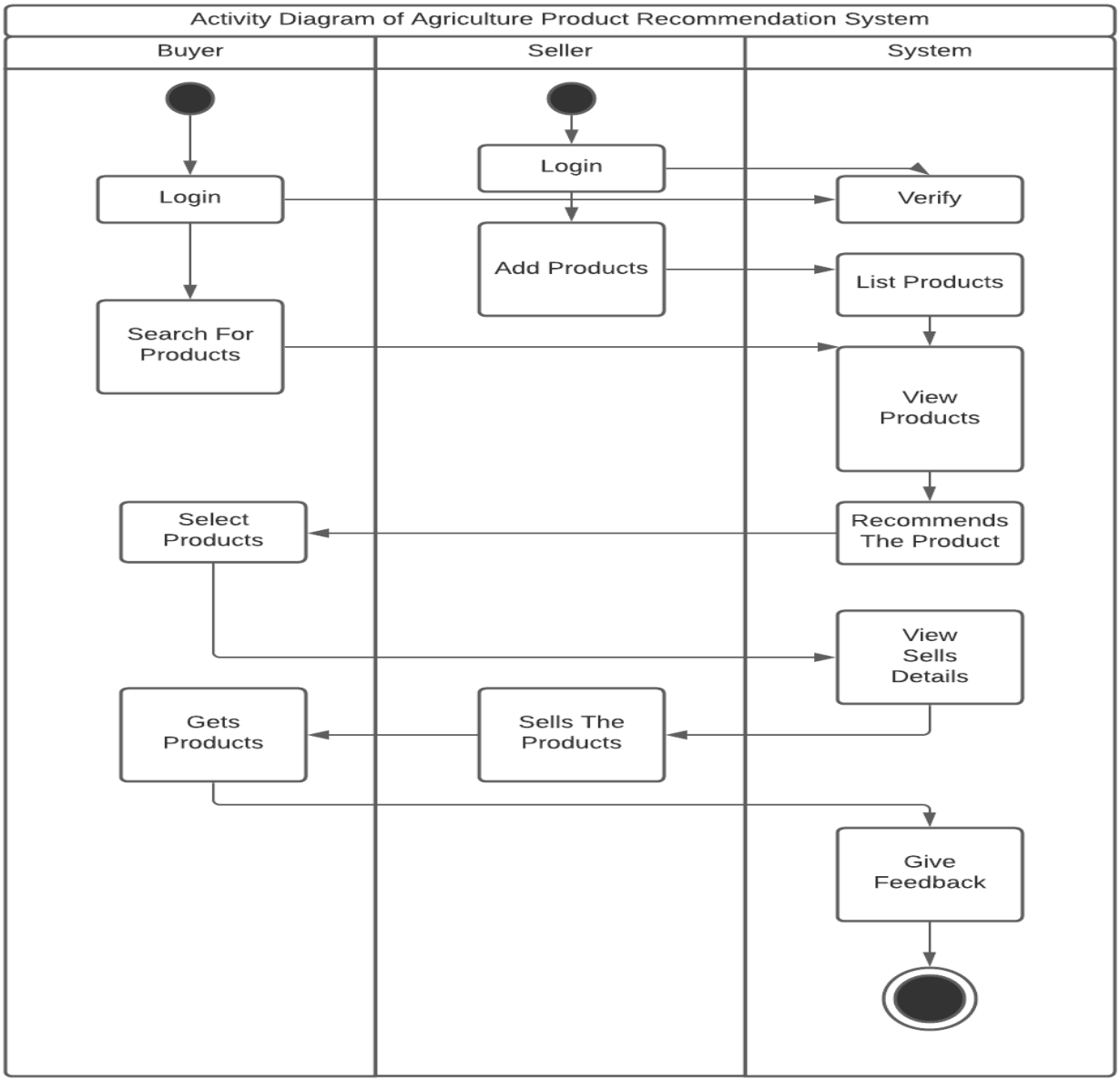


Figure 4.2 Activity Diagram

4.3 Database Design

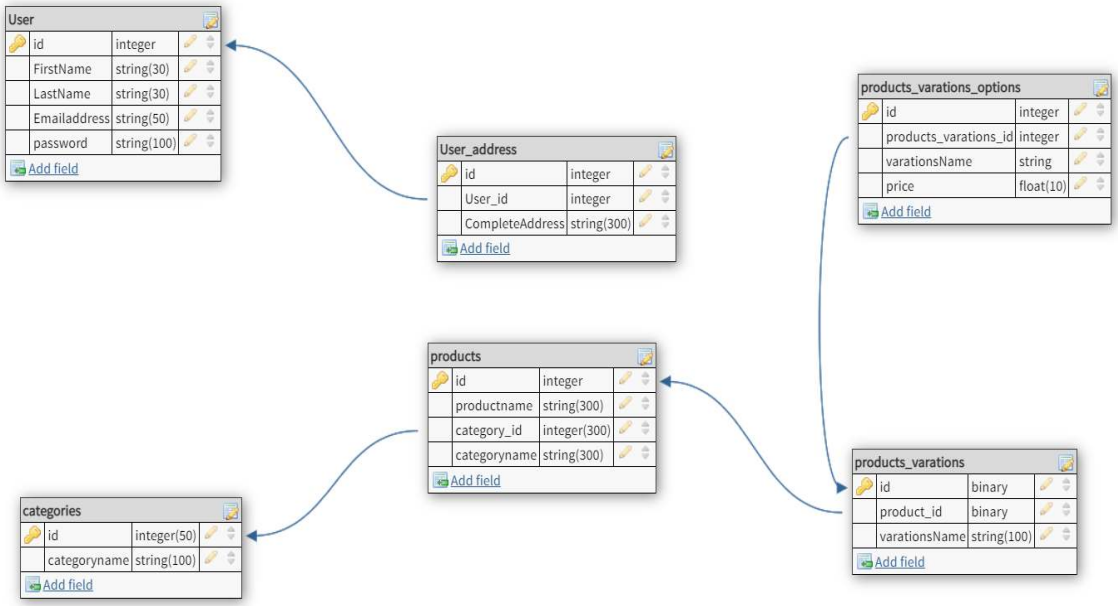


Figure 4.3 Database Design

4.4 Algorithm

The algorithm used for this site is Collaborative Filtering which is a technique used by recommendation system. Collaborative filtering is a family of algorithms where there are multiple ways to find similar users or items and multiple ways to calculate rating based on ratings of similar users. Collaborative filtering systems have many forms, but many common systems can be reduced to two steps:

Step 1: Look for users who share the same rating patterns with the active user (the user whom the prediction is for).

Step 2: Use the ratings from those like-minded users found in step 1 to calculate a prediction for the active user

This falls under the category of user-based collaborative filtering. A specific application of this is the user-based Nearest Neighbor algorithm. Alternatively, item-based collaborative filtering (users who bought x also bought y), proceeds in an item-centric manner:

1. Build an item-item matrix determining relationships between pairs of items
2. Infer the tastes of the current user by examining the matrix and matching that user's data.

In the CF recommendation algorithm, the most important thing is to calculate the similarity between users. In order to calculate the similarity between two users from the user-item rating matrix, many user similarity measures are proposed.

The COS is one of the most popular similarity measures in CF recommendation algorithms. It is the cosine of the angle between two vectors in vector space as a measure to the difference between two individuals. The user rating is regarded as a vector in the *n*-dimensional project space. If the user does not rate the project, the user's rating of the project is set as 0, and the similarity between users is measured by the cosine angle between the vectors.

Let U={u1,u2,…,um} and I={i1,i2,…..in} be the set of users and items, respectively. The user-item rating matrix is expressed as $R=[r_u]^{m*n}$. Here, m and n are the number of users and items, respectively. The $r_{represents}$ the rating made by the user of u on the item of i. And, r_u is represented the average rating of user .

The COS equation is defined as follows:

$$\text{sim}(u,v)^{\text{COS\_User}} = \frac{r_u \cdot r_v}{\|r_u\| \cdot \|r_v\|} = \frac{\sum_{i \in I_{uv}} r_{u_i} r_{v_i}}{\sqrt{\sum_{i \in I_{uv}} r_{u_i}^2} \sqrt{\sum_{i \in I_{uv}} r_{u_i}^2}}$$

Expected Output*:*

1. System should be able to list, rank and advertise the agricultural products.

2. Will provide a platform for advertising, buying and selling of agriculture products.

3. User must be able to receive best possible products.

4. Users are able to reach wide range of Market.

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