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Design and Prototypical Implementation of an Online Auction System: "Farmer's Market"

An online market for farmer and trader

Design and Prototypical Implementation of an Online Auction System: "Farmer's Market" (an online market for farmer and trader)

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Abstract

Effective market information systems can help to reduce information asymmetries, increase competitiveness, and improve efficiency in the marketing system. In Bangladesh, these aspects of agriculture have been very much neglected. As a consequence, the small farmers do not get proper price for their products, whereas, he middlemen get the lion's share of benefit. Thus, lack of dissemination of market information and the bargaining capability of the farmers across the agricultural supply chain is a major concern in Bangladesh. Since increased mobile penetration will help in up scaled access of Voice & Data, mobile banking, Agri-service - through mobile phones are expected to rise etc which provides with the new opportunities and challenges for agricultural product marketing. The "Farmer's Market" online auction marketplaces will allow for the buyers(farmers) and sellers to overcome geographical constraints and purchase and sell products anytime from anywhere over the internet. Farmer`s market provides the buyer and seller with great advantages of appropriate prices, greater product selection opportunity, and greater efficiency compared to the usual traditional offline markets.

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Chapter-1: Introduction

1.1 Overview:

In Bangladesh, where more than 75 percent agricultural producers are small and marginal farmers, market information is an important fact that can facilitate in ensuring the functions in the agricultural marketing system. Particularly for small-scale producers and traders, who typically have limited access to, and understanding of market information and analysis. Market information is an important fact facilitating the functions in the agricultural marketing system. It facilitates marketing decisions, regulates the competitive market process and simplifies marketing mechanisms. Reliable market information is needed by farmers in planning production and marketing timely as well as by other market participants in arriving at optimal trading decisions. In Bangladesh, where more than 75 per cent agricultural producers are small and marginal farmers. Marketing information service should ideally be available to all. Removal of inter and intra-state restrictions on storage and movement of agricultural production demands, existence of complete and accurate marketing information services to the farmers to facilitate better realization of prices for the produce of marketed items. To eliminates the unnecessary intermediaries and reduced cost for both buyers and sellers **"Farmer's Market"** will be an integrated online auctioning system. By using this system small farmers get help to strengthen their bargaining position and improve their understanding of marketing opportunities and options. Finally, for the traders, the envisioned system can help them to identify producers and other traders and expand their business and bargain more effectively.

1.2 Problem Statement:

Poor bargaining strength of farmers: Millions of smallholders with small scattered individual production do not have any network or bargaining platform to negotiate for better prices, nor are they able to retain their own production to increase time utility.

Unnecessary intermediaries between the producer and the consumer: Farmers are always dominated by the local traders i.e. Faria, Beparis and Aratders. They assemble small quantities from and around the primary markets, incurring extra costs, time and efforts

Lack of realistic demand assessment: Production targets are set by lead departments on an ad-hoc basis assuming some linear trend of growth in recent years, without considerations of quantity already in storage, information about production situation and market demand of

products. As a result, the classic farm management question – of how much to produce - remains in a vacuum, and the price to be received becomes something of a chance

1.3 Objectives:

The Major object of this report are to explore following thing

i. To identify Existing challenges, face by farmer for agriculture product marketing.

ii. To Analyse, design and develop an online auction system that ensures the buyers on the sellers and the products that are being auctioned.

1.4 Report Outline

This report basically consists of several chapters that are outlined as below: Chapter-1 provides a general overview of what the whole project is all about such as project aim, objective, scope and the outline of the report. Chapter 2; provides methodology of the project which include the first part of the literature review focuses on existing scenario of Agriculture production marketing In chapter 3 states overall concept of auction system and the different type of auction system and it also looks at the different strengths and weaknesses of the current existing systems. And, finally describes an overview Bangladesh existing online agriculture market information system , the proposed system overview and the business model of the system. Chapter 4 states an overview of functional and non-functional requirements as well as the core use cases of the proposed system are also introduced in Chapter 4 it's also including the data model, system design, Class diagram, Activity diagram, sequence diagram. The implementation and the system architecture are states in Chapter 5. Chapter 6 concludes the report by discussing the findings and proposing, future endeavors in the area of farmer's market application. Finally reference and annex part is in last part the report.

Chapter-2: Literature Review

2.1 Background Study:

Agriculture is one of the major driving forces of the Bangladesh economy, providing employment to just under half the workforce and contributing around 20% towards our national GDP. In Bangladesh, where more than 75 per cent agricultural producers are small and marginal farmers. Market information is an important fact facilitating function in the agricultural marketing system. Particularly for small-scale producers and traders, who typically have limited access to, and understanding of market information and analysis.

Imperfect information and high transaction costs can constitute major impediments in the agricultural marketing process (Dao, 2004). The potential impact of lack of knowledge and other relevant information on the bargaining power and productivity of the farmers is reflected. Kizilaslan (2006) argues that proper dissemination of information for agricultural and rural communities is a crucial tool in the fight against poverty and deprivation. Information helps the poor to avail of the opportunities and also reduce their vulnerability. Kiplang'at (1999) postulates that dissemination of relevant information to the farming communities can facilitate the effective adoption of agricultural inputs, decision making on markets and adoption of scientific methods.

Intermediaries are essential part of agriculture products supply chain in Bangladesh. They share profit with producer. But farmer in Bangladesh cannot avoid intermediaries' for shifting their product to market (Das and Hanaoka, 2010). Agriculture products prices in any markets are not stable, especially in rainy and flood seasons when traders are those who confuse the markets. Relationship in the value chain for agriculture products is very important. Payment for agriculture products by urban is privileged than rural market. Besides, agriculture products have been influenced by raising fuel prices, higher transport fees etc. The government has no supports agriculture products supply chain through agriculture and business extension center: technical training, financial support for farmers and businessman, cold storage, highway police, market monitoring cell etc.

In the value chain of agriculture products in the Bangladesh, farmers are main suppliers who supply by intermediaries most of agriculture products to urban market in supply chain. Some farmers sell to traders and mostly selling in rural market because of many barriers in supply chain and middle man convenience to farmers and compared to retailing their own product.

Figure 1:Scenario of present supply chain of vegetables in the domestic market.

Source: A Market price survey conducts by Nobinkhor Kundu1 Nigar Sultana and Farhana Sehreen (2011) on rural market.

A Market price survey conducts by Nobinkhor Kundu1 Nigar Sultana and Farhana Sehreen (2011) on rural market, urban whole sale and urban retail market on a particular week, February 2nd week in FY-2011. Rural market mentioned at local market (Coatchadpur, Jibonnagar) under Jessore district and local market (Nimsar, Chandina) under Comilla district. Whole sale urban market mentioned at Kawran bazar under Dhaka district, and also urban retail market mentioned at Mirpur, Uttara and New market kacha bazar under Dhaka district.

Table 1:Market price Comparison between Urban and Rural Market

Name of agriculture products	Rural market cost price (rm) TK. per quintal	Urban retail market cost price(ur) TK. per quintal	Urban whole sale market selling price(uw) TK. per quintal	Urban retail market selling price(ur) TK. per quintal	% of Price Increase
Eggplant	1696	2611.7	2711.3	4000	136%
Tomato	1802	2975.6	2975.6	4500	150%
Chili	2544	3703.1	3803.1	5500	116%

There is increasing Price difference because of the increasing number of intermediaries. Price difference, on the contrary, can be reduced if the number of intermediaries can be reduced. Matin et al (2008) shows that price at outlet at distant market (Dhaka) become almost double higher than that at farm. Several studies on analysis of supply chain on determination

agriculture products price in Bangladesh pragmatic that rural and urban market price is wide gap. Sabur (1990) showed marketing for eggplant and tomato was as higher as 74%. Perishable product marketing depends on many intermediaries due to the absence of requisite infrastructure and cause huge delivery cost and physical wastage. So Several studies on the supply chain transportation system and various unlawful activities are most vital reason for price discrimination between rural and urban market. The analysis of supply chain is one of the most vital factors in formatting the price mechanisms. The supply chains of agriculture products are dominated by traditional businessmen (middlemen). Without growers and consumers, all groups of businessmen are benefited by many ways. Growers got for agriculture products, like as, eggplant is 1600 TK/Quintal, tomato is 1700 TK/Quintal and chili is 2400 TK/Quintal, urban consumers, other hand, paid for same eggplant is 4000 TK/Quintal, tomato is 4500 TK/Quintal and chili is 5500 TK/Quintal. So change in price of eggplant is 150%, tomato is 164.7%, and chili is 129.1%. So, growers and urban consumers toward between show wide gap. Unfortunately, this gap creates not improvement of growers and urban consumer's living standard and effect of this gap is sinking purchasing power. Use of ICT can improve the availability and delivery of information in a user friendly manner to the farmers and other market participants

2.2 Analysis of Existing Auction Systems

Before starting with the project, considerations of current existing system and their functionalities are taken into account, then decide on the kind of system architecture and software technology to use. The first part of the project is an investigation of already existing on-line auction systems around the internet. Two famous auction systems considered for this project are eBay, uBid.

2.2.1 eBay Auction System

Online auctions, in particular, exemplify a huge growth rate that was made possible by Internet technology. eBay, the premier online auction retailer with over 80% of the online auction market, boasts that, on any given day, there are more than 12 million items listed on eBay across over 18,000 categories. The major beauty of eBay has long been the fact that anyone can sign up and start selling without any experience or complicated store front set-up. Even sellers without stores even get 100 free listings a month under its fee structure. This type of selling has attracted many smaller scale sellers over the years but rising fees and increasing feedback and customer service requirements have alienated many.

eBay provides a lot of buyers with the convenience of shopping online. EBay also offers international shipping to many purchasers around the world. Still, whether you are buying or selling on eBay, there are a number of disadvantages that are evident and this project addresses some of these disadvantages that are presented by eBay auction. The advent of online auctions such as eBay and uBid has made shill bidding much more exploitable. This is because it is relatively simple for a seller to register under many aliases and operate this illegal fraud. eBay has been involved in many legal disputes where the bidders and the sellers have been accused of shilling (Schwartz et al, 2002). eBay has a policy for shilling that clearly outlines the penalties for shill bidding. The regular process for the bidder who suspects that that they have been shilled is to contact eBay, who then investigates the incident. With the new system it provides the shill scores for the different buyers there is no need to first make calls to make complains.

2.2.1 Ubid.com

The other current existing online auction that was analysed is Ubid.com. UBid is one of the world leading UBid is one of the leading online auction and e-commerce site that offers live auction bidding using sophisticated auction technology uBid.com is a leading on-line auction and e-commerce site offering brand name products to both consumers and businesses through live-action bidding using sophisticated auction technology. The company's Internet auctions feature a rotating selection of brand-name computers, consumer electronics, housewares, sporting goods and memorabilia, and jewelry. uBid also meets Better Business Bureau Online standards, which gives customers the confidence and security to bid safely online.

The site specializes in excess new, refurbished and overstocks consumer electronics such as computers, electronics, home goods, jewellery, watches and cellular phones. uBid.com is not a penny auction site where it sells bids, nor does it open its platform compared to eBay to any third-party sellers without being approved. Sellers must be approved with the idea that the platform should avoid counterfeit, infringing, stolen or other questionable products on its platform.

2.2.3 Existing eMarket Place available in the Bangladesh

Bikroy.com and cellbazar.com are the websites where you can buy and sell almost everything. You can also buy and sell the agricultural products from these market places. The best deals are often done with people who live in your own city or at your own street; cellbazar.com and Bikroy.com are easy to buy and sell locally.

The Krishi Market (http://www.krishimarket.com/) is one of the agro-based online shopping market in Bangladesh. You can buy many kinds of agro based products here. There is a huge number of made transactions every day. Many kind of product categories are available here.

"Banglalink Krishibazaar" that eventually empowers the farmers with important market information and eliminates the middleman. To know the latest market prices of essential agro produces in 18 major markets across the 7 divisions of Bangladesh to find other agro buyers and sellers. Agro buyers and sellers can post or browse their desired agro product info in the service for selling or buying. The seller or buyer can also call up his/her desired seller or buyer instantly by pressing "8" and finalize the deal. The information of the products is available by categories, prices, locations, etc. to make the process easier.

Krishi Barta is an agro portal for Robi customers especially targeting the 'farmer' community of Bangladesh. This basket of services will be helpful to anyone who is directly or indirectly related to agriculture or agribusiness.

e-Krishok: BIID's agricultural service is branded as e-Krishok, an initiative which is aimed at farmers with the desired goal of providing services from which farmers will benefit both in terms of their farming activities and opening up opportunities in new avenues which will ultimately translate into increased income for farmers. Farmers with any problem or query or issue which is related to agriculture can go to nearby ICT enabled Information Center / Telecentres and receive the information that they are seeking. The information usually provided to them in a timely and quick manner, so that the farmers can get on with their activities. With such timely and appropriate information, farmers will be able to maximize their economic gain; enabling them to achieve income growth through agricultural activities. e-Krishok is now in a process of transforming into a transactional service. BIID in collaboration with Grameen Phone (GP) introduced SMS/call back service via Short Code.

Bangladesh Government developed agricultural policies, plans, regulations, acts, etc. for sustainable agricultural development and for food sufficiency. It provides support in developing new agricultural technologies to boost up agricultural production and coordinate in local and international trade agencies for marketing. Agriculture Information Service, Bangladesh Agricultural Research Council (BARC),Ministry of Agriculture.

Table 2:Comparison of Existing e Portal for Agriculture price information

System	Feature	Platform	Facility
Agricultural Market Information for Farmers (AMIS)	Market Price Information	Mobile phone, SMS	Market price information
Ekhanei (was Cellbazaar)	Buyer/Seller Matching	web, mobile phone, SMS	Offers a virtual marketplace for the 20 million mobile-phone subscribers of Bangladesh's GrameenPhone Ltd. See agriculture category
e-Purjee: Digital Purjee Information Service	Procurement	mobile phone, SMS, telecenter, software	The Digital Purjee Information Service via SMS ensures timely harvest, enhanced income for farmers, and ready supply of raw materials for sugar mills.
e-Krishok	Agricultural Extension Services	mobile phone, voice, SMS	e-Krishok offers information and advisory services through mobile phones (call back and SMS) and email. All information is sourced from the government and private sectors: e-Krishok collates and disseminates this directly to farmers.
Banglalink Channel I Krishi News 3646	Agricultural Extension Services	IVR	IVR based service where agro professionals can get the latest and crucial agriculture news.
jigyasha 7676	Agricultural Extension Services	Voice	Helpline providing advice on agriculture, vegetable and fruit farming, poultry, livestock, fisheries
krishibazaar	Market Price Information, Buyer/Seller Matching	IVR	IVR based services to access market prices and allow buyers and sellers to find each other

Chapter -3 Auction System &Farmer's Market

3.1 An Overview of Auction Systems

Electronic markets especially those based on the internet have become popular by providing platforms to conduct business transactions (Brien, 2001). In fact, it can be argued that the auction based electronic markets best represent the changes tko business inherent in e-commerce. Auction systems are a major component of the electronic marketplace that allow users at any site to sell and buy products. The sellers set up auctions for their different products while the purchaser who bids the highest amount wins the right to purchase the product in an auction.

In general auction systems usually make use of different various agents, the commonly used kind of agents include Purchaser Agent, Seller Agent and Facilitator Agent. Whereas the Seller Agent provides the function of registering goods for an auction to the sellers. This design maximizes the probability that the product auctioned sells. The second agent is the Purchaser Agent that requires bidding to buy and it suggests a proper bidding price by analyzing the bidding history of the bidding competitor. The third agent is the Facilitator Agent that plays the role of an auctioneer and enables a bidder to look at the other person's auction history while bidding for and buying a product.

The auction system runs on a set of host computers connected via a network. Clients access the auction system from one of these computers. The system allows the clients to buy and sell items by means of auctions.

Back in the history of auctions it was relatively not the most common way to negotiate the of goods or commodities. It was overlooked as most people preferred buying using the set-price. Before the seventeenth century the few auctions that were held were sporadic. Nonetheless, auctions have a long history, having been recorded as early as 500 B.C. According to Herodotus, in Babylon auctions of women for marriage were held annually. The auctions began with the woman the auctioneer considered to be the most beautiful and progressed to the least. It was considered illegal to allow a daughter to be sold outside of the auction method

Auctions were even popular during the Roman Empire. Later slaves, often captured and they, were auctioned in the forum under the sign of the spear, with the proceeds of sale going towards the war effort.

Auctions have dramatically over the years and now auctions are carried out over the internet. An online auction is an auction which is held over the internet. Online auctions come in many different formats, but most popularly they are ascending English auctions, descending Dutch auctions, first-price sealed-bid, Vickrey auctions, or sometimes even a combination of multiple auctions, taking elements of one and forging them with another. The scope and reach of these auctions have been propelled by the Internet to a level beyond what the initial purveyors had anticipated. This is mainly because online auctions break down and remove the physical limitations of traditional auctions such as geography, presence, time, space, and a small target audience. This influx in reachability has also made it easier to commit unlawful actions within an auction. In 2002, online auctions were projected to account for 30% of all online e-commerce due to the rapid expansion of the popularity of the form of electronic commerce

3.2 Proposed System overview

To ensure proper price of products to the farmers, the envisioned system, **Farmer`s Market**, is a B2B e-trading place which is an online auction and trading platform where farmers and traders will buy and sell agricultural products. The "Farmers Market" provides modern facilities to assist in ensuring fair price for all parties, namely both farmers and buyers, reduces logistical burdens, and provide relevant information at fingertips. This Farmer's market system only allows for the auctioning of all kinds of agriculture crops such as Rice, Potato, Wheat etc.

- The market has an online auction system so farmers, buyers and agents can trade from anywhere.
- The system offers 24/7 visibility, transparent price discovery, and options to buy or sell bulk quantities.
- The System have a mobile interface, so users can use the system from anywhere including their mobile devices.
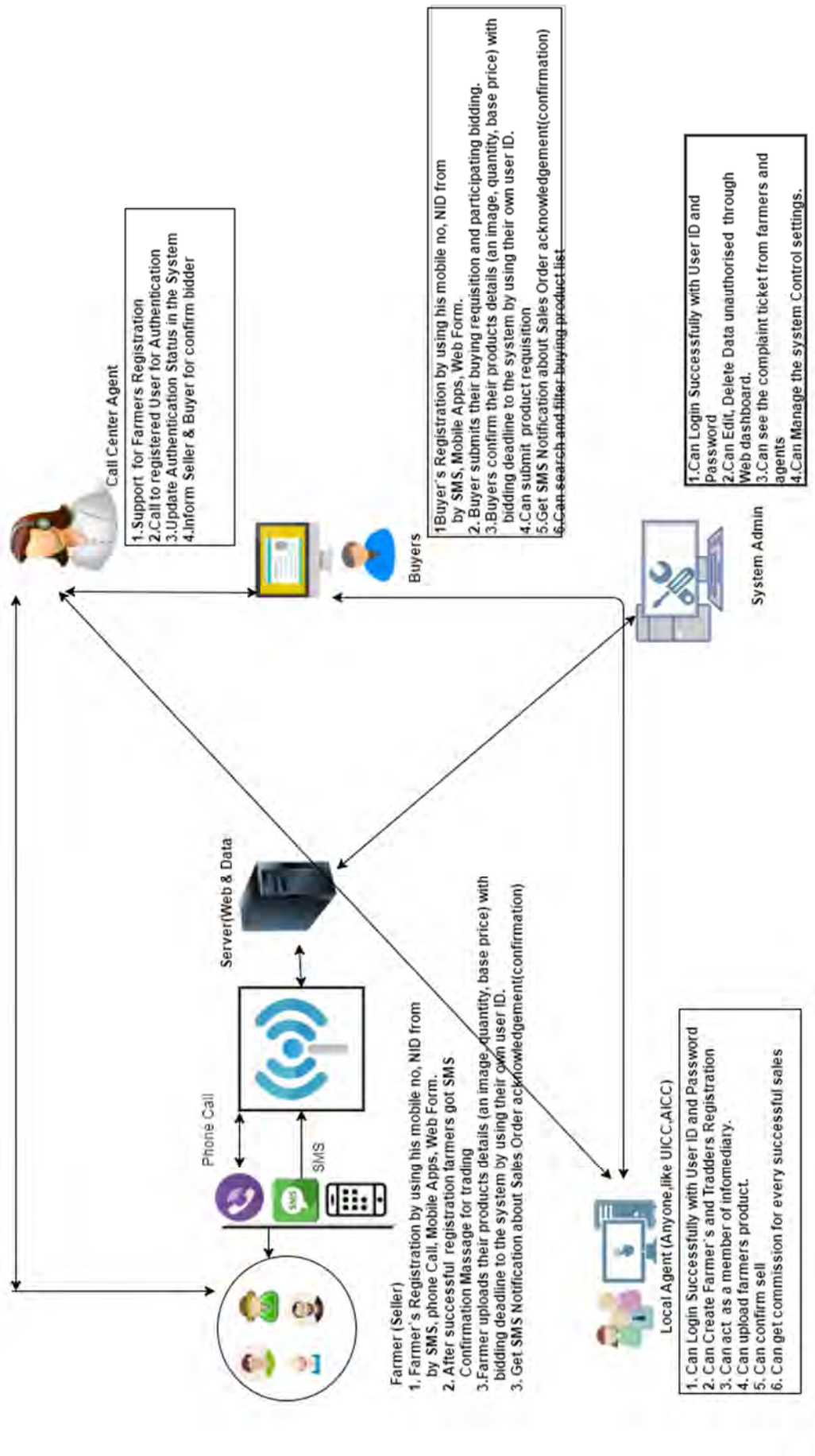
Benefits for Farmers:
- Price transparency ensures fair price for farmers' efforts
- Marginalized farmers can access market information and plan according to market demand.

Benefits for buyers:
- Easy discovery of market prices from cell phones.

- Place orders without physically being at the market.
- Buyers will have access to the market 24/7.

Only registered potential buyers and sellers participate in any of the auctioning process. The use of online auction system makes use of the decision making assistance tool that results in greater buyer's certainty towards their choice of the seller's and product that they make. The decision making assistance tool consists of three parts that is the product information signals, seller's rating scores and seller's shilling activities. The product information signals seek to fully describe the product through the use of textual and visuals, description of the product characteristics, the product usage and book value. This strives to ensure the buyer's product certainty. The decision making assistance tool also provides for seller's ratings by making use of the feedback scores. These feedbacks are given by previous winning bidders and they evaluate the online auction product sellers. These bidders give detailed seller ratings of all aspects of the seller and giving scores for example giving scores of how satisfied they were with the seller's communication and similarly Seller give detailed trader ratings of all aspects of the trader and giving scores for example giving scores of how satisfied they were with the trader's communication.

Figure 1:System Overview of Farmer's Market

Call Center Agent
1.Support for Farmers Registration
2.Call to registered User for Authentication
3.Update Authentication Status in the System
4.Inform Seller & Buyer for confirm bidder

Buyers
1Buyer's Registration by using his mobile no, NID from by SMS, Mobile Apps, Web Form.
2. Buyer submits their buying requisition and participating bidding.
3.Buyers confirm their products details (an image, quantity, base price) with bidding deadline to the system by using their own user ID.
4.Can submit product requisition
5.Get SMS Notification about Sales Order acknowledgement(confirmation)
6.Can search and filter buying product list

System Admin
1.Can Login Successfully with User ID and Password
2.Can Edit, Delete Data unauthorised through Web dashboard.
3.Can see the complaint ticket from farmers and agents
4.Can Manage the system Control settings.

Server(Web & Data)

Phone Call

SMS

Farmer (Seller)
1. Farmer's Registration by using his mobile no, NID from by SMS, phone Call, Mobile Apps, Web Form.
2. After successful registration farmers got SMS Confirmation Massage for trading
3.Farmer uploads their products details (an image, quantity, base price) with bidding deadline to the system by using their own user ID.
4. Get SMS Notification about Sales Order acknowledgement(confirmation)

Local Agent (Anyone ,like UICC,AICC)
1.Can Login Successfully with User ID and Password
2.Can Create Farmer's and Tradders Registration
3.Can act as a member of infomediary.
4.Can upload farmers product.
5.Can confirm sell
6.Can get commission for every successful sales

✦ UICC-Union Information & Service Center
✦ AICC-Agriculture Information & Communication Center
✦ FMS -Farmers Market System

3.3 Business Value Proposition for Farmer's Market System

A business model describes the rationale of how abusiness creates, delivers, and captures value. For farmer's market system.The Business Model Canvas is a strategic management template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's value proposition, infrastructure, customers, and finances

Table 3: Business Model Canvas

Problem	Solution	Unique Value Proposition	Unfair advantage	Customer segments
1. Middlemen influence the price of the commodities . 2. Farmers cannot easily sell their commodity at appropriate price.	1. Reduce middlemen activity	1. Farmers can sell their commodity appropriate price.	1. Such kind of bidding system does not exist in Bangladesh	1. Farmer 2. Trader 4.Local Agent (UICC, NGO 6. Mobile/internet Service provider
		2. The consumer can buy their goods proper price.	2. Farmers can get proper price by using system	
		3. System owner can get some valuable profit from it.	3. Farmers can easily compare market price by visiting web app	
		4. Reduce middlemen activity	4. Consumer can buy fresh products from field by using app	
		3. Proper balance on Market Demand & Supply		

Key Activity	Channels	
1.Develop ICT platform for farmers	1. Local Intermediary(NGO, Government)	
2. Provide different marketing initiative	2. Mobile Application	
3. Familiarization farmers with this system.	3. Web Application	
	4.Social Media	

Cost structure	Revenue Streams
1. Software Development 2. Human resources cost 3. Server Maintains & Support 4. Server Maintains & Support 5. IVR & SMS Gateway 6. 3rd Party Financial Gateway	1. Registration fee 2. Advertisement Fee 3. Transaction Fee

Chapter 4: System Analysis and Design

4.1 System Requirements

This section introduces the requirements for the prototypical implementation of an online trading application "Farmer's market". The project requirements were initially not clear and changed during the project in several major evolutionary steps. This section only reflects a summary of the most recent state of the requirements initial requirements set, nor their history. As a primary step of the project is to find out the functional requirement of application (Farmer's Market) with the help of techniques like Use Cases and User Stories.

4.1.1 Use Cases and Functional Requirements

System Users		Use CASE
Administrator	1	*Can Login Successfully with User ID and Password*
	2	*Can Manage Items*
	3	*Can Mange user(Access data on users, Modify data on user, delete user)*
	4	*Can Manage categories(Access Data on categories, Modify data on categories, delete categories, Add new categories)*
Buyers	1	*Can Login Successfully with User ID and Password*
	2	*Can participate online bidding process as a buyer*
	3	*can received confirmation notification after bidding process completed, if his bid is highest*
	4	*Can Edit their profile data.*
	5	*Can search and filter based on different category.*
	6	*Give feedback to the Seller.*
Farmers	1	*Can Login Successfully with User ID and Password.*
	2	*Can Registration*

	3	*Can Upload products with auction time.*
	4	*Can search for in item based on different category.*
	5	*Can place a bid for Selling*
	6	*Can received Notification via SMS/Application notification*
	7	*Confirm sell after bidding process*
	8	*Can Give feedback to the buyer.*

As shown on the above table, there are three type of user of the system such as Farmer (Seller), Buyer(Trader), and a Admin User. Anyone who registered in the system can register to the system, browse the available items, post his/her bid and post a new auction. The administrator, on the other hand, can insert and modify available data about items, users and categories of items.

The following list describes the most important functional requirements that evolved during the system development:

1. The auctions shall be running in real-time. This means that clients always have current information visible. This is important for short time auctions, where the frequency of bids is relatively high.

4. An auction may consist of several slots, allowing the buyer to split the material desired among several Farmer. This allows to prevent a dependency on a single Farmer only, as well as to split delivery.

5. Different auctions may depend on each other. For example, depending on the results of simultaneous auctions, the buyer purchases percentages of competing materials.

6. Persons may participate in an auction in different roles: the auctioneer, the bidders

7. Different roles get different information at hand. Only the auctioneer can co-relate the bids to their bidders during the auction. Bidders appear to each other anonymously, but know how many competitors there are. Furthermore, bidders see their ranking.

9. The auction times may vary. Very short auctions may have an auction time as short as 15 minutes. Typical auction times are 1-3 hours.

4.1.2 Non Functional Requirements
Performance

The system must be interactive and the delays involved must be less. So in every action-response of the system, there are no immediate delays. The system shall display an activity indicator when elements take time to be loaded. The server must be robust with respect to any possible occurring failures.

Availability: The system must be available at all times, except when upgrading or restarting the backend database. In case of no network connection the system shall enable the admin to add, update or delete item entities to the server once the network connection becomes available again.

Safety: Information transmission should be securely transmitted to server without any changes in information

Reliability: The system is reliable in its operations and for securing the sensitive details. In short term auctions, the synchronization of client and server times is essential. An appropriate protocol must ensure that the server does not close the auction if a participant still believes it is open. A two phase dynamic protocol is used for this purpose in our system.

Availability: If the internet service gets disrupted while sending information to the server, the information can be send again for verification.

1. Cross site scripting (XSS) – Security of XSS is provided by removing all unwanted HTML tags of values and when the user is submitting HTML them we will use HTML Purifier to clean it before processing.

2. Cross site request forgery (CSRF) –CSRF middleware and template tag to provide easy-to-use protection against Cross Site Request Forgeries.

3. SSL/HTTPS – This will ensure that authentication of the website and associated web server with which one is communicating, which protects against man-in-the-middle attacks. Additionally, it provides bidirectional encryption of communications between a client and server, which protects against eavesdropping and tampering with and/or forging the contents of the communication.

Database Security: Sensitive data (e.g. password) will be stored in encrypted manner. Database backup will be taken in regular interval and stored in secured place. Database will be secured with strong password.

Usability: As the system is easy to handle and navigates in the most expected way with no delays. In that case the system program reacts accordingly and transverses quickly between its states.An intuitive graphical user interface is to be offered, that must be accessible through the web without any installation necessary. The software shall be downloaded from the Internet without any separate installation being necessary, and should run on currently common hardware and operating systems.

Interoperability: The System will able to communicate with other external system.

Localization: The system must be available in Bangla and English.

After discovering the functional requirements, the project goes on with the system design using the following techniques: Business Process Model and Notation Diagram (BPMN), the UML class diagram, the EER diagram for the database design.

4.1.3 Complementary Features of Farmer's Market

Farmer's Market systems provides complementary features that enhance a user's (both buyer and seller) experience with the site. In fact, many of these features are essential to success of an auction application.

Personalization

Bidders need an interface that allows them to create accounts, find product listings, and place bids. All sites require that bidders log in to place bids or initiate auctions. Authentication also allows the server to customize the user's view of the **Farmer's Market**.

Search

Catalogues and *search* features are two methods that enable bidders to find products, and both are typically provided on sites with large numbers of products. Catalogues are based on a natural, hierarchal organization of the products.

Payment and Escrow

Auction sites increasingly offer extra services to improve the security and efficiency of the marketplace. Two of the most common offerings are *payment* and *escrow* services.

Reputation Management

Reputation mechanisms are another common method of combating the fraud that often comes with the freedom afforded by anonymity. Reputation mechanisms collect feedback about a user and allow her to accumulate a personal history.

Integration with Online Payment Gateway

It is common, especially in B2B or B2C settings, for the auction system to be connected to a variety of other software systems such. Consider a company selling its products via an auction

4.2 Business Process Modeling:

The business model for the project under development is designed in terms of flow of information and the distribution of information between various business channels. By Using BPMN model, we find the vital information for business, how it can be obtained, how and when is the information processed and what are the factors driving successful flow of

information. Business Process Model and Notation (BPMN) will provide businesses with the capability of understanding their internal business procedures in a graphical notation and will give organizations the ability to communicate these procedures in a standard manner.
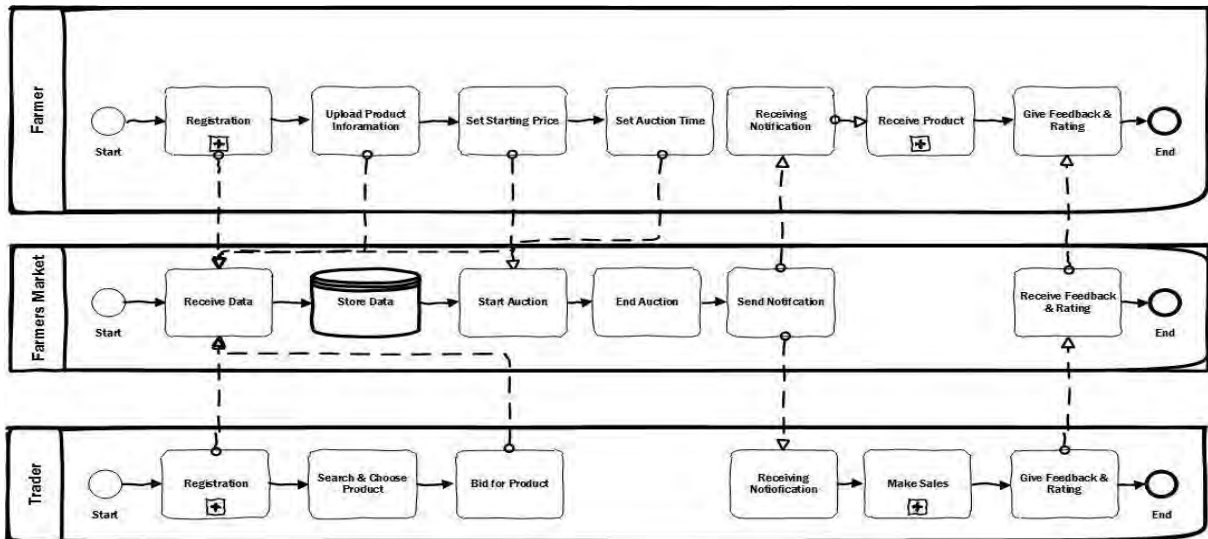

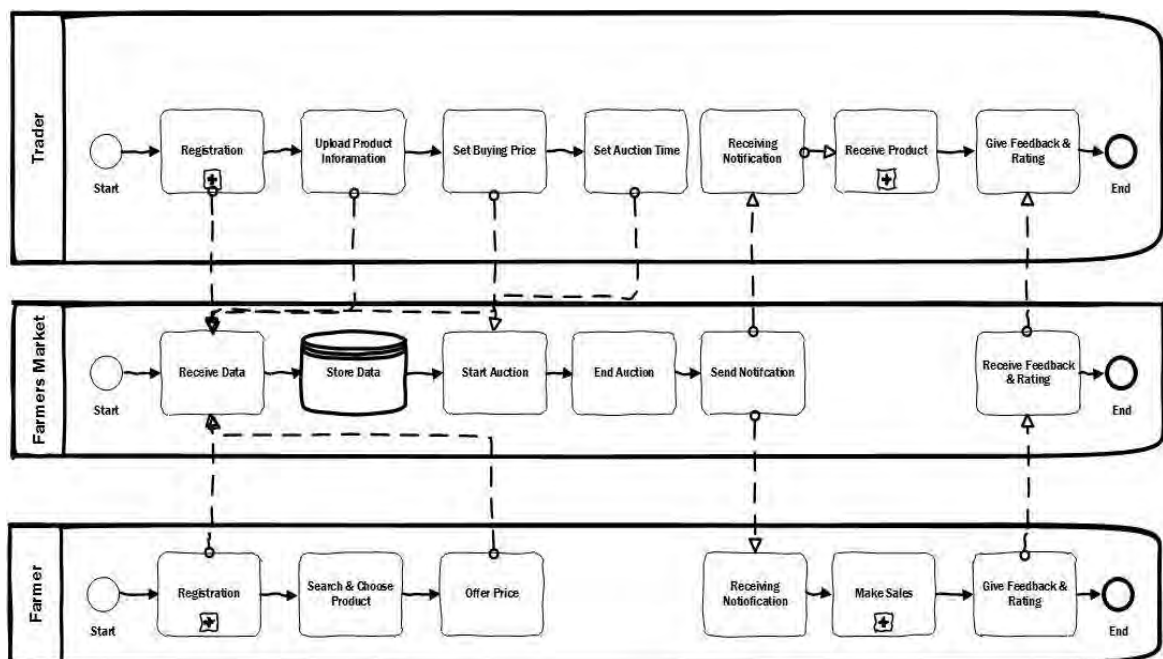*Figure 2:Business Process Network Diagram: Selling*

Figure 3:Business Process Network Diagram: Buying

Description of the diagram:

Farmer Role: At first Farmer can create their own account (bidder account and farmer account). Then Farmer uploads their products details with image to the system by using their own user accounts. After that the farmer can set an auction time with initial product price. Farmer can submit local wholesale price to the system. After a certain period of time farmer

will be notified from the system about the bidding status. Finally, Farmer will give feedback on buyer dealings.

Trader's Role: Bidder can also create their own accounts. They can bid each product from minimum level of price. Highest bidder get product. When bidder buy product, money from their online banking account deposit to our account. Here we are being middleman for reducing syndicates from vegetable market. After a certain period of time trader will be notified from the system about the bidding status. Finally, trader will give feedback on seller dealings.

How the bidding will happen?

Timed auctions take place without an auctioneer calling the sale. Each lot can be bid on for a defined time period. At the end of this period, the bidder who has submitted the highest bid wins the lot, provided the bid exceeds the reserve price.

4.3 Use case diagram

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.
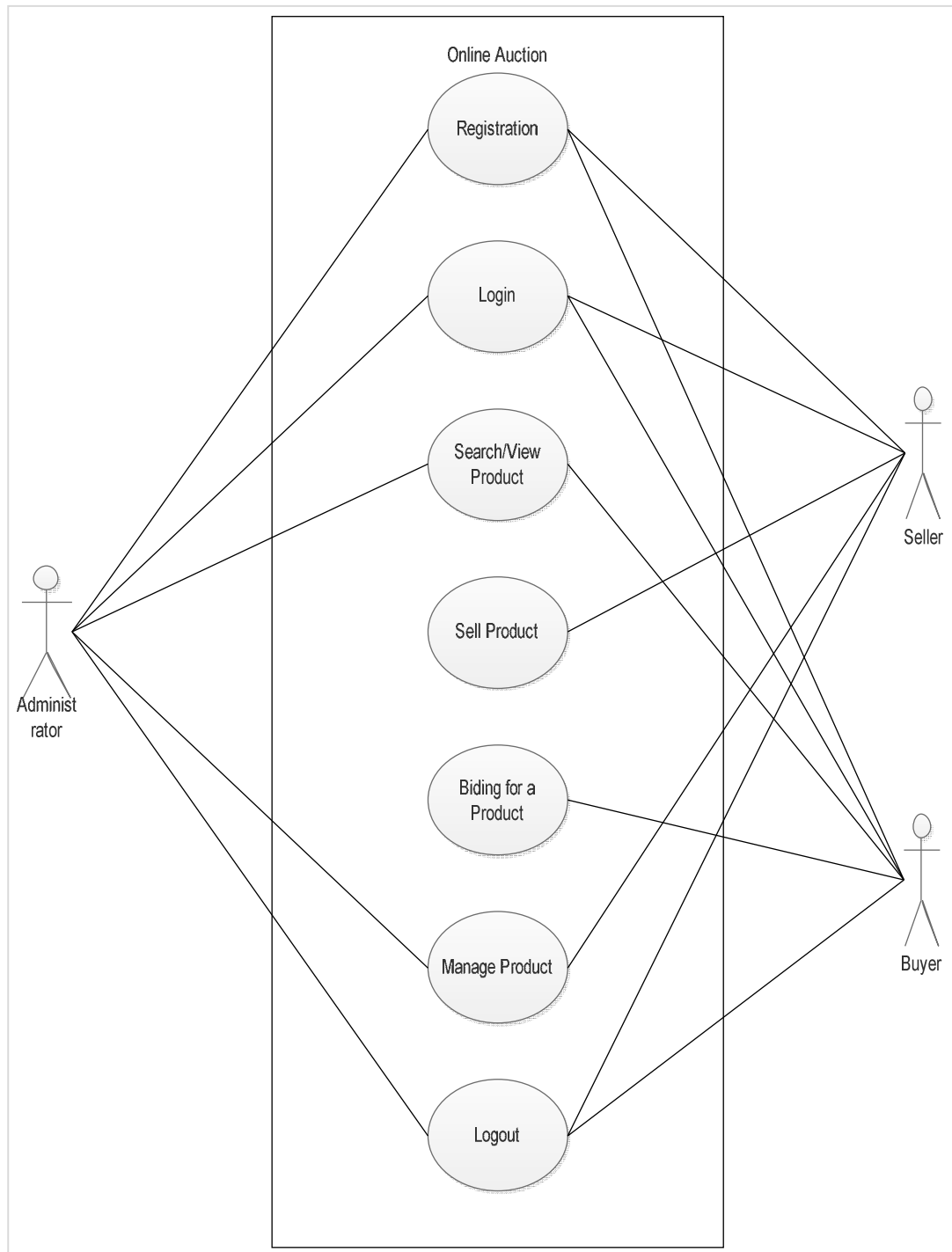

Figure 4:Use Case Diagram

4.4 Activity Diagram:

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. So the control flow is drawn from one operation to another.
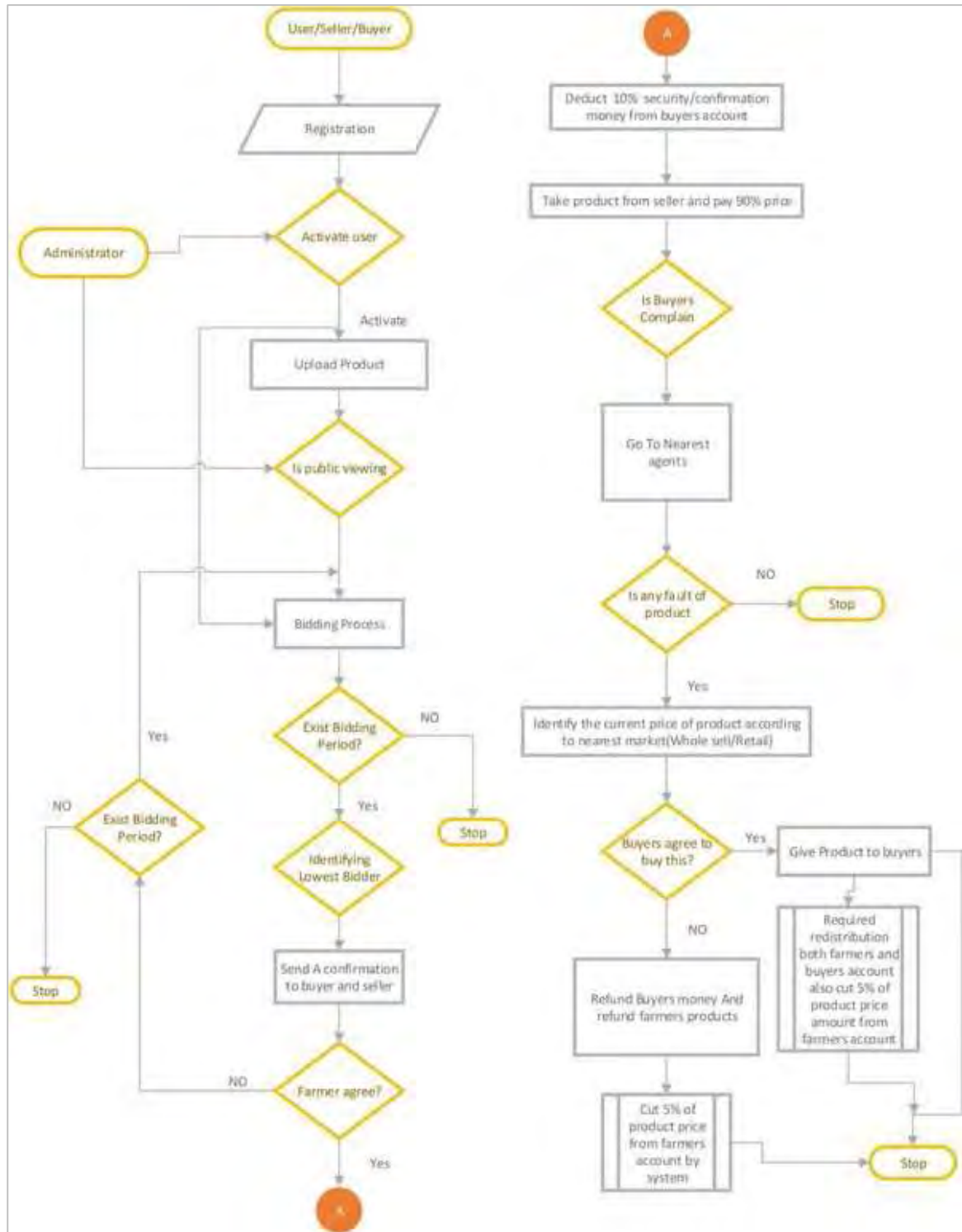
Figure 5:Activity Diagram

4.5 Sequence Diagram

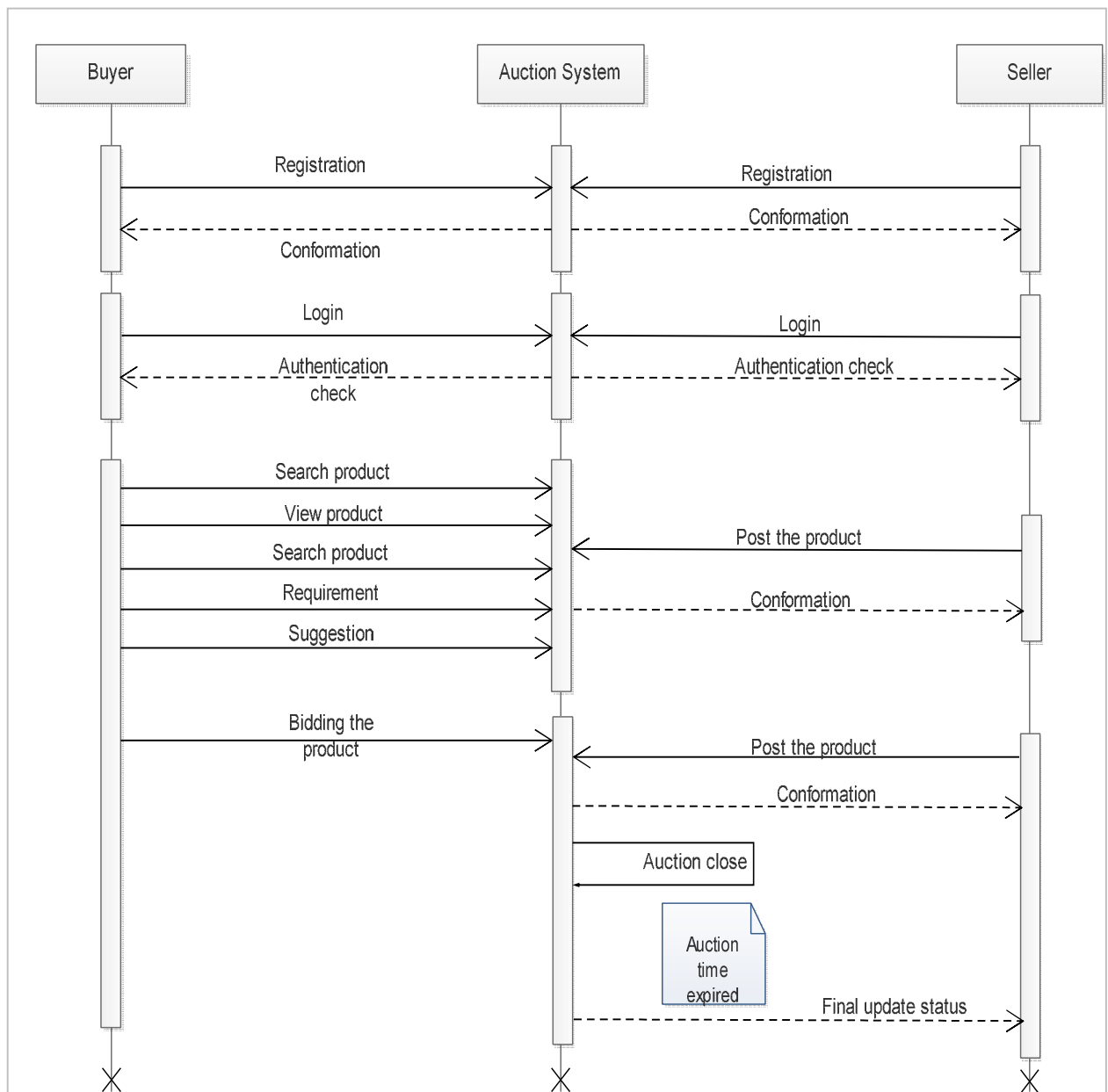A Sequence diagram is an interaction diagram that shows how processes operate with one another and in what order.

Figure 6:Sequence Diagram

4.7 Class Diagram

Class Diagram provides an overview of the target system by describing the objects and classes inside the system and the relationships between them.
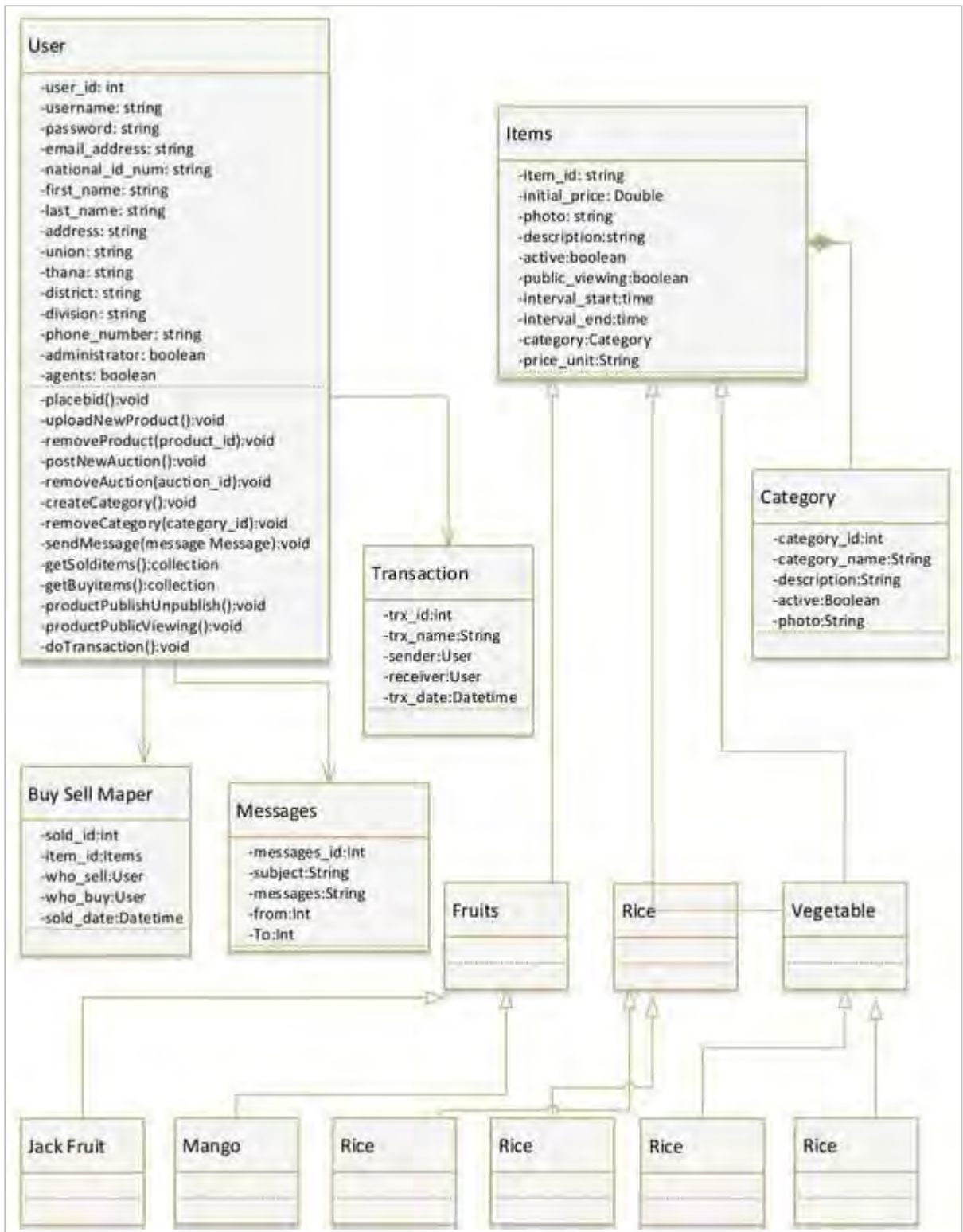
Figure 7:Class Diagram

4.8 Data Modelling:

The information gathered in the Business Modelling phase is reviewed and analysed to form sets of data objects vital for the business. The attributes of all data sets is identified and defined. The relation between these data objects are established and defined in detail in relevance to the business model.
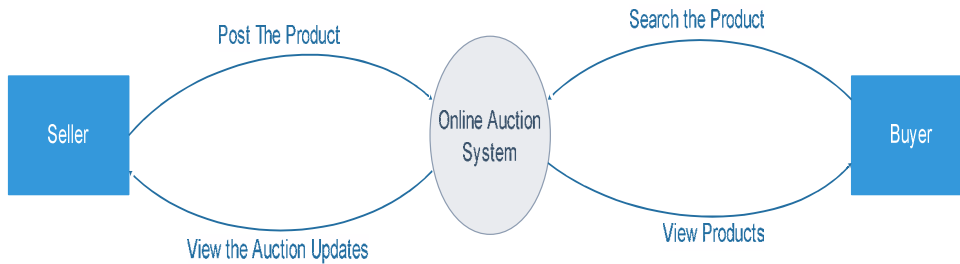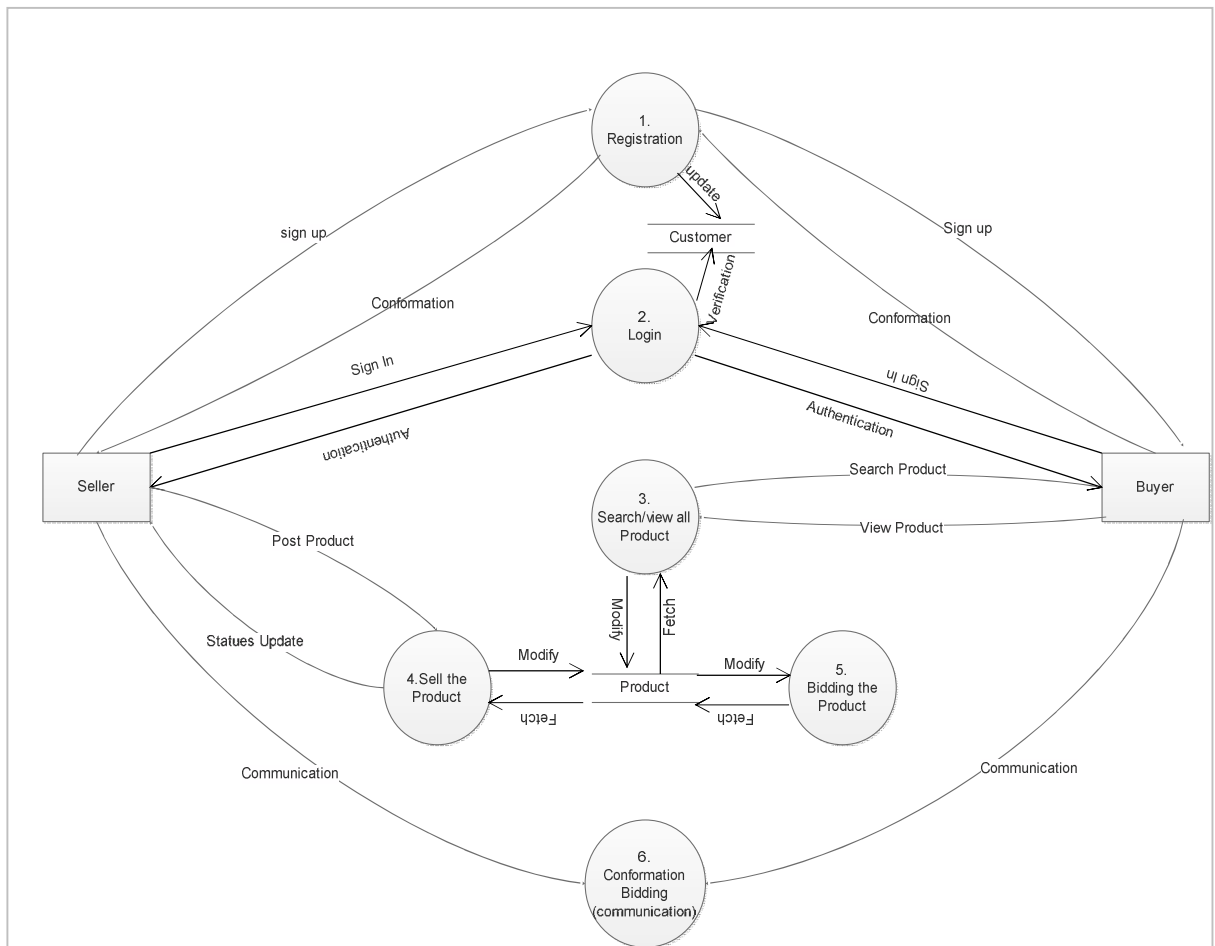

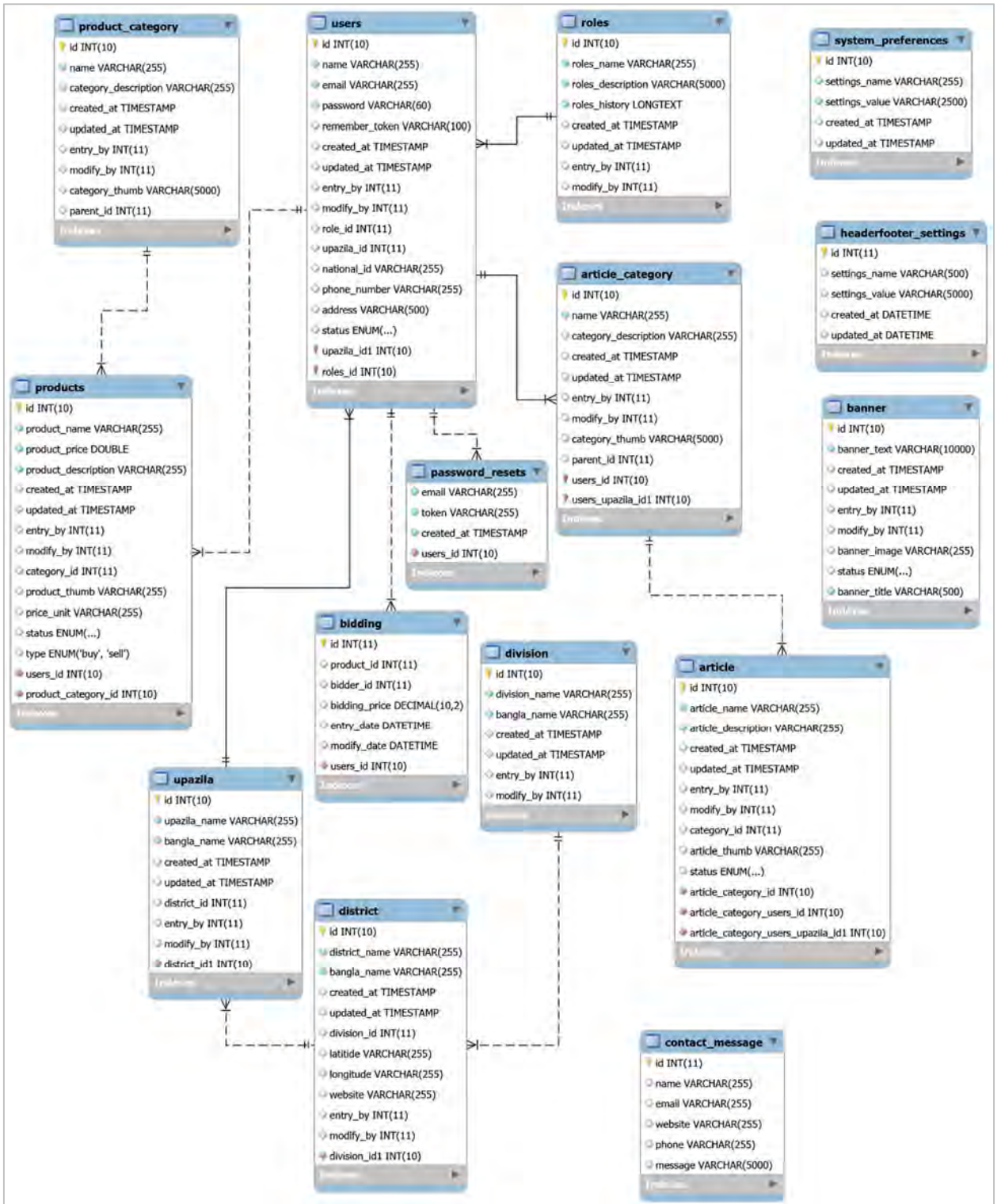*Figure 8:Data Flow Diagram Level-0*

Figure 9:Data Flow Diagram Level-2

Figure 10:E-R Diagram

Chapter 5. Implementation

5.1 Development Tools

In the development of system (Farmer's Market) we were using a number of development tools. The tools that are going to be used will ensure the delivery of are reliable end product. The tools used are platform independent so that they can be used on different hardware and software systems. To ensure proper development of the auction system we used some of the following tools Unified Modelling Language (UML), PHP, Laravel (A PHP Framework), MYSQL, java script and Sublime text editor for writing code.

Table 4:Tools Uses

Tools	Uses
Balsamic	Prototyping
Visio	Design Diagram
Excel	Business Model
Laravel	Backed Development
Php	Backed Development
Html-5,CSS,Jquery	Front End
SQL	Database
Apache	Server
Sublime	Code Editor

5.3 System Architecture

The system is designed as a simple model-view-controller application. The views are constructed in the Laravel BLADE template engine and stored in resource/views folder in the project www directory. Every views call from controller action. Controllers are placed in app/http/controllers folder. Controllers are communicating with Model, those are stored in App\Model folder. We follow RESTful web service for backend development. And other scripting like javascript and css are placed on public folder.

Access Control: Will restrict unauthorized data submission and access. The system will have System Administrator who will have complete access over the system. The system will have different types of roles to which each user will be assigned. Each role will have controlled access of system functionality which can be edited by the system admin.

As each user will be listed under a specific role they will have controlled and limited access to the system thus providing security to the system.

Chapter 6: Challenges and Learning, Conclusion& Future Scope

6.1 Challenges

Every innovation project faces different types of challenges or have limitations, and the 'Farmer's Market' isn't exception of that. We would like to categorize the limitations of this system into 2 broad categories considering the phases of the project development. Such as -

A. Limitations related to conceptual model development and design:
   i. The system is designed on the basis of available secondary research and personal experiences. There is scarcity of available research on the issues or more advanced research information could be collected. If a direct research could be conducted on the issue the system would be more insightful to the current market system. Research could have been on farmers, agricultural market, and consumers etc.
   ii. Due to shortage of time, it was not possible to test any prototype with the possible users of the system.
   iii. System's language, signifiers etc. could have been tested with the farmers and the buyers.
   iv. We hadn't much time to develop policy or legal protocol or other operational protocols for different types of stakeholders.

B. Limitations related to system development:
   i. Since we had little time to design and develop the project, we could not get chance to incorporate more features that we've dreamed of to make this project more functional.
   ii. It would be joyful to us if we could develop a finished product, but within our limited programming skill, time, and resource constraint we weren't able to finish the product.

Nonetheless, still it's a good opportunity to test and work further for improvement.

6.2 Learning

Knowledge Acquired During the development of the project we have learned how to use Larabel, a very powerful open-source framework. With this project we also had the opportunity to see in practice the modeling techniques (use cases, user stories, UML class diagrams, EER diagrams,) learned during the various courses of the University.

6.3 Conclusion

Absence of proper market system especially in areas where the produce is produced and the price increases more than 100% at consumer level. In a market where intermediaries take place between the producer and consumers, producer have no access to national market level information and get comparatively less chance to bargain. The intermediaries capitalize the situation over the real producers who deserve most. An establishment of a platform that enables farmers to interact with more buyers and even direct consumers could minimize the gap of existing market system. In 'Farmer's Market', both the producers and consumers get the opportunity to interact irrespective of being physically present in the place. With the designed system registered users can take part in auction system which is identical in comparison with other existing market systems. This auction facility will allow the farmers to negotiate and ensure proper pricing which is essential to create acceptable market equilibrium. In spite of having lots of scope for improvement, the developed 'Farmer's Market' is a useful system to be tested in the practical situation for receiving feedback and evaluation, acquire knowledge and further improvement for national-wide scale up.

What this envision system is trying to accomplish is to create a higher level of buyer's certainty on the type seller and products that they choose to make bids for. Through the use effective information like the use of visual and textual product description, third party product certification, product book value and product usage. The successful implementation of this project results in an online auction system that allows evaluation of the product that is far much effective and that come close or equal the physical evaluation of the product.

6.4 Future Scope:

The Farmers System Auction works very well in all of its functionality. However, some future works can be done on the existing system. We did not implement these two requirements for time constraints. However, the two requirements had a much lower priority with respect to the others. Besides Enhancement regarding to user friendly features such as bar graph, line chart

chart on product Price over the time. Besides those the following feature might be value added of the proposed system.

1. Best deals instant search.
2. Add an SSL security system. Since a registered user can post new auctions, place bids, send messages etc., username and password are sensible data. So it could be useful to protect these data from being intercepted by a third party.
3. Add a chat room to the portal. It would be nice for a user to enter in a chat room to talk with other users about auctions or any other topic.
4. Add a more attractive graphics to the web pages of the portal. The site is very easy to browse, also for new users, because the pages are simple and clear. However, the graphics of the site is also much simple, so it could be the case to improve it in order to attract more users.
5. Add a payment gateway system. It would be nice for users to make payments using their own credit card/Bikash to complete sales with the help of the website.
6. Mobile Application will add great mobility and accessibility of the system.

Table 5:Requirements Vs implemented Status

Requirements	Implemented
Login, Logout	Yes
Home page	Yes
Manage Users	Yes
Registration	Yes
Upload product	Yes
View data	Yes
Edit data	Yes
Delete data	Yes
Bid (Post an action)	Yes
Bidding Process Completion	No
Search, Filter	Yes
Confirm Notification	No
Payment Gateway	No
Multilanguage Support	No
Mobile Application	No

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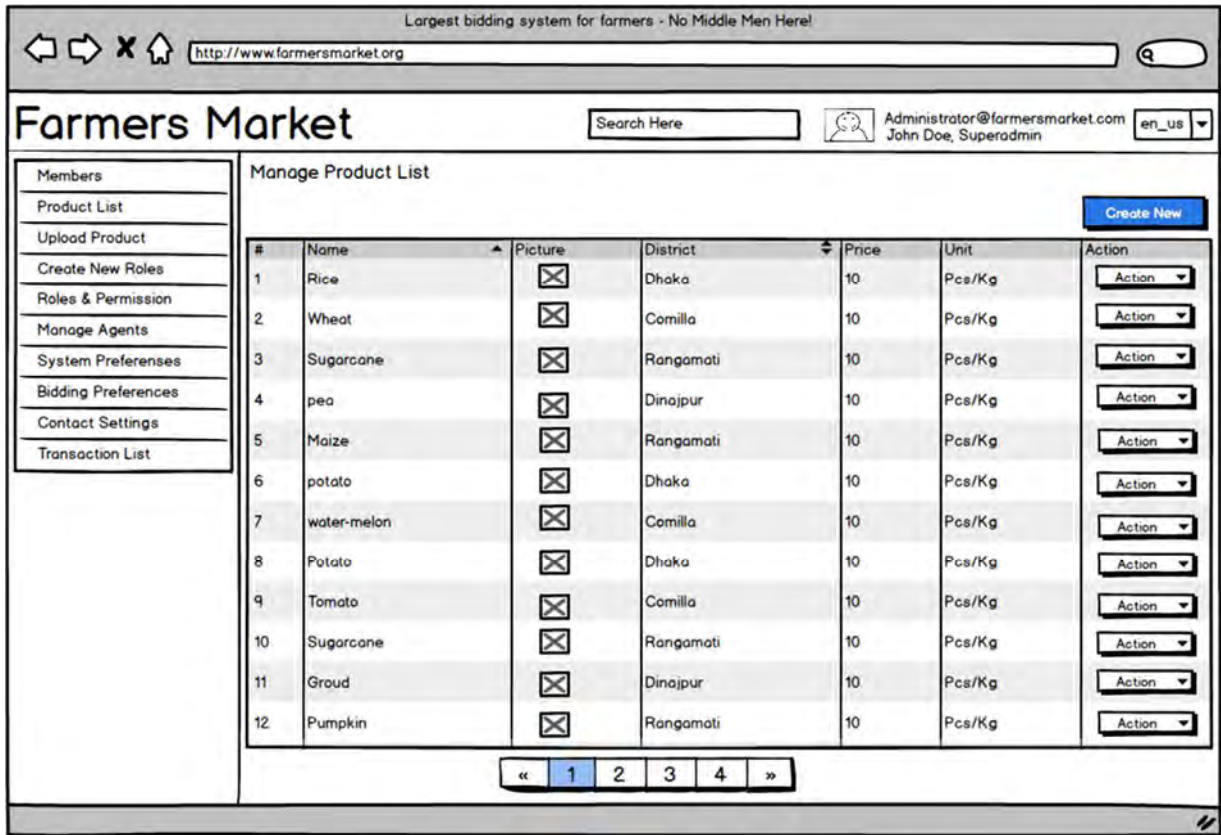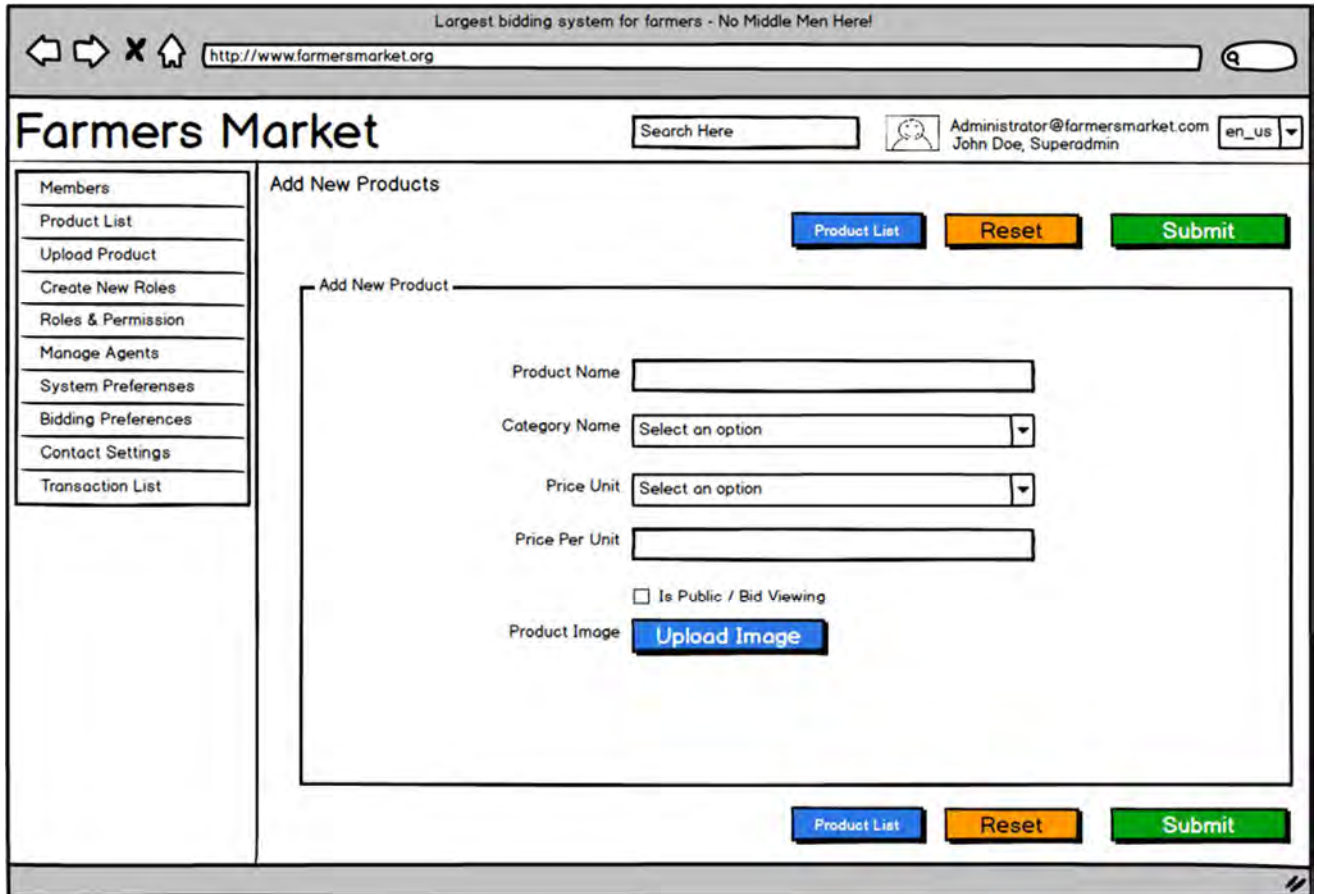
Appendix
System Prototype

Figure 11:System Prototype- Product List

Figure 12 :System Prototyping- Add Product