IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

PULL SYSTEM USING KANBAN

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Abstract : ***The Push System was first used long back. The push system involves forecasting its inventory needs to meet based on customer demand. Companies must foresee which products customers will acquire along with determining what quantity of goods will be procured. The company will in return invest enough product to fulfil the forecast demand(request) and sell, or push, the goods to the purchaser. As there are many downsides in this push system which we will explain later on, it is going to be overcome using the pull system.***

Index Terms *- push system, pull system, inventories, procurement, acquisition.*

INTRODUCTION

The major inconvenience of the push system is that the estimates are often inaccurate as sales cannot be predictable and vary from one year to the next. Another problem with push inventory systems is that the product is being manufactured in huge quantities and then discarded. This increases the company's costs for storing these items.

The major advantage and the benefit to the push system is that the company is equally secure it will have enough product on hand to complete customer orders, opposing the inability to meet customer demand for the product. Our project deals with all categories of this problem. An elementary problem arises that in pharmaceutical companies as push systems were used, there was a lot of wastage of the resources which is a major drawback that leads to the pharmacy not adapting this thing. Thereby, a pull system needs to be introduced in this field. The pull system is only implemented when the customer passes on its requirements and it satisfies them. Firstly, the user requests the particular medicines and then the production is being done. Our software implements such things and a pull system using Kanban is implemented.

NEED OF THE STUDY

Demand and supply are relative quantities. Higher the demand, higher should be the supply. According to a survey, we observed that 2 out of every 3 pharmaceutical companies found it very difficult to adapt to the changing demands of medicines. Thus, a huge amount of products was wasted in the push system, where the products are stocked beforehand to meet the supplier's needs which in turn led to wastage of productivity, cost, manpower, and raw materials. To tackle this problem, we are planning to design a pull system that will work only when there is a demand from the supplier. The aim of our project is to effectively manage the supply chain of the pharmaceutical company. This will be done by a Kanban system which will help the owner to segregate the micro-level tasks into To-Do, In-Progress, and Done. First, the supplier will provide the requirement to the pharmaceutical company and the system will estimate the number of days to produce the order. As soon as the order is nearing its completion, a message will be displayed to the supplier asking for any further processing requirements.

LITERATURE SURVEY

In the existing system it is observed that no such system existed for searching medicines which are not stocked in our system. We observed that Inventory management system already existed with all of its functionalities. So the problem with this system is that it becomes tedious for the customers to keep track of their previous bills. We were not able to rectify yet another problem of security when it comes to accessing confidential health records.

Wastage in raw materials, not efficiently using the transportation, resources, delay in assembly line is considered as waste. All the problems lead to inefficiency in resource utilization which results in less profit for the company. Determining the optimal number of Kanban in a multi-products supply chain system and the research gap found here was the problem of restocking the supply chain. There were almost 400 constraints which are taken into consideration for these restocking calculations, which is a very time consuming and difficult task and it is important task because the assembly line depends on it.

Determining the optimal number of Kanban in multi-products supply chain system and the research gap found here was the difficulty in Kanban implementation. For example, if many orders are placed simultaneously then there is a chance of human error here like forgetting the deadline, priority of an order, quantity of order etc. So it becomes difficult to handle such problems.

In our first paper i.e. Analysis of E-Commerce Application in Pharmaceutical Enterprises which was published in 2010, we researched that no such system existed for searching medicines which are not stocked in our system. So keeping this point into consideration, we are planning to integrate a chatbot that will help the customers to search for unavailable medicines. This will help the customers to get their medicines in a much more efficient way.

In our second paper i.e. A Pharmacy Stock Control Management System which was published in 2018, we observed that Inventory management system already existed with all of its functionalities. So, the problem with this system is that it becomes tedious for the customers to keep track of their previous bills. So, we are planning to keep a chatbot that will fetch the details of the transaction according to the logged in customer.

In our third paper i.e., Determining the optimal number of Kanban in a multi-products supply chain system we were not able to rectify yet another problem of security when it comes to accessing confidential health records. So, we are planning to provide a very secure system by implementing JWT (JSON Web Tokens). In JWT, we don't need to manage any sessions so there are less chances for the hacker to exploit user data.

The 4th paper we studied was Kanban implementation within the pharmaceutical supply chain which was published in 2015.And the research gap we found was a major issue of wastage. Wastage in raw materials, not efficiently using the transportation, resources, delay in assembly line is considered as waste. all the problems lead to inefficiency in resource utilization which results in less profit for the company. To overcome the problem of waste management we propose a lean philosophy with a pull system. So, lean with a pull system will not only help us to reduce the waste but also to maximize the project with proper and efficient resource utilization. So the prime goal of using lean technique is to reduce wastage of resources and obtain an efficient system .

The 5th paper we studied was Determining the optimal number of Kanban in a multi-products supply chain system and the research gap found here was the problem of restocking the supply chain. There were almost 400 constraints which are taken into consideration for these restocking calculations, which is a very time consuming and difficult task and it is an important task because the assembly line depends on it. So, to overcome this problem We propose a machine learning model to overcome the restocking problem. We think that ML models will help us to estimate the time and cost for preparing the stock, quantity of the stock, etc.

The 6th paper we studied was Determining the optimal number of Kanban in a multi-products supply chain system and the research gap found here was the difficulty in Kanban implementation. For example, if many orders are placed simultaneously then there is a chance of human error here like forgetting the deadline, priority of an order, quantity of order etc. So, it becomes difficult to handle such problems. We propose that the Kanban activities should be automated so the problem of technical error can be resolved, also it will become more efficient as less manpower is needed to handle it. Also, it saves time to prepare the documents as each and every detail will be present in the Kanban itself.

PROPOSED SYSTEM

E-COMMERCE

Firstly, the client/user need to login in the website by providing the authentication details such as username, email, password, and after logging in they will be able to interact with the frontend part of the ecommerce system which will guide him/her throughout the website and if he/she has any queries there is a chatbot functionality integrated inside it which they can user for their queries and from there they can get their answers.

Secondly there is a categories page which will show all the product categories available and related products in those categories. Users can select specific categories or can see all the products. Some categories may also contain sub-category also. Inside the categories there is a product details page which will show all the details related to the product such as name, quantity, ratings, reviews, price etc.

After selecting the product, they can move to the checkout page which will be used for getting all the delivery details such as shipping address, pin code, city, state, country, total bill etc. Lastly there is a payment gateway integrated for making the payments of the product, after making a payment an invoice is generated according to the order and is sent back to the user.

There is also a user account page where all registered users can edit their entered details like phone number, shipping address, state, country, pin code, email, password, username. They can also see their order history, reviews if they have given to any product.

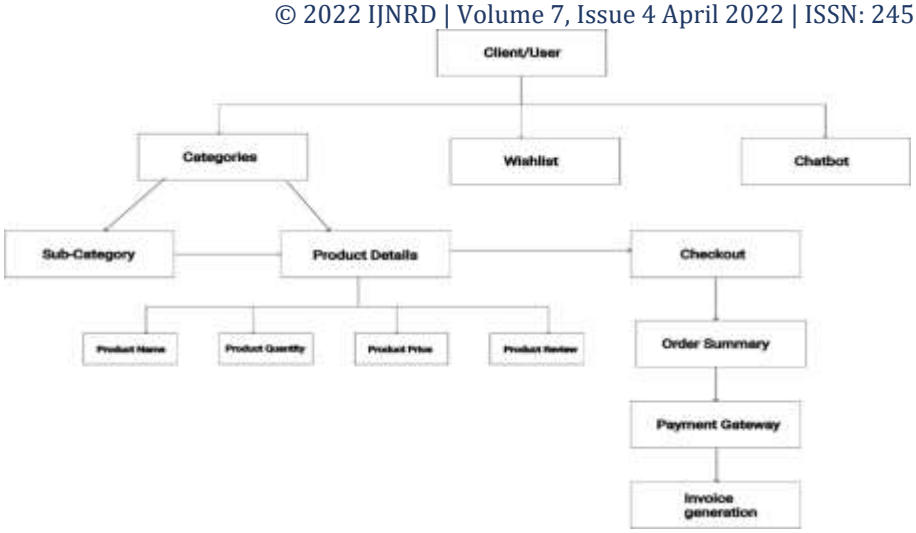

Figure 1: E-commerce Flowchart

INVENTORY MANAGEMENT

Inventory management systems are used for organizing all the elements that go into inventory management. By using this procedure, we can track our medicines from supplier to the consumer.

The Inventory Management System consists of a Dashboard, Stock Management Section, and Account Management Section. Inside the Dashboard you get all information such as Analytics of Inventory and previous order history. After that there is the stock management part where all the inventory products and raw materials are managed. For this Kanban board is used as it contains all the necessary details of the production cycle as well as order details. The inventory system also keeps track of all the available items and if there is shortage of any then it also notifies the admin. Also all the order summary information is stored in the system. And finally the invoice of all the product orders as well as raw materials are generated and stored in the database.

Account management system is also added to store information of all the different users and to manage all of their orders as well as their previous order history. Also users can edit their details like name, phone number, address, email password etc.

Figure 2: Inventory Management Flowchart

KANBAN BOARD

Kanban Board is an agile project management tool designed to help visualize work, limit work- in-progress, and maximize efficiency. It consists of 3 sections: To-do, InProgress, and Completed. All the cards related to the orders are placed on the board and are shifted from section to section according to the completion of the order.

The Kanban board implemented here is used for tracking all stages of production and maintaining the orders of the customers and it is also responsible for generating invoices of the orders. Also, orders are managed in the board according to the priorities given i.e. (Low, Medium, High). Here a machine learning algorithm is used for calculating the time and cost estimation of the order and accordingly time & cost of delivery is given to the user.

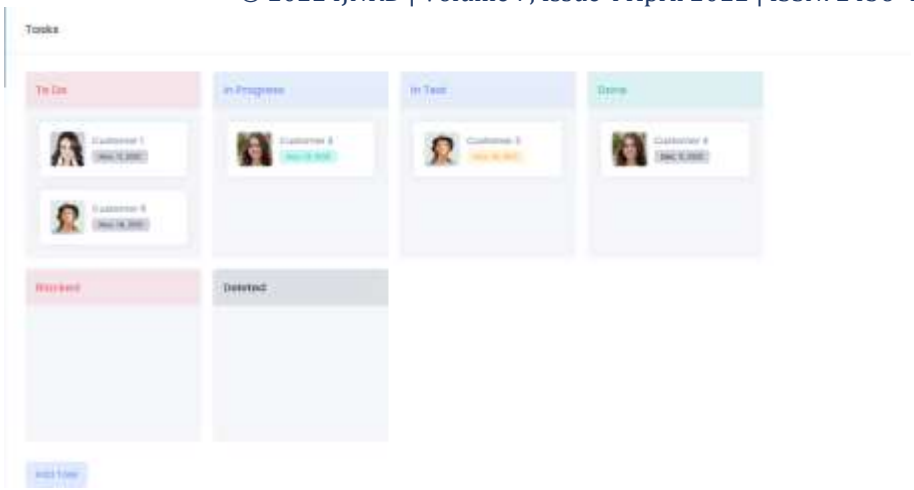

Figure 3: Kanban Board

RESULT AND DISCUSSION

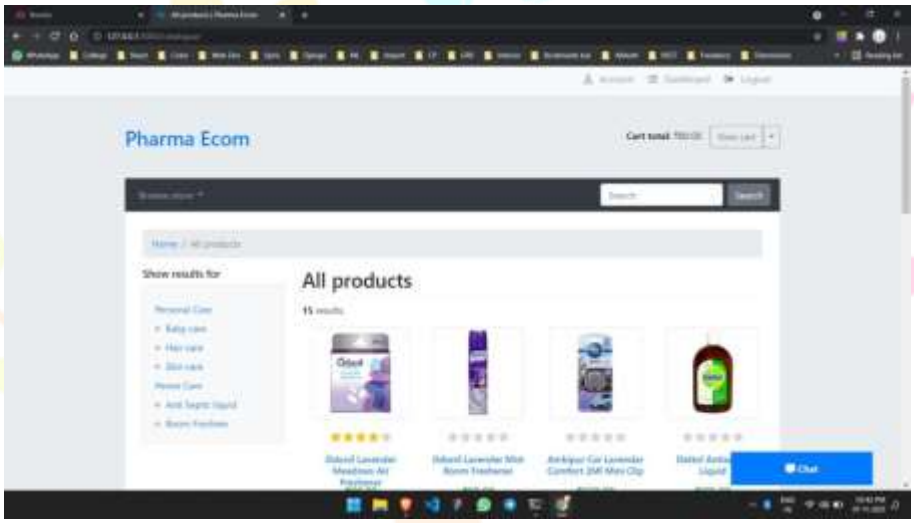

Figure 4: Home page: Figure shows the home page of e-commerce.

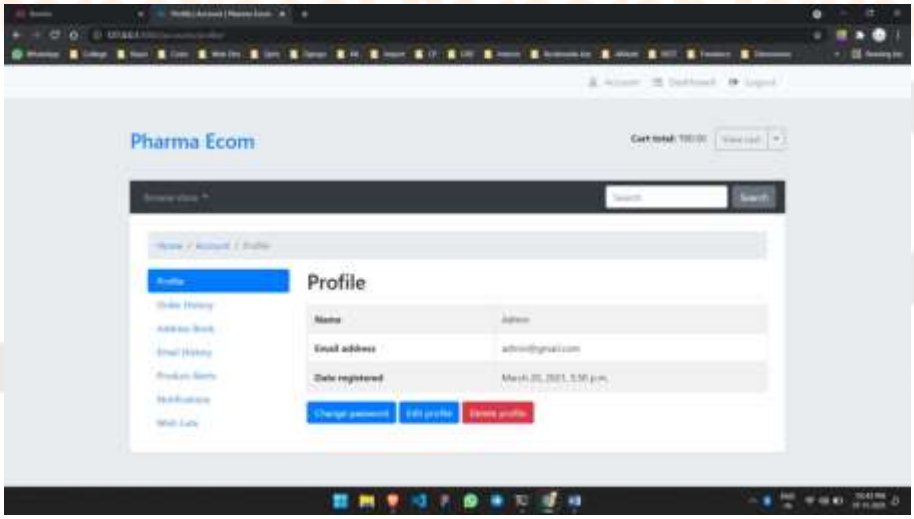

Figure 5: Account page: shows details of user

Figure 6:Product Detail View: shows the detail of product

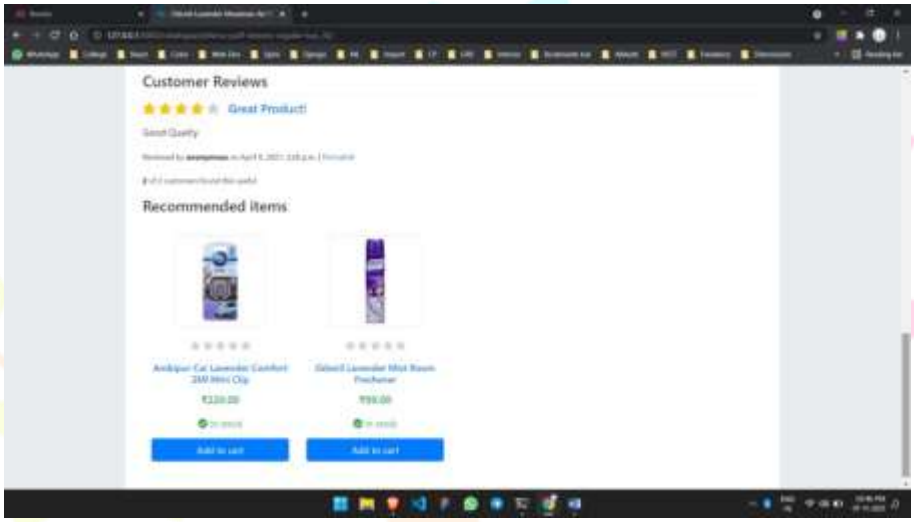

Figure 7:Customer reviews and Recommended items: shows recommended items and reviews of customers

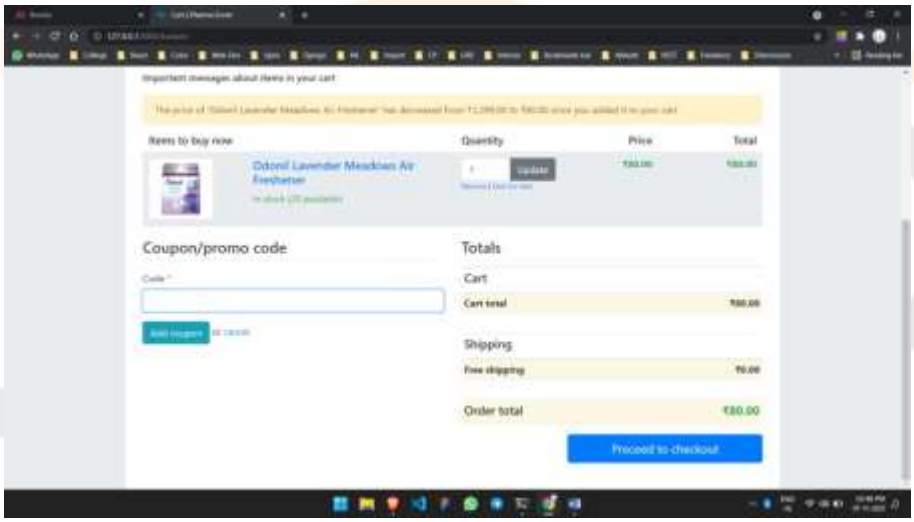

Figure 8: Cart View: Shows the details after adding items in cart

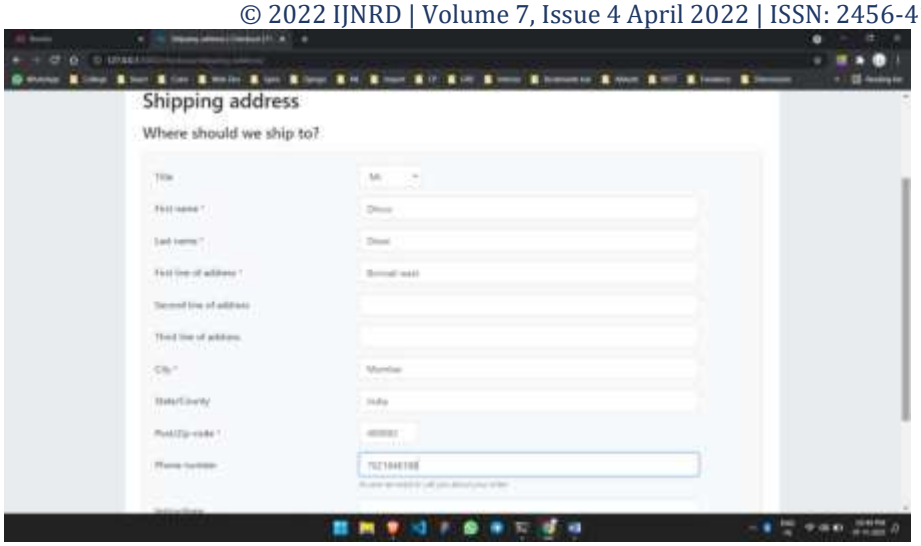

Figure 9: Shipping address: details of user address

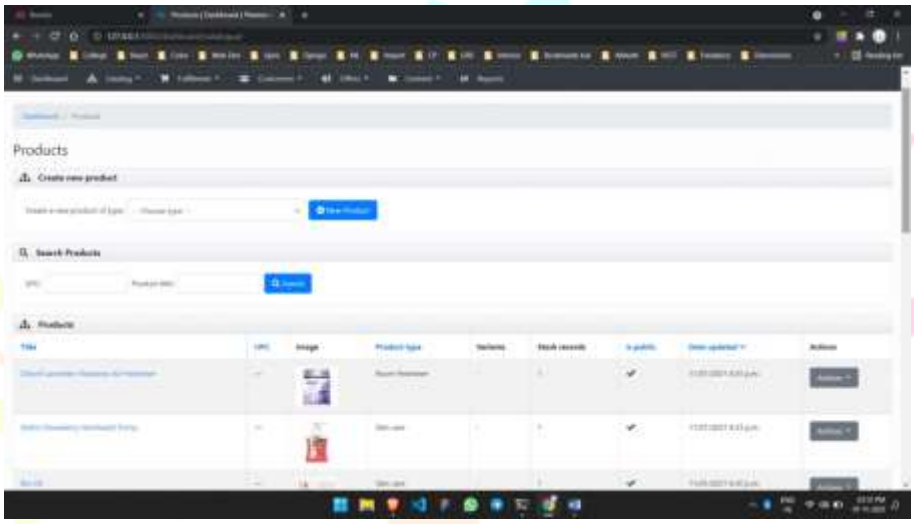

Figure 10: Admin Dashboard: shows all the products and can be used to add products.

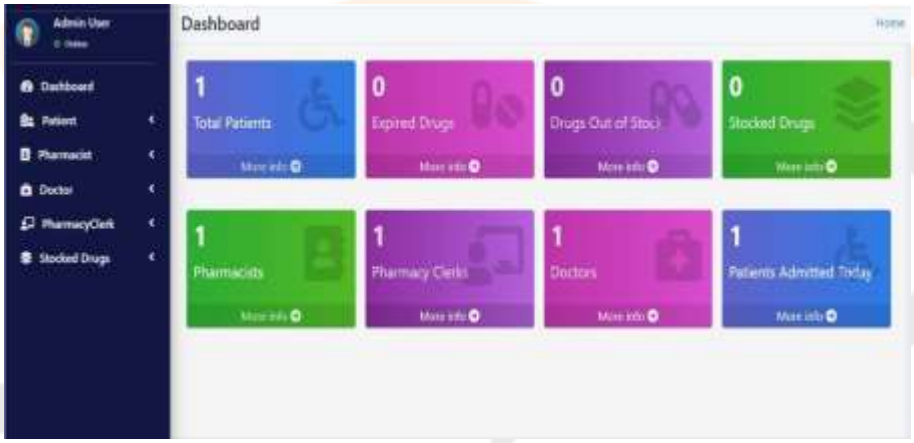

Figure 11: Admin Login: shows the details after the admin is logged in.

Figure 12: Patient Login: shows the details after Patient is logged in.

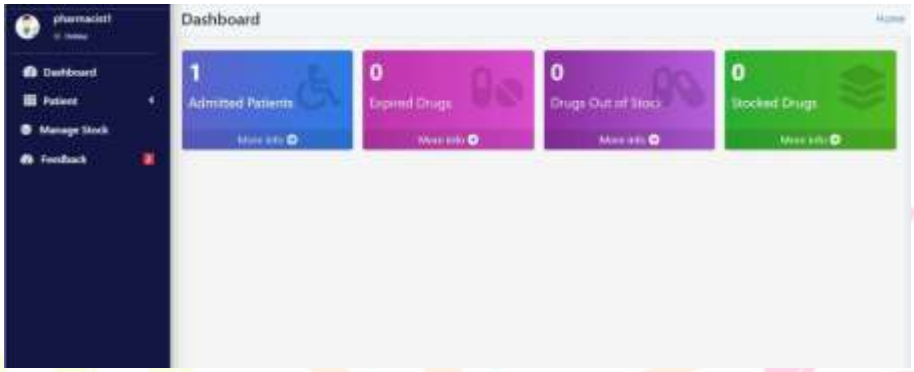

Figure 13: Pharmacist Login: shows the details after the Pharmacist is logged in.

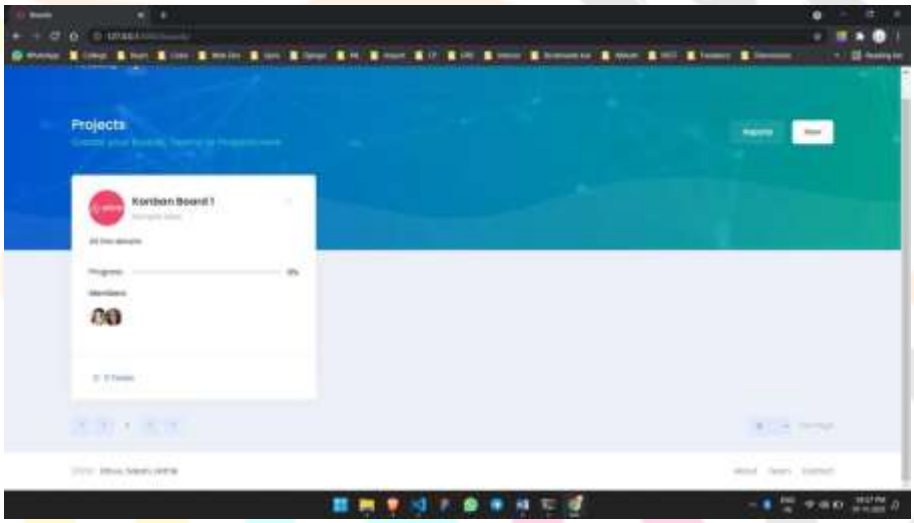

Figure 14:Kanban boards: shows all the Kanban boards that are created.

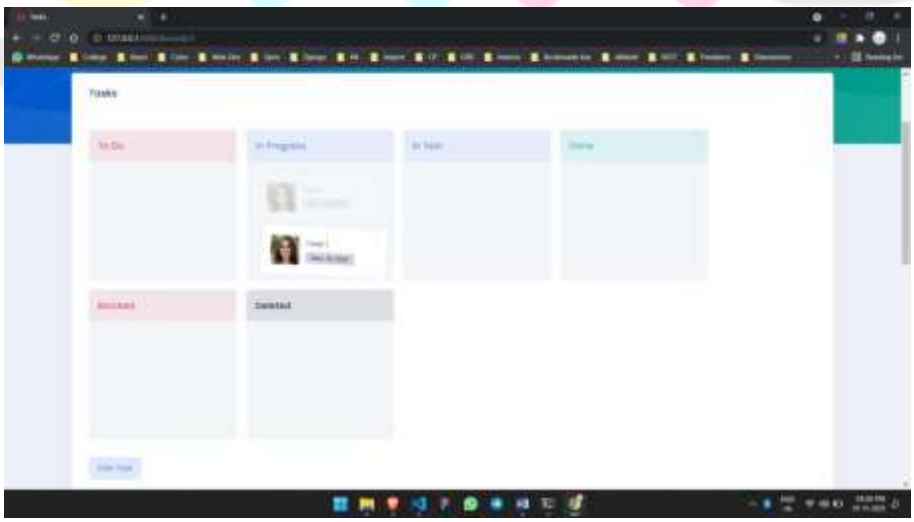

Figure 15: Tasks in Kanban: All the tasks that are assigned and the cards are draggable.

CONCLUSION

The Kanban System is really useful for pharmaceutical companies. It reduces the cost and our software works in an efficient way where each and every product is deployed and needs to be taken care off so that the customer's requirements are fulfilled and resources are saved. The Kanban system is used on an enormous stage. Kanban is used now-a-days by many manufacturing companies because it aims to prevent inventory pileup by initiating production only to restock empty reserves. Kanban is a great addition for teams that have lots of incoming requests that vary in priority and size.

Inventory management system is actually a Web application which handles the essential data and saves the data about the database of a pharmacy and its management. This software helps in effectively managing the pharmaceutical store. It provides the statistics about medicine or drugs which are in stock with which data can also be updated and edited. It works as per the requirements of the user and provides options accordingly. It allows users to enter manufacturing as well as the expiry date of medicine placed in stock and for sales transactions. This web application also has the ability to print the bill and invoices etc. The record of supplier's supplies can also be saved in it. There are other functions available too. The main purpose is effectively and easily handling pharmacy data and its management.

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