

Artificially Intelligent Warehouse Management System

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ABSTRACT

The era of digitization in Saudi Arabia, had led to the foundation of the use of digital technology in every aspect. May be a simple task or a business analytics work. The dependency of technologies increasing day by day. This is somewhat very good as far as convenience of human being is concerned. Keeping in mind the vision 2030 of Saudi Arabia. The need for smart management of inventory in a particular organization is very important. For this reason, an artificial intelligent application can be constructed that will be helpful enough to obtain various good results. This project consists of an analysis of such a system that will be intelligent enough to help the users of the organisation to manage their inventory in a very smart way that will be helpful enough for providing enough information useful for the organisation, as well as providing various amazing heuristic methods that will be helpful enough to manage the contents of the system.

Keywords: Indonesia, Finance, Chemical.

1. Introduction

Current System

If you talk about the present world scenario, we can very well identified that the inventory management at various organizations is done in a manual basis. The system involves the help of some computer machines that will be holding the database of the inputs to the system and outputs from the system in a local manner. If you talk about the system on a comprehensive mode. We will be able to identify that the system is very time-consuming and the particular person was involved in the management of the inventory is also involved for a large number of time. The collection of the inventory is done on records with the help of large books called as ledgers and nowadays they are restored in huge databases are termed as ERP systems. However, it can be identified that the main points that are in the current system under consideration are:

- The management of the inventory is done manually.
- The procedure is very time-consuming in nature.
- The system is not expecting a very good output from the system itself.
- Various chances of problems and some errors are available.
- Was the input is given manually a person is required to check again. The inputs and the cumulative reports at the end of the stock clearances required.
- In order to produce a report manual entry is required and the system is not generating any kind of reports based on the input that is available inside the system.

Problem Description

If you talk about all the places where huge number of inputs is given to the system and the organisation as a whole is trying to find out some particular issues in the inventory, it becomes nearly impossible job to find out what the

problem was and how the problem can be resolved easily with the cases of searching the inventory. But the searching and management of the inventory system is not at all very easy. As far as big organizations are concerned in which the total emphasis is given on the huge amount of inputs and raw materials that come inside the company. It is also a matter of fact that the imports are given straightaway to the system by Manuel or by computer-aided technologies, however, it must be identified that these inputs have error prone [1]. And there are obvious. Many chances to have errors inside the system without having a connectivity and correct relationship between the input and the output. So, it becomes a very challenging task to manage the inventiveness smart management system which is artificially intelligent enough to give some inputs and outputs from the system based on its previous activities and recordings. We have seen that this output and input is not very easy job and whenever the input is given inside the system on the arrival of any particular stock or any particular raw material, it becomes a necessity to restore the information and as the raw material is consumed [2]. It then becomes a necessity to manage this inputs clearly. We have seen various tools which are used for inventory management system. But there is no tool that will be smart enough and artificially intelligent enough to solve the problems that are stated above.

Research Objective

While keeping in mind all the points that are stated in section 1.2, the need for the technical outcome of a particular system was finally obtain and checked for the project. The main stakeholders in the project are namely, the organisation whose inventory is to be controlled, the user or more profoundly called as the manager, and finally the person who is involved inside the give-and-take of the inventory are the most important keys of this particular system. The main objective of the project is to give a particular system that will be helpful enough to manage the inventory in a very smart and intelligent manner. The artificial intelligent heuristics that will be applied to the databases of this particular system will be helpful enough in order to manage the inventory very easily and effectively in a very intelligent manner [3]. In order to find out a relation between the three deep studies were done and it was finally reviewed that several objectives are required in this project to solve the problem that includes:

- Utilization of the system by the manager is responsible to give-and-take any object from the inventory system.
- To create certain heuristics that will be taking care of the inventory on its own, and the management of the inventory will be done mechanically instead of manual work.
- To facilitate the organisation in order to find out the ways in which the inventory management can be done smartly and effectively using an artificial intelligent heuristics.
- To make sure that all the inputs and all the outputs going from the organisation should be recorded and a particular stage. The alarms should be given for any specific kind of results reports that is required by the organization.

Proposed Solution

The project aims to develop design and finally deploy an application that will be having high characteristics and heuristic methods of artificial intelligent nature in which the problems that are stated in the above sections will be

resolved easily and effectively [4]. The project aims to develop application for managing all the entries that are associated with an organisation in achieving its goals as follow:

- Any registered user will be having the application accessed easily.
- A manager will be tested to handle all the entries.
- It will be possible for the manager to handle all the entries available inside the system.
- Provide anything to the user. As per the demand from the manager by the use of the system from the inventory to give him the respected asked article.
- Send notifications and important improvements inside the system that are required and artificially inject module heuristic technique that will be made available for the complete package.
- Utilization of the complete database of the inventory system in order to create certain heuristic results, which are helpful for the manager, as well as for the organisation.
- The system will be able to generate reports, which are very helpful for the users from the point of view of sale and replacements of various goods at different interval of time.
- The users will be able to only access or request a particular object from the inventory and not able to find out any other details of other than this.

2. Feasibility Study of the System

If we try to find out the similarity in non-similarity with the machines that are available nowadays and those who are available in the past tense. It is very difficult for us to find out. Since the machines that are available in the past tense when not as advanced at what we are having today. Similar is the need and the type of the services that are available in the past tense and now we're having sophisticated tools to manage all the services for inventory management. These tools are sufficient enough for managing all the information that is available inside the system from the particular point of view and respect for different users inside the system.

However, it is very difficult in order to predict a particular system based on the observations that are available in the past inside the system itself [5]. But if we look about at the old systems. Those who are available currently for the management of the inventory of an organization, we can very well identified that now systems have such a brilliant approach as it is expected inside our system.

However, it can be further add-on that just getting the correct report is not the need of the hour today. More important is to find out various systems that will be helpful enough to create certain results based on the previous results and such kind of analytics is very popular nowadays in the market.

The entire system of computation is trying to automate itself with the help of minimum users and the machines, learning by the observations. However, it is very clear that the organisations are facing a lot of difficulties in order of predictive systems that are available inside the world nowadays. A very strong. Utilisation of search technologies that will be able to protect the future of any particular from material of the expected to arrive release without having any breaking between. Does this avoidance of the problem that can arrive in the future is minimised with the help of such technology is very easy. One of the most important parts for designing a project is the

management of the feasibility study. The study for all the things that are available inside the system and that can arise in the future from the views of the system. If you talk about the inventory management system, the warehouse Management will be a very big job without the help of artificial intelligent services [6]. The complete package will be very helpful if the power of intelligence is given to the entire system. The feasibility for designing such heuristic methods is very difficult. But it has to be done before in order to obtain a complete package.

Technical Feasibility

Technical feasibility evaluate the technical skills of the project team that will be provided by coordinating among the skills and talents and contracts with each other to achieve successful task completion through positive work relationships to implement this system [7].

As per the technical inputs are concerned, a web enabled system can be sufficient enough for this purpose. However, the additional add-on of the artificial intelligent heuristic methods will be a great help inside the system. The use of small database management system will not be enough for such a big work.

Thus a proper database management system like MySQL, SQL Server is required for managing all the information that the user is going to input inside the system,

Operational Feasibility

The first and foremost a step that can be required for utilizing this application is the registration of a user into the system to ensure that the application is used by a correct person.

The registration of a manager is the most important job in the system that has to be done by the administrator of the entire work [8]. The operational feasibility of the entire system will be done.

The best when the system is installed properly with the required hardware and the necessary conditions for the operation of the system provided from the user.

Economic Feasibility

The analysis of the benefits and results that are opting from this particular project is of immense importance. The economic feasibility evaluates the effectiveness of the system and determines the benefits and savings that associated with i-Inventory.

3. Requirement Analysis

User Requirement

- The user should be able to register.
- The user should be able to request for request.
- User may ask items.
- Manager can register.
- Manger can allot articles.

Hardware Requirement

- Web server for hosting the website.
- Laptop or computer with the minimum requirements as follow :
 - HD: 500 GB.
 - RAM: 6 GB.
 - CPU: Intel Core i3

System Requirement

Functional Requirement

- Save and provide items.
- Regular Searching.
- Manual Allocation of items.
- Record Maintenance.
- Artificial Intelligent system for prediction of item needed in the department.
- Artificial Intelligent System for approval and denial of the requisition from the user.

Non Functional Requirement

Performance

- The system shall support use of multiple users at a time.
- The style will be separated from the content so any style changes will not affect the system.
- Make sure that the system is doing what it is supposed to do.

Security

- The system should be secure. So admin must give permission ID and password for specific users.
- Only the respected user having an ID and password shall be allowed to access to data, insert data and modify.
- If the username or the password not correct, the system will display out an error message telling the user try again.

Usability

- The user interface of the application must be user-friendly, intuitive and easy to us.
- Users shall be able to use all the system functions with no need to training.
- Functions are done in minimal steps/time.
- The system should work very effectively without the problem of getting stuck in between.

4. System Modelling and Diagrams

4.1. Use Case Diagrams

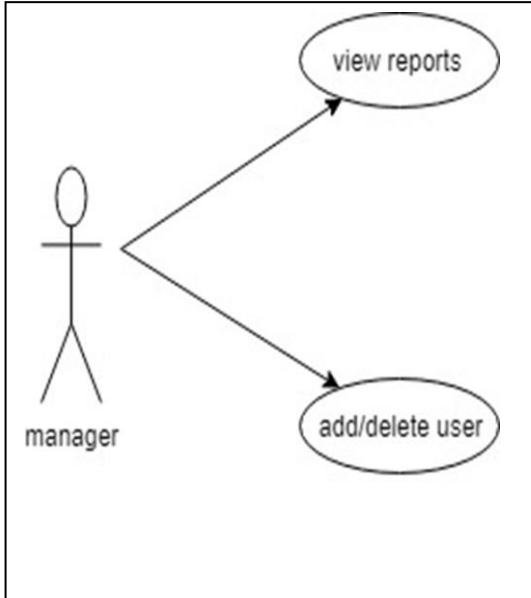


Fig.1. Use Case Manager

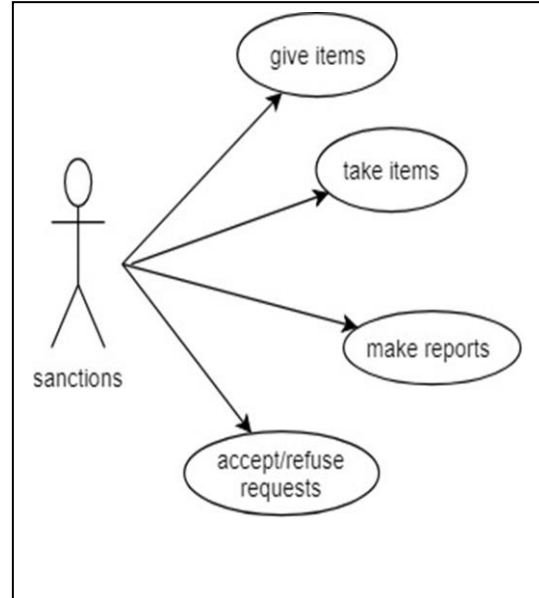


Fig.2. Sanction Use Case

4.2. Activity diagrams

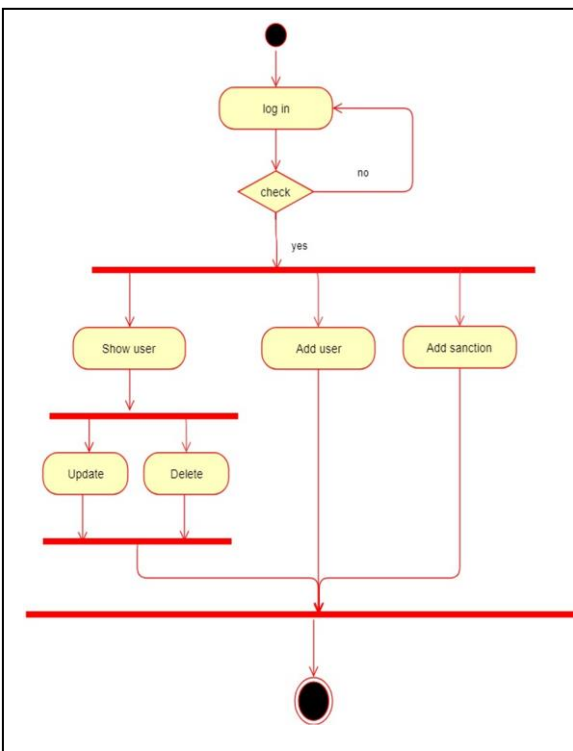


Fig.3. Admin Activity

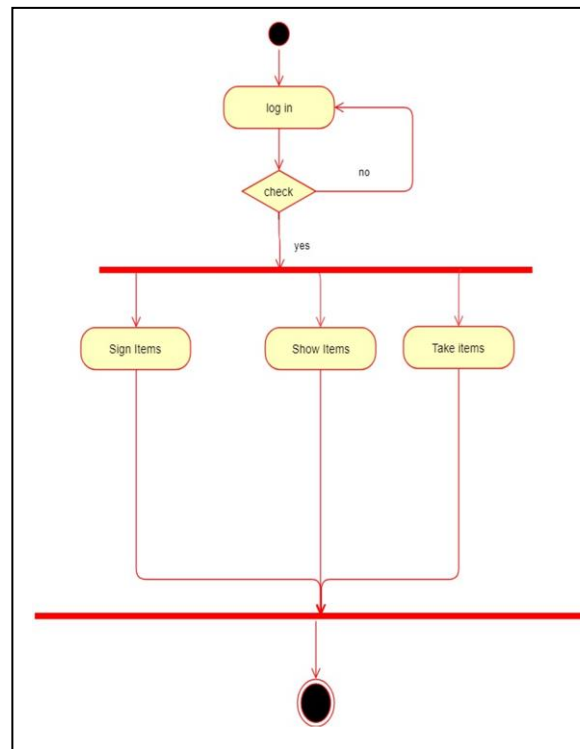


Fig.4. Reporting Activity

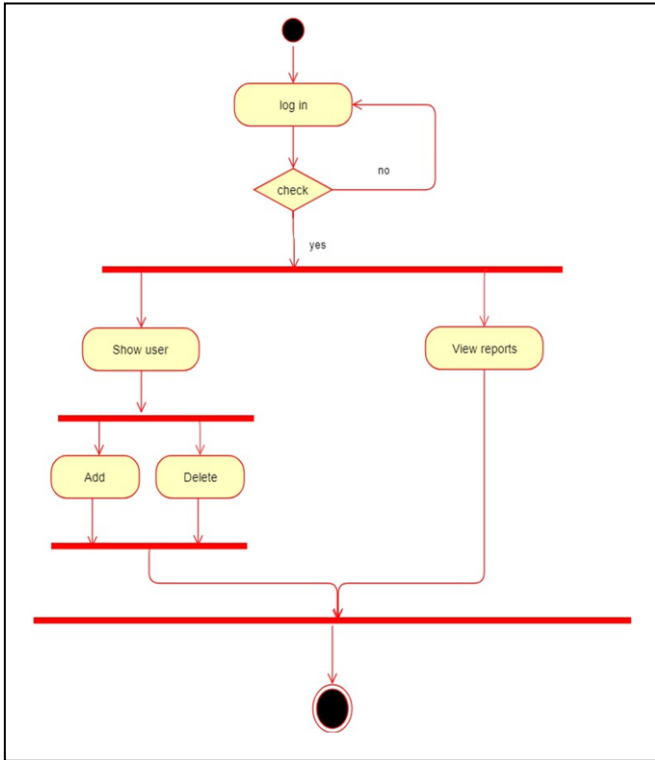


Fig.5. Admin User Activity

4.3. Sequence Diagram

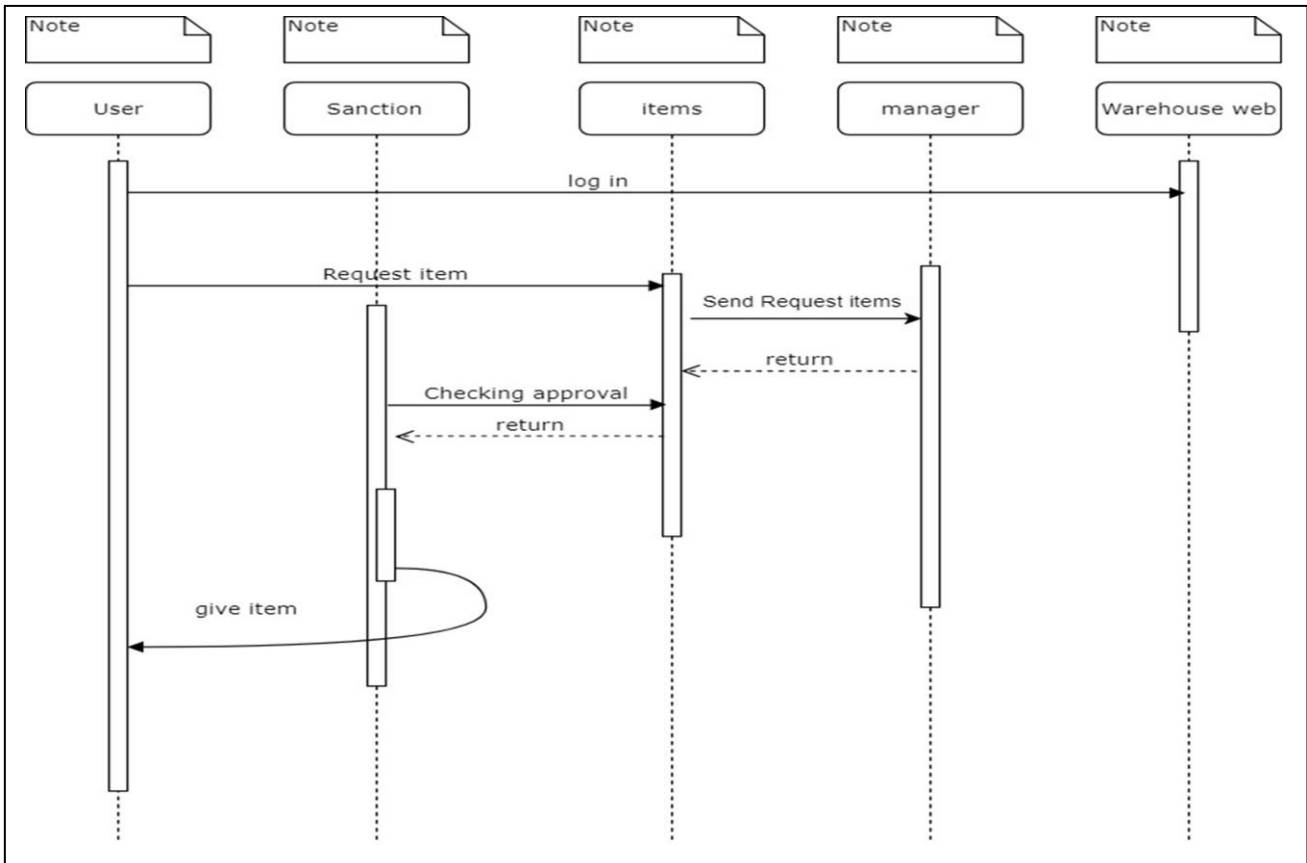


Fig.6. i-Inventory Sequence

4.4. ER Diagram

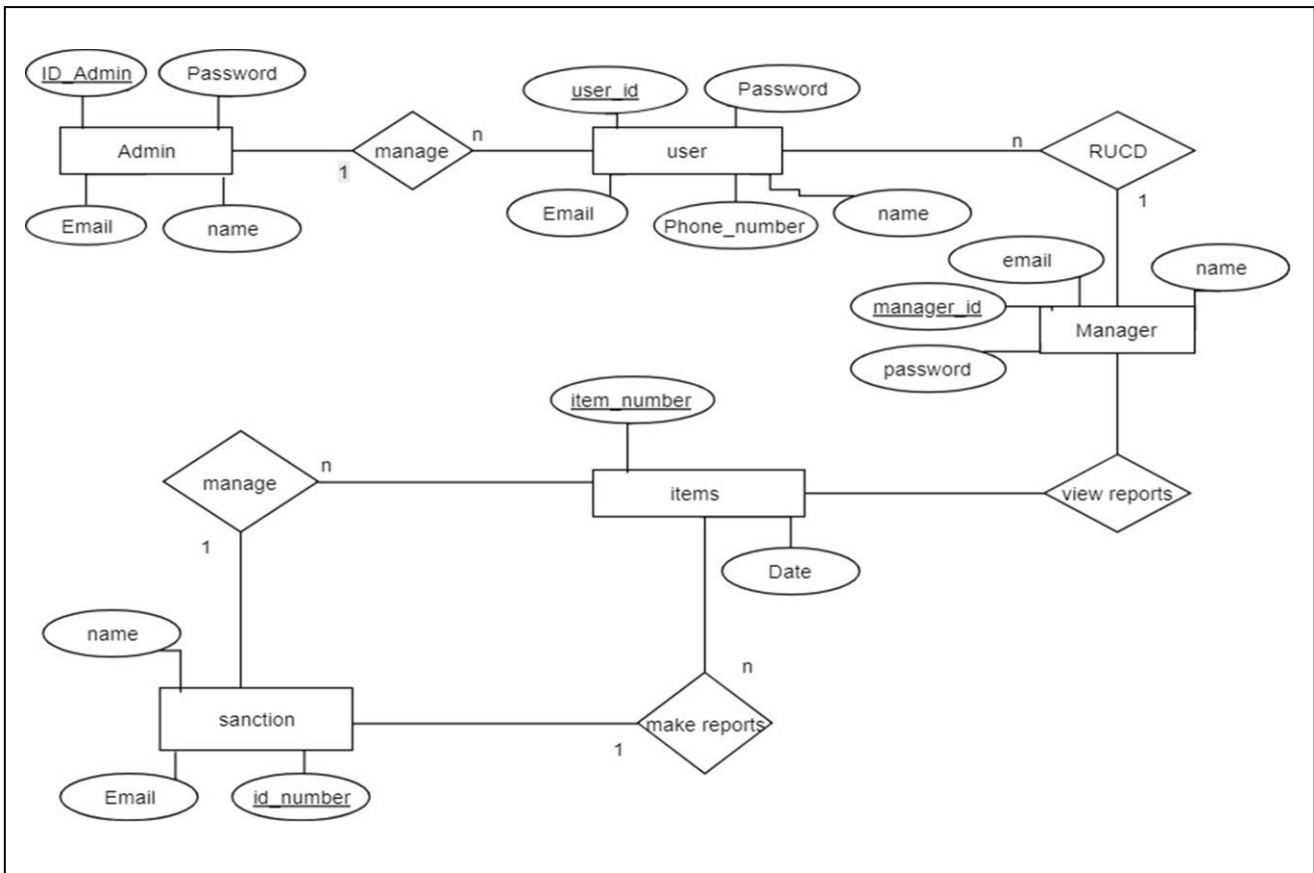


Fig.7. Entity Relationships Diagram for the i-Inventory System

4.5. Database Schema Diagram

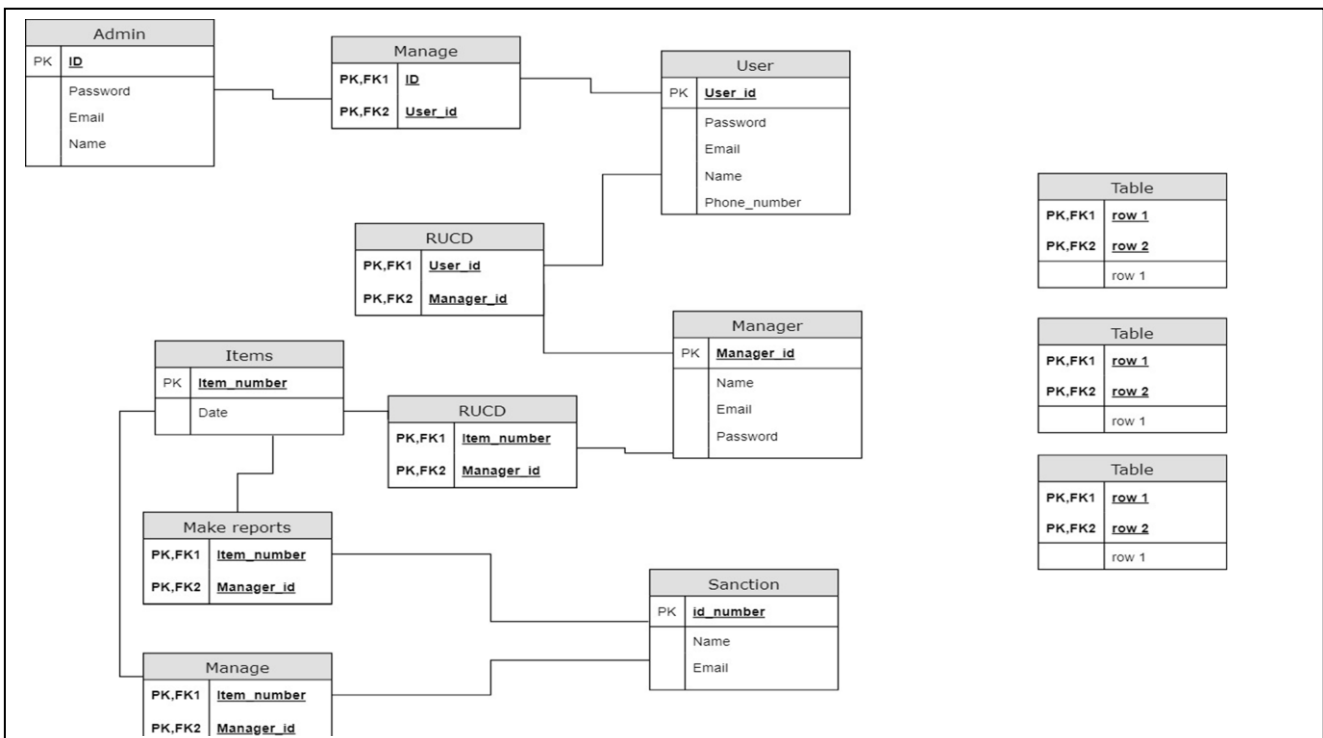


Fig.8. Database Relationship Diagram for the System Proposed

5. Conclusion

The system design proposed in the paper is focusing the adaption of intelligence and improvement in the existing inventory systems which are used across the globe. The main identifying feature as depicted in the design is the approach of artificial intelligence. This makes the system work as per the need of the hour. The prediction power of the prescribed system is very useful for various inventories as such. The power to provide the notifications in advance are very helpful to manage the system and its components. Overall the system is very inspiring and provide excellent features as desired.

Declarations

Source of Funding

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Competing Interests Statement

The authors declare no competing financial, professional and personal interests.

Consent for publication

We declare that we consented for the publication of this research work.

Availability of data and material

Authors are willing to share data and material according to the relevant needs.

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