Smart Card Based e-PDS System

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Abstract: With rapid growth of human-computer interaction, more and more useful software are replacing human efforts. The smart card based system we propose in this report integrates the idea to automation instead of manually manage public distribution system. The manual maintenance of records for issuance of food grains at the Fair Price Shops aids in creating a supportive environment for the FPS owners to divulge in malpractice. As a result, this new e-PDS system can reduce possible human errors and provide accurate information of public distribution system at any point.

Keywords: Smart Card,e- PDS, Public Distribution System, and Fair Price Shop.

I. INTRODUCTION

India's social commitment for providing food security for the poor and needy is answered through the strong network of more than 4.99 Lac PDS-FPS across the country. Our Planning Commission estimates that more than 180 million families purchase commodities at ration shops every year. The Public Distribution System in India is however plagued with several malpractices which prevent the benefits from reaching the intended beneficiaries and also result in revenue loss for the Government. There is leakage and pilferage of food grains at each point of the supply chain - from procurement to distribution. It has also been seen that issuance of multiple ration cards to a single person hinders the proper allocation of food grains to deserved beneficiary. The manual maintenance of records for issuance of food grains at the Fair Price Shops aids in creating a supportive environment for the FPS owners to divulge in malpractice.Keeping in mind the above mentioned factors, it is thus crucial to strengthen the PDS to ensure Adequate supplies, reasonable subsidies and efficient delivery of subsidized food to the deserving people, using ICT as a tool to strengthen this system.

II. PURPOSE OF THE SYSTEM

The primary objective of the project is to shift the processes, systems and approach from Government centric to citizen centric by leveraging the effective usage of ICT.
The key objectives of the system are:
- Introduce a Smart Card based Public Distribution System.
- To introduce e-mail and SMS alert.
- Replacement of existing Paper based Ration Cards with Smart Card based Ration Cards.
- Replacement of manual records with computerized standardized documents.

- Faster request processing in delivery of services with better turnaround time (TAT).
- Ensure more Transparent distribution of essential commodities at the Fair Price Shops.
- Generation of meaningful MIS from the system enabling the department in informed decision making.
- Elimination of Bogus Cards.
- Elimination of Cards for a Family holding more than one card.
- Elimination of members in case a particular member is present in more than one card.
- Reduce the chances of forged documents being circulated.
- Procurement storage and distribution.

III. ABOUT E-PDS SOFTWARE

The software automates various functions of PDS System, like:
- Replacement of Paper based Ration Cards with Smart Card based Ration Cards authenticated by finger print based biometrics.
- Fair price shop Operations (Inventory management system)
- Registration of a new Ration Card
- Registration of a new ration shop
- Cancellation/modification of Ration Cards and ration shops
- Cancellation/addition of member(s) in ration cards and the corresponding database
- Identification of Inactive Cards (Bogus Cards)
- Assigning Ration Cards to Fair Price Shops / Kerosene Outlets
- Shop wise allocation and per card allocations.

- Reporting daily Transactions from each Fair Price Shop / Kerosene Depot
- Inventory Status for essential commodities
- Inactive Cards (Bogus Cards)
- Assigning Ration Cards to Fair Price Shops / Kerosene Outlets
- Cancellation/modification of Ration Cards
- Change in member data for each ration card
- Change in the number of Ration Cards per FPS/KO
- Complaint Monitoring System
- e-mail and SMS alert
- Card transfer from one FPS to another
- Feedback mechanism.

Fig.1. Index page(GUI) of smart card based e-PDS system

This is the entry point of the system through this interface system administrator, State level user, District level user, Taluka level user can make his login and enter in to the system. Researcher also facilitate login for the guest with limited access.
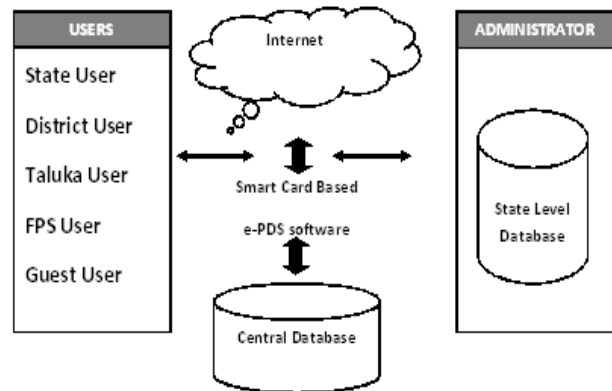
A. Smart Card Based e-PDS System Structure
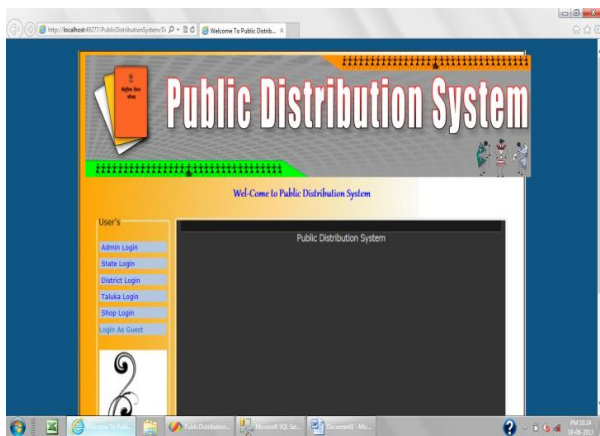

Fig2. Smart Card Based e-PDS System Structure
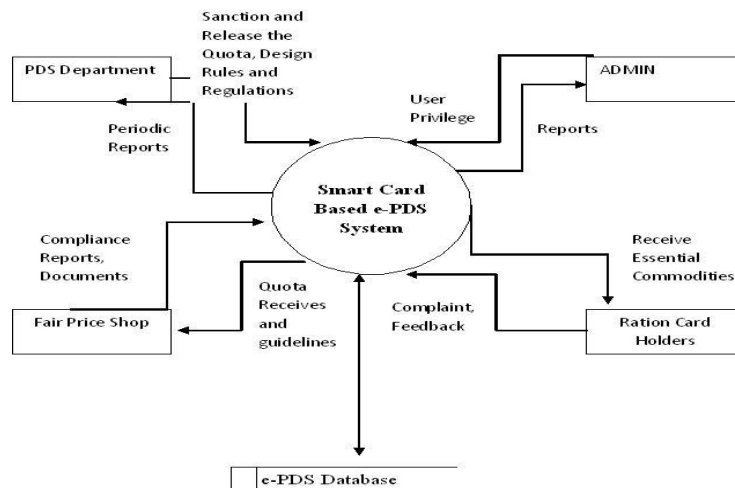
B. DFD for Smart Card Based e-PDS System

Fig.3. DFD for Smart Card Based e-PDS System

C. Technological Background

The smart card based e-PDS system is implemented with the latest **.net** technology utilizing extended library which makes layout easy to use and eliminate much of the tedious code. .Net applications can access any database, using standard SQL statements, while still following .net conventions MSSQL is preferred database system which is used while developing smart card based e-PDS system.

TABLE I
HARDWARE REQUIREMENTS

Hardware	Minimum Requirement
Processor	Pentium® Class PC (P4 - 3 GHz or greater; faster processor or multiple processors recommended)
Memory	2 GB or more recommended
Disk Space	-Approximately 500 MB -Approximately 10 GB of free space for scan logs on Agent Server -Approximately 200 GB of free space on the system hosting the database (equals approximately 400,000 pages)

TABLE II
CONTROL CENTRE SOFTWARE REQUIREMENTS

Software	Version
Operating System	Windows 2003 Server SP2 (32-bit)/ OR Windows XP SP3 (32-bit)
Web Server	IIS6 (Windows 2003/2008 Server)
Browser	Microsoft Internet Explorer 6.0,/ 7.0,/ 8.0 OR Mozilla Firefox 2.0, 3.0, 3.5, 3.6
Database	SQL Server 2005 Standard Edition or SQL Server 2005 Enterprise Edition Service Pack 2

TABLE III
WORKSTATION REQUIREMENTS SOFTWARE REQUIREMENTS

Software	Version
Operating System	Windows 2003 Server SP2 (32-bit) OR Windows XP (32-bit)
Browser	Microsoft Internet Explorer 6.0, /7.0, /8.0 OR Any compatible browser

D. Design and Implementing Details

i)   *Database design:*

Following are the database tables designed for the suggested smart card based e-PDS system. The database for the system is designed using MS-SQL server software. All the tables are normalized.

TABLE IV
DATABASE DESIGN

[TblCardTypemaster]	[TblrequisitionMaster]
[TblDistrictMaster]	[TblrequisitionDetail]
[tblReceiveItemCardOwnar	[TblreceiveMaster]
[tblShopItemStock]	[TblSMSSendMaster]
[Tbltalukamaster]	[TblStateMaster]
[TblCardInfo]	[TblAddNewCardType]
[TblVillageCityMaster]	[Tblitemmaster]
[TblMonthStatusDistrict]	[TblOwnerTypeMaster]
[TblMonthStatusState]	[TblCardWiseMembers]
[TblMonthStatusTaluka]	[TblDistributeDetail]
[TblMonthStatus]	[TblDistributemast]
[TblUom]	[TblreceiveDetail]
[Tblshopinfo]	[tblReceiveItemDetailforDistrict]
[TblAdminItemStock]	[tblTalukaItemStock]
[tblInsertItem]	[tblReceiveItemDetailforTaluka]
[tblStateItemStock]	[tblReceiveItemDetailforShop]
[tblReceiveItemDetail]	[TblLoginMaster]
[tblDistrictItemStock]	[tblPublicGravidence]

ii)   *GUI Design:*

The GUI of the suggested system is designed to be easy-to-use and simple. The e-PDS home page is composed of six types of different login pages these are as follows.

e-PDS Home Page:
- Admin Login:
- State level Login
- District Level Login
- Taluka Level Login
- FPS Login
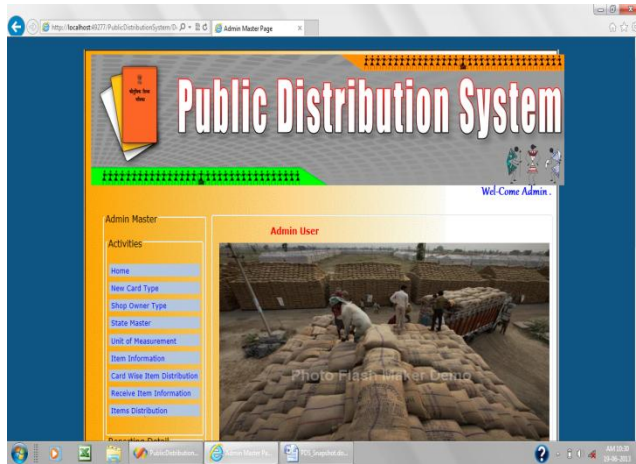- Guest Login

1)Admin Home Page:

Fig.4. Smart card based e-PDS system Administrator Home Page

Administrator of the system is involved in following activities:

- Add/Edit/Delete New ration card type.
- Add/Edit/Delete New ration shop owner type.
- Add/Edit/Delete New State.
- Add/Edit/Delete New unit of measurement.
- Add/Edit/Delete New item
- Ration Card type wise allocation of essential commodities.
- Items distribution to the State.
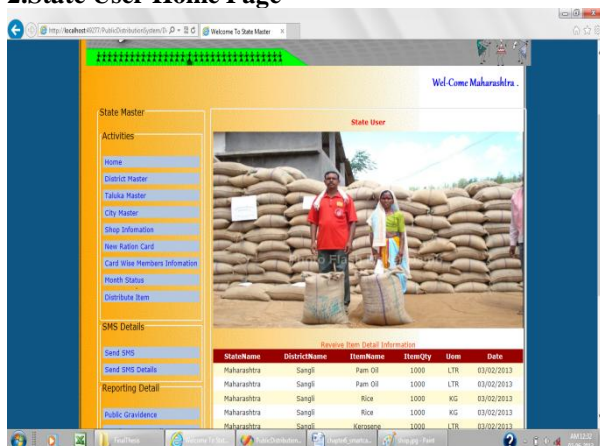- View public grievances
- View feedback
- Send SMS and E-mail.

2.State User Home Page

Fig.5. Smart card based e-PDS system State User Home Page

State level user of the system is involved in following activities:

1)   Add/Edit/Delete New District.

2)   Add/Edit/Delete New Taluka.
3)   Add/Edit/Delete New City.
4)   Add/Edit/Delete New FPS.
5)   Add/Edit/Delete New ration card.
6)   Ration Card wise member information.
7)   Items distribution to the district office.
8)   Create new district user.
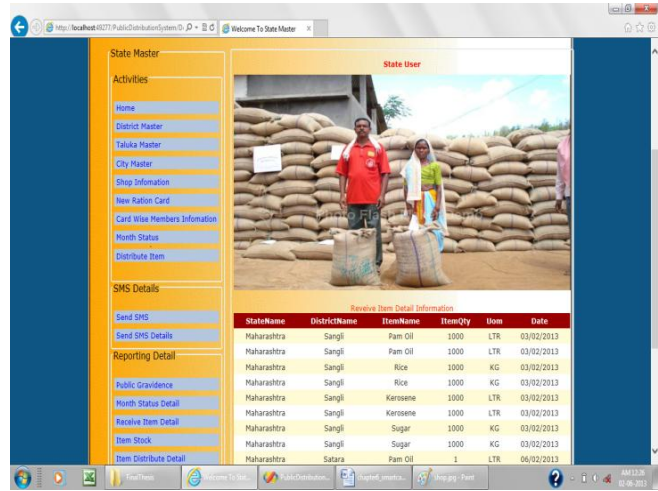9)   View feedback
10)   Send SMS and E-mail.

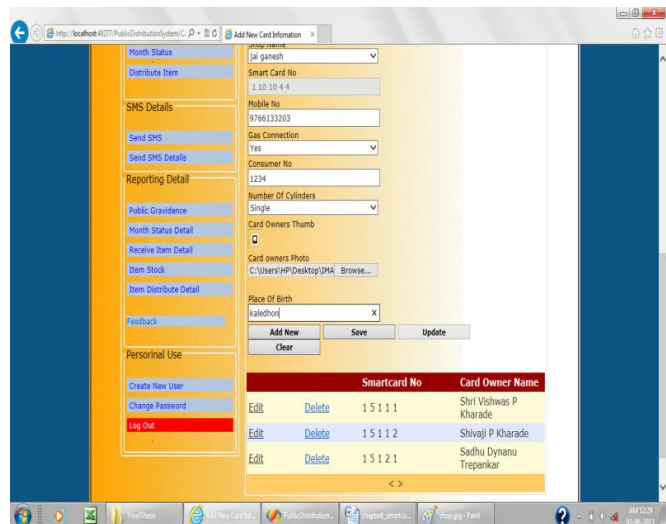
Fig.6. Smart card based e-PDS system District wise Item.

Fig.7. Smart card based e-PDS system New Smart Card Form

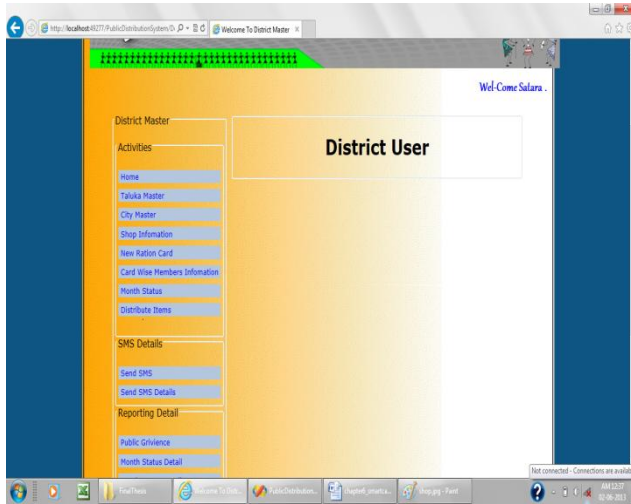## 3. District User Home Page

Fig.8. Smart card based e-PDS system District Home Page

District level user of the system is involved in following activities:
1)   Add/Edit/Delete New Taluka.
2)   Add/Edit/Delete New City.
3)   Add/Edit/Delete New FPS.
4)   Add/Edit/Delete New ration card.
5)   Ration Card wise member information.
6)   Items distribution to the Taluka office.
7)   Create new Taluka user.
8)   View feedback
9)   Send SMS and E-mail.
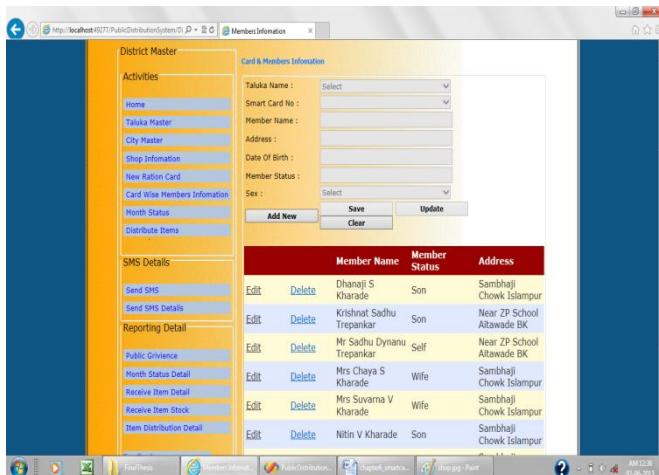

Fig.9. Smart card based e-PDS system Card wise Member Information
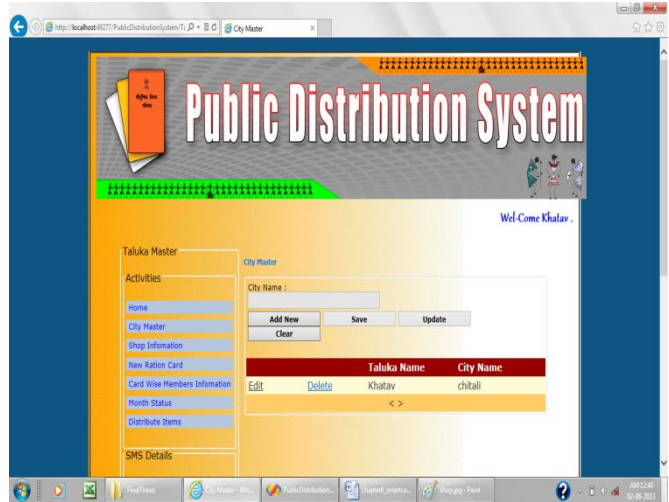
4.Taluka User Home Page

Fig.10. Smart card based e-PDS system Taluka User Home Page

Taluka level user of the system is involved in following activities:
1)   Add/Edit/Delete New City.
2)   Add/Edit/Delete New FPS.
3)   Add/Edit/Delete New ration card.
4)   Ration Card wise member information.
5)   Items distribution to the Fair Price Shop.
6)   Create new FPS user.
7)   View feedback
8)   Send SMS and E-mail.
9)   View Stock.

5. Fair Price Shop User Home Page

Fig. 5.11. Smart card based e-PDS system FPS User Home Page

Fair price shop user of the system is involved in following activities:
1)   Distribution of items to the Ration card holders.
2)   View feedback
3)   Send SMS and E-mail.
4)   View Stock.
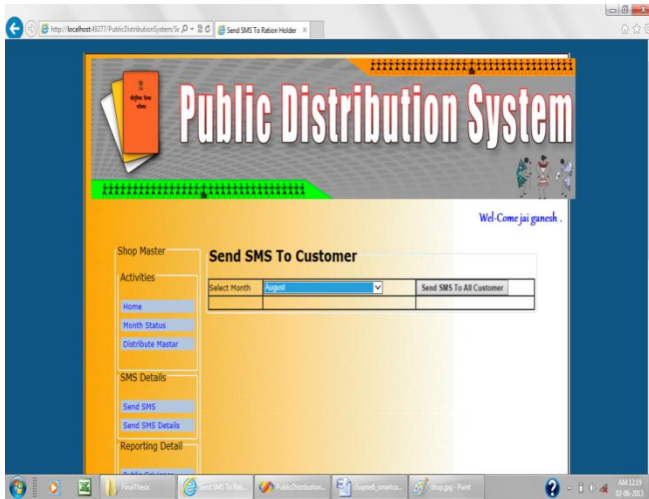5)   Change Password.
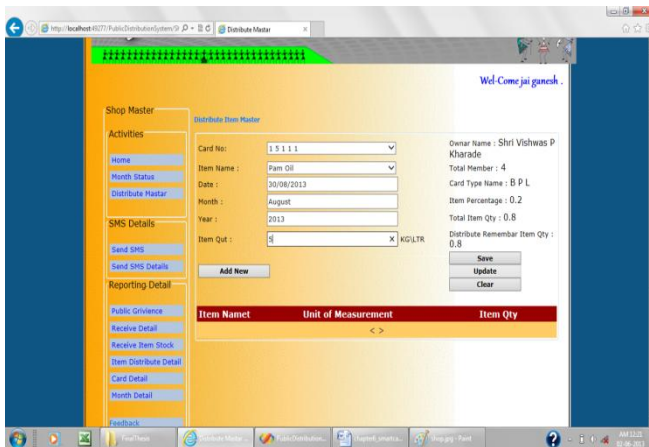
Fig.12. Smart card based e-PDS system SMS Form

Fig.13. Smart card based e-PDS system Item Distribution Form

6. Guest User

Fig.14. Smart card based e-PDS system Guest User Home Page

V. CONCLUSION

After accomplishing the smart card based e-PDS development, researcher found that the system is easy to use and user centred. The suggested system smart card based e-PDS successfully finishes user's requirement by providing instant information. It fulfils all the set objectives.

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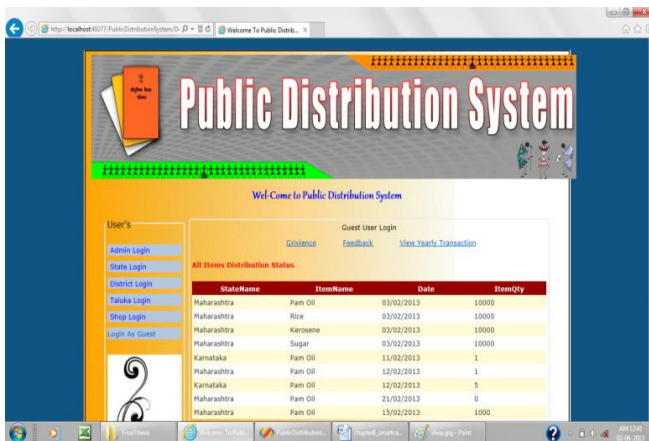[7].   Francesco Contini and Giovan Francesco Lanzara (2009) "ICT and Innovation in the Public Sector", Palgrave Macmillan