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Utility Payment and Record Monitoring for the Simplicity of Prototyping Client's Necessity

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Abstract

With given opportunity by internet. The number of tasks that can be initiated and accomplished are boundless, one of the regular chore which is carried out with help of internet happens to be paying of monthly bills, which is done by everyone. If not, almost majority of population. Paying bills through online is not a very unfamiliar process and is created to make process easy, but we doubt upon the existence of the system which are dedicated completely to online automated billing systems which are free from miscellaneous add-on functionalities, which we think that is not required and can be made more functional. In this paper we propose automated billing system particularly for electricity, for ease of prototyping our concept, that allows the users to pay the bills online, store separate database for individual users and also record power consumption.

Keywords: *online billing, automated process, e-billing, distinct database.*

1. Introduction

The practice of first online payment was witnessed in 1994. Introduced by 'Stanford Federal Credit Union', an American financial institution which offered services to its members, but not main stream.

The method gained momentum gradually and was used as a fancy feature by giant consumer company which advertised as cashless payment. But failed to incorporate due to complexity. With advancement in internet technology and improvement in functionality, the online transaction method was revived with promising improvements, which was in mid-2000's that paved way to concepts such as automated billing and electronic wallets. It was observed, that the service did fulfill the user requirements. But not completely devoted towards utility purpose. In our case we refer it to online billing. Such services were always a tiny part of much larger functionalities. Which can be seen in e-application such as online wallet, where utility payment is one of its functionality but not the utility payment itself. This may lead to ambiguity where the transaction records are randomly documented.

This led us to develop a utility payment mechanism which is completely devoted towards payment of bills. Which not only maintains proper documentation and record but also monitors power consumption. Further details will be discussed which is partitioned into sections ease of use, proposed system, application.

2. Literature Survey

Several scholars, experts and researchers have involved considerable timeline on subject 'Behavior of online transactions'. As referred in [1], which highlights on transmission and distribution losses, utilization of man power in effective manner and emphasize on machine to machine communication (M2M) concerning towards electricity management and transaction of bill payment. Machine to machine communication aims to eliminate the involvement of third parties such as human initiation to minimize manual work and offer automation. The method approached by [1] is to setup an automated meter reading and establish a communication with other computer to record and document the reading, which eliminates the possibility of manipulation and foul play, at the same time vulnerable to installation setup and error-tolerance.

The following [2], incorporates along with IoT and automated meter reading (ARM). Which not only encompasses documentation of electricity reading, but also theft of electricity. IoT is an emerging technology which consist of interrelating computing unit to carry on a function. The interrelated components can consist of things, humans, or animals. As described in [2], the

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functionality involves a AMR and an embedded system and linked to automated meter reading which indicates the end user about fluctuation and usage in power supply. IoT is often criticized for the limited from factor features, over all security and difficulty in deployment.

Also in the following case [3], AMR has been used, topped with smart billing. The method of approach is to setup a prepaid meter along with a prepaid card, where the utility is provided as long as the card is valid and checked by the utility provider. This is in case of domestic use. For large scale purpose, the ARM is wirelessly connected with regional billing office, so that direct communication is established between providers and consumer. Critical demerit in this case happens to be strong dependability on the card.

Featuring [5], which introduce product based technology that encompasses radio frequency identification (RFID) along with sensors (finger print sensors). The main objective here is to provide a hassle free experience throughout the transaction process involved between producer and consumer. The situation can be illustrated as follows. The customer walks into the store and picks the desired product, where money is automatically deducted from e-wallet as soon as the product is picked from the shelf and money is returned when the product is placed on respective place. However technology involving RFID is very effective for short distance communication and transaction. And cannot be applied for long distance remote communication which make an unfortunate choice for utility payment. A straightforward approach given by [6], is to integrate smartphone application with reading and records of power consumption. So that user is aware by smartphone application.

The following approach [7] introduces automation of appliances with pre-defined modes which is controlled and integrated by mobile application, referring to modes where user can send instruction through smartphone to work in desired way, such as low power mode, performance mode, or customized one. This enables the user to have a clear insight in power consumption.

3. Proposed System

Our primary focus being on dedicated online automated billing system, we differentiate our self by following characteristics

- To provide a dedicated utility online transaction system, which is free from miscellaneous add on functionalities.
- To monitor the consumption of power.
- Maintain a clean record of all transaction.

We've used the method of MVC, model view controller. Which is a discipline or method of approach to implement web application.

A Model View Controller pattern is made up of the following three parts:

Model - The lowest level of the pattern which is responsible for maintaining data

View - This is responsible for displaying all or a portion of the data to the user

Controller – Software code that controls the interaction between model and view.

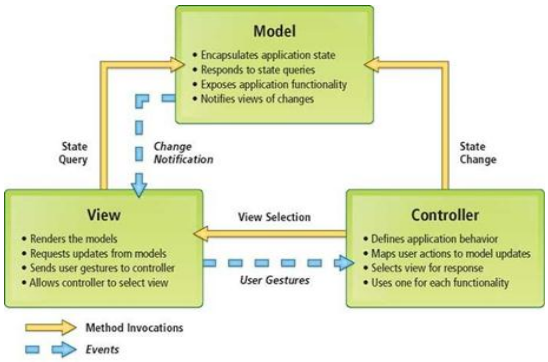

Figure 1: Architecture of Implementation Approach

MVC is popular as it isolates the application logic from the user interface layer and supports separation of concerns. Here the Controller receives all requests for the application and then works with the Model to prepare any data needed by the View. The View then uses the data prepared by the Controller to generate a final presentable response.

The web application consist of distinctive models which are layered in a defined manner. Each modules are exposed as the user traverse through the process. The modules consist of login form, customer details, connection details, generate bill. The results are showcased further.

4. Tools Used in Development

Java Development Kit:

The java development kit is a software development environment used for developing java application and applets. It includes the java run time environment, an interpreter/loader, and a complier (javac), archiver and documentation generator. The components of JDK are the following

Javac- used to compile Java source code into Java bytecode.

Rmic- creates skeletons and stubs for use in Remote Method Invocation (RMI).

Jar- This compression utility aggregates a multitude of files into a single Java Archive (JAR) file. Uses a standard compression algorithm used by all of the most common zip utilities.

Javadoc- can examine the names of classes and the methods contained within a class, as well as consume special annotations in order to create application programming interface (API) documentation for Java code.

Jwap- Disassembles class files, generating information about the methods, properties and attributes of a given compiled component.

NetBeans- It is an integrated development environment

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for java. NetBeans allows application to be developed from a set of modular software called modules. Particular used for its versatility in web application, mobile application and support for cross platform and also used to design the graphical user interface for ease of UI.

MySQL-My SQL is relative database management system. Which is popularly used to create database including data warehousing, e-commerce and logging application

5. Experimental Result

The following are the screencast of the modules

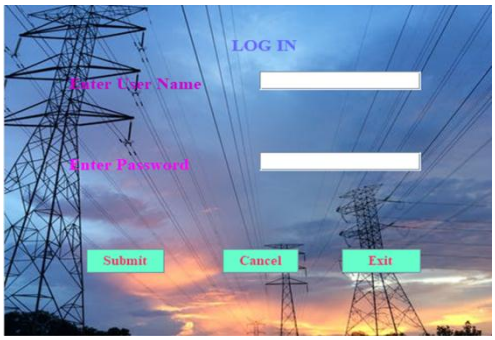

Figure 2: Login page of the User

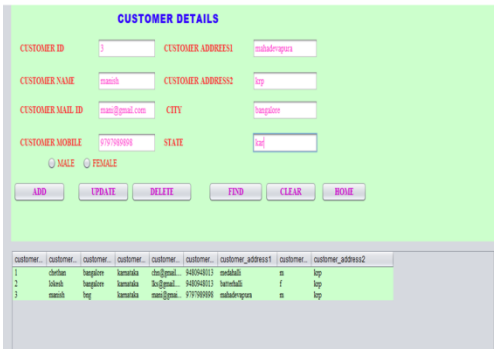

Figure 3: Showcases customer detail

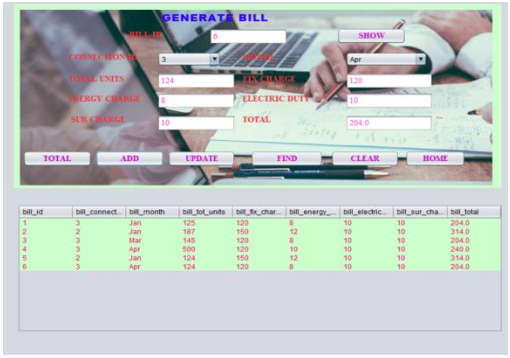

Figure 4: Receipt or Bill Generation

6. Application

As we stress spontaneously on "Dedicated online automated billing system. The following are the merits.

- Free from ambiguity.

The chances of shuffling of information is avoided as detailed record is maintained with respect to that entity.

- The user is aware of power consumption. Provides a detailed log of history.

7. Conclusion

The concept of online utility automated bill payment is not an unfamiliar one. Various approaches and proposals were seen throughout timeline for betterment and functionality. Or the existing system were discarded due to its outdated values. We believe our proposed discipline will evolve to grasp the contemporary necessity by few patches in form of update or enhancement which will overcome demerits such as old traditional way of implementation, like swapping MySQL with mangoDB or swapping NetBeans with visual studio. Which will boost the performance. Thus the paper has detailed how a dedicated online automated billing system can be a valuable alternative.

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