

Convenient Electricity Billing System through QR Code Android Application : A Review

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ABSTRACT

The electrical meter reading and bill generation process is very complex and exhaustive as it is done manually. So this project is developed for the betterment of the Electric meter reading and payment process. This solution would provide better performance, integrity, consistency and many more. We have tried to achieve the solution for convenient electric meter reading through QR code. In this project, we have tried to remove the drawbacks. It was found that the human effort is too much in the traditional electric meter reading and efficiency of traditional process is much less than it could be with this new process. We would provide an improved system for this project. For which we would be converting the traditional manual meter reading process which is done by the company worker removing the human error through modernizing it in some way So, there is no chance of any kind of fraud happening with customers. We would use QR code scanning for smart meter reading and android base application that will provide support to this system by providing previous data of that particular user. We would create an application for user interface. So the user doesn't get into a complex situation to use this system.

Keywords : QR Code , Android Application , Energy Consumption Data

I. INTRODUCTION

Today's current system regards to the billing process for electricity is not so convenient and easy. The process involves manual reading of meter by a person and then updating the system with current reading. The application is built for reducing the human errors and complex process.

To monitor the energy usage and accessing the energy data which can be result in energy management, we have built this application. The android based meter reading used Q-R code will have an android application and a web application. Android app is for meter reader for reading the meter. By this way the process of meter reading will be easy for meter readers. There will be a problem in this

project is the vast sums of money required to update or maintain this device. But, to solve the problems associated with the big problems related to the Manual Billing process it is recommended to use a mobile device (android mobile phone). The application clear most of the manual calculations and manual data with error.

II. RESEARCH METHODOLOGY

Problem Identified

The current system uses a manual process for billing purposes because of these reasons: They are used to the manual process and they can go with it even though there are problems with it. They are not ready to change their current process because it will

be time consuming. They cannot spend big amount of money for a new system. But the users face many problems with the current system of manual process to calculate Bills. The meter readers view is that the reading is done manually from the meter and calculations for some month and after that, the data is stored manually in the system. Now from the Electricity Board's view, all these processes are manual. This is a big work for them. Some mobile devices with business card reader app installed lets users to transfer contact information directly from business cards. This allows people doing business to carry only one unique card with no physical copies to share. The real time system will be the process of capturing an image and transmitting it to a remote hand-held device located out to store the information. To plan a solution for the system problem we are facing, many different tasks had to be performed.

Literature Review

In the current process, the company which supplies electricity tends to use a manual process for reading and billing purposes as they think that it is an easy process and don't require any skills for that. However, the customers have to face problems with the current process used to calculate the bill. Now in this current process, there is no facility provided to know the current usage of meter or calculating it manually. There is no facility to compare the previous month's usage with current usage also. Also, users are having problems about complaining of meter to the company. It can be about incorrect bill or device failure. Now the problems in current system are that it's highly dependent on person.

Difficulties in Existing System: -

- Time consuming process.
- Totally manual process.
- Adds lots of burden on employees.
- More chances of occurring human errors.

The propose system in previous attempts was to create an android based meter reading application that is used to get the readings from the meter automatically by capturing the image of the meter and then performing the OCR technique which is Optical Character Recognition.

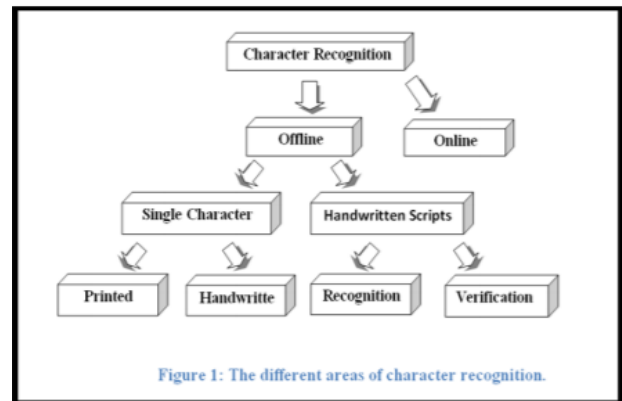
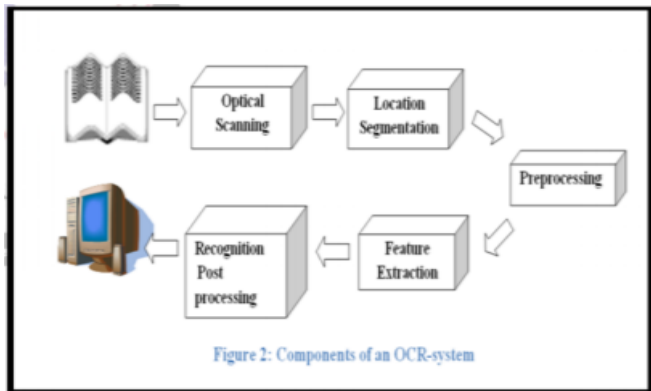


Figure 1: The different areas of character recognition.

So Optical character recognition is a method of converting a scanned image into text. When a page is scanned, it is stored as a bit-mapped file in image format. Now the image is displayed on the screen, we can read it. But to the computer, it is just black and white dots. The computer does not recognize any words on the image. A typical OCR system consists of several components. The first step in the process is to digitize the analog document using an optical scanner. When the regions containing text are located, each symbol is extracted through a segmentation process. The extracted symbols In most commercial systems for character recognition, the training process has been performed in advance.

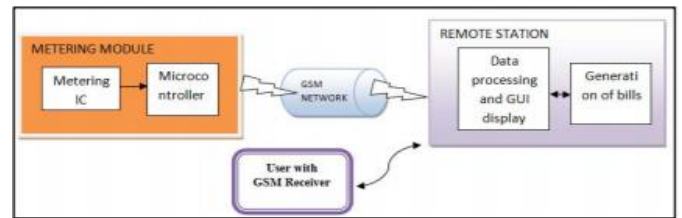
OCR looks at each line of the image and attempts to determine if the black and white dots represent a particular letter or number. OCR can be a very powerful tool. The key is its ability to produce a text version of the scanned documents. Once a text file has been created, it then becomes possible to launch a text search and locate any page with a given word or set of words. But there is a chance that some of the

images will not be missed. If someone is tired or bored, the human error can be happened. So if this happens no one is going to pay for a second pass. Companies have just had to accept the fact that data will be missed. However, it is important to understand the limitations and capabilities of OCR. It is a powerful technique but it is not perfect.



Another process the design of a wireless GSM energy meter and its associated web interface, for automating billing and managing the collected data. The traditional method of collecting of meter readings becomes more problematic and costlier when readings have to be collected from vast, the proposed system replaces traditional meter reading methods and enables remote access of existing energy meter by the energy provider. Also, they can monitor the meter readings regularly without the person visiting each house. A GSM based wireless communication module is integrated with electronic energy meter of each entity to have remote access over the usage of electricity. A pc with a GSM receiver at the other end, which contains the database acts as the billing point. A new interactive, user-friendly graphical user interface is developed using Microsoft visual studio. With proper authentication, users can access the developed web page details from anywhere. The complete monthly usage and due bill is messaged back to the customer as SMS (Short Messaging System) after processing these data.

. Before using GSM Based meter reading, various types of system were also introduced. A microprocessor/DSP based meter is used in some of the previous systems to measure the electricity consumption of multiple users in a residential area. A master PC at the control centre was used to send commands to a remote meter, which in turn transmitted data back, using the Power Line Communication (PLC)[3] technique. These techniques were mainly implemented in areas that had a fixed telephone network. So author suggests that a new approach of using an energy measurement technique that uses the GSM network for transmitting energy data is more relevant.



So the proposed AMR system consists of three main parts: a digital GSM power meter installed in every individual consumer unit, transmission facility (SMS gateway), and billing server at the energy provider side.

This GSM energy meter is constructed using the microchip single phase dedicated energy metering IC MCP3905A [4], a display, 8-bit PIC Micro-controller PIC16F877A [5] and GSM modem. A 10A class I single phase meter is designed with GSM modem which utilizes the GSM network to send its power usage value as SMS to the energy provider wirelessly. While sending the message each time, the same data is also stored in the associated non-volatile memory (EEPROM). In the office, the GSM unit will receive these data and software will calculate the total consumption of each user.

Proposed Solution

So we have been developing the proposed solution from the given problem using Q-R code scanning through mobile application which will decrease the human effort than the previous solutions.

Quick Response Code is another form of barcode. They can be used for business cards and or anything where it can be efficiently used. QR Code is a two dimensional symbol. A QR code consists of black squares arranged in a square grid on a white background, which can be read by an image capturing device such as a camera, and processed using Reed-Solomon error correction until the image can be appropriately interpreted. The required data is then extracted from patterns that are present in both horizontal and vertical components of the image. QR Code is capable of 360 degree (omnidirectional), high speed reading. QR Code accomplishes this task through position detection patterns located at the three corners of the symbol.

The Q-R Code would contain all the user information and past records which would be scan by android application. The data would be store in the online database which will provide support to the bill generation at instance.

III. CONCLUSION

The idea of creating this application was to show some common problems related to the manual electricity billing process. Before suggesting this solution they were using a manual process on meter reading, amount calculation, and billing customer and so on. The communication between customer and Electricity Board was very poor and it took much longer to respond to customer problems.

The other major problem which was founded during the literature survey is that customers had complain

that bills are incorrect. Most of the time bill calculation , generation and system updating are done manually. There can be some resulting human errors to frustrated customers who are not satisfied about the service of the Electricity Board at all.

The proposed system has come up with solutions which address all the above problems. With this solution the difficulty of the Meter reader as well as the Electricity Board will be decreased and it will be more efficient. A mobile solution is given for the Meter reader so that the day to day work becomes less complex and hard. Most of the manual processes and calculations are eliminated so that the meter readings can easily be collected more accurately to be updated to the system.

For future research, it is suggested that image processing be done in the mobile device as the image gets captured. The send the numeric value can be sent to the server through Web service.

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