Project ID : (To be assigned by Project Coordinator)

School of Information Technology and Engineering

B.Tech (IT) Final Semester Project –WINTER 2015-16

DATA SHEET

(Kindly fill in the details and Print)

1.Project Details : Individual Team members

Team Member(s) REG NO	NAME	MOBILE NUMBER	EMAIL-ID	Doing Project Inside/outside VIT	If doing project outside	
					Company name	Location
12BIT0106	Sourabh Parmar	7598066283	sourabh.parmar7495@gmail.com	Outside	Knolskape	Bangalore
12BIT0044	Vivek Duhan	9050485193	vivekduhan1@gmail.com	Outside	Knolskape	Bangalore

2.Type of Project (Capstone/SAP) : Capstone

3.For students doing Internship & SAP only (Attach the Xerox Copy of the offer)

(i) Name of the Company / University : Knolskape

(ii) Location : Double road, Indiranagar, Bangalore

(iii) Name of the External Supervisor : Mr. Sameer Agrawal

4. Project Title: Smart Electricity Meter Reading System

5. Name and Signature of the Guide /Internal Guide : Raghavan R

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Acceptance Review- Project Proposal

(07.1.16 -12.01.16)

Team Member(s) REG NO	NAME	MOBILE NUMBER	EMAIL-ID
12BIT0106	Sourabh Parmar	7598066283	sourabh.parmar7495@gmail.com
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1.1 Background

Electricity is one of the vital requirement for sustainment of comfort of life. It should be used very judiciously for its proper utilization. The traditional utility meter displays energy usage as an accumulation of counts (KWH) presented to a display, which is used to calculate the monthly bill. It has applications for domestic, commercial and industrial applications.

Reducing losses and waste, and adopting power efficient products and technology, can achieve this utility by remote management. Predicting energy usage remains a key issue in an industry or Utility sector where downtime is unacceptable. Thus we are trying to present an idea towards the minimization of technical errors and to reduce human dependencies at the same time.

1.2 Problem Statement

The title for this project is "Smart Electricity Meter Reading System", as the name suggest this system is used to take the reading of domestic electricity meter in a smart or technology driven way. The main aim of this project is to receive the monthly energy consumption from a remote location directly to a centralized system.

To take the reading of existing electricity meter, a person from electricity department need to go door to door and take the reading. This results in considerable loss of human hours and also does not provides the considerable details regarding the average consumption of a locality efficiently so that the power supply can be made according to the collected data. Also sometime the consumers are not satisfied with the service of power companies. Most of the time they have complaints regarding statistical error in their electricity bill. Sometimes the person who is taking the reading may take wrong reading accidently and this may lead to some serious problem. Technology can be used to automate such process and hence human efforts can be reduced. The purpose of this project is to remote monitor the domestic energy meter. This system enables the electricity department to read the meter reading regularly without the person visiting each house. Also this system use efficient devices to maintain trustability of the consumers. The use of highly efficient device and better system program make the system less error prone.

This system helps the customer and energy service provider to access the accurate and updated data from the energy meter. It can send energy consumption in hourly, monthly or on request. This technology mitigates labour cost, collection time, energy theft, avoids late payment. Also it increase data security, improved customer service, reduced revenue losses.

2.1 Proposed System Overview

The Smart meter reading system will help the customer to see his electricity usage and make a balanced check on his electricity consumption so that he can maintain his expenses within the budget. It will also help the customer because generally in manual reading, there may be a chance that the person who takes the reading may take a wrong reading. So, it will also protect the customer from those type of manual mistakes and will save the customer from extra hustle.

This will be helpful for the company because the company need not to employee people for taking electricity meter reading. It will save the company from extra cost. Also, the bills sent by the company will not have any mistakes. It will increase the company credibility among the user and the service of the company for the customer will improve. Traditional electrical and gas meters only measure total consumption, and so provide no information of when the energy was consumed at each metered site. Smart meters provide a way of measuring this site-specific information, allowing utility companies to introduce different prices for consumption based on the time of day and the season. Therefore, company will get new customer which will improve the company customer base and will provide the company a great improvement in their revenues.

For this we will take a digital energy meter whose blinking LED signal will be interfaced to a microcontroller of 8051 family through a LDR. The blinking LED flashes 3200 times for 1 unit.

The LDR sensor will give an interrupt each time the meter LED flashes to the programmed micro controller, microcontroller will take this reading and will display it on an LCD duly interfaced to the microcontroller.

The reading of the energy meter will also be sent to a GSM modem being fed from the microcontroller via level shifter IC and RS232 link. The sim used in the modem being internet enabled will transmit the data directly to a dedicated web page for display anywhere in the world.

2.2 Challenges

Technical Challenges:

The blinking led is of utmost use because based on it the readings of meter will be taken and will be sent to the web page hosted on the internet. Therefore using the good quality led light is of utmost importance in the meter.

The data will be sent to the internet by the internet enabled GSM sim, so if the network problem exists at some place than the reading will not be sent to the internet and page will not be updated. Therefore it will cause a gap in reading measurement and will not provide the exact reading therefore it will cause a decrement in the value of the company revenue.

Economic Challenges:

The smart meter cost should be less so that it will not become a burden on the electricity providing company. If the cost of the meter will be high then people will not be showing interest in the product. Therefore the product cost should be feasible enough for the company as well as for the customer.

Security, Health and Privacy Concerns:

The security needs to be taken care of the sending mechanism of the data to the webpage from the meter so that it cannot be modified or altered by the unwanted sources.

Health concerns may arise from the radio frequency waves used by the smart meters in sending the data to the web page hosted on the internet.

Then Privacy concerns may arise from the customers because the company people will be able to see the electricity usage data time and date.

3.1 Literature Survey & Summary

India may be a huge market for the smart electricity meter reading system. Because of its huge population India will provide a great customer base for the companies to try

out this idea. Most of the electricity sector in India is government controlled. Whenever a mistake is done by the meter reading taking guy than customer has to go to the office and he has to submit a lot of documents to the government offices. It is a very time consuming task and sometimes it is just equal to impossible without giving a bribe. So, it will protect the customers from this type of mistakes and will save their time and money. Companies or Electricity corporation also send the people to take the reading, therefore companies do not have to send their employees for this work and they need not to hire people for this work which will reduce the salary burden on them and they can earn more. Also, if company cost come down then the electricity charges may come down which will be beneficial for the customers.

Outcome Matrix:

Outcomes	Plan for demonstrating outcome
a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline	The computation and coding has to be done calculating the units and bill for the customer. Also we need the computing knowledge to connect the micro-controller and different hardware devices.
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution	The different hardware devices to be used are identified and their working and connections need to be done.
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	For the required functionality the hardware design need to be made to connect the different components. Also different systems like micro-controller need to be studied and used efficiently in the product.
d) An ability to function effectively on teams to accomplish a common goal	The common goal is to make the smart meter reading system as feasible as possible and we are doing in a group of two, so team collaboration

	will be maintained.
e) An understanding of professional, ethical, legal, security and social issues and responsibilities	The smart meter reading system will be helpful for the local people in India. It will save their time and energy.
f) An ability to communicate effectively with a range of audiences	To build the system, we need to communicate to people with different skills. And after product is ready, we will get the users feedback.
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society	This product will impact the lives of electricity consumers as well as the strategies of the companies. So, it will provide a good opportunity to us to study that.
h) Recognition of the need for and an ability to engage in continuing professional development	The professional development is a continuing process which should never stop. Communication is an ability which will be used in this to communicate to different audiences.
i) An ability to use current techniques, skills, and tools necessary for computing practice.	We will be using the 8051 micro-controller, led and other hardware devices. Also the information will be given on the internet in the best graphical way.
j) An ability to use and apply current technical concepts and practices in the core information technologies	The current technical boom is of Internet of Things which will be used in this project to connect the different hardware devices and sending the information over the internet.
k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems	In India, electricity consumers face many difficulties relating to the mistakes and constraints due to the traditional meters. Therefore a system needs to be developed which will address this problem.

l) An ability to effectively integrate IT-based solutions into the user environment	The different hardware devices will be coupled together in the home of the consumer which will send the information over the internet.
m) An understanding of best practices and standards and their application	The best practice is to follow the product development life cycle. The 8051 micro-controller interface and assembly will be used for machine level instruction.
n) An ability to assist in the creation of an effective project plan.	The project plan will be requirement gathering phase and then system design and followed by implementation and debugging and then deployment.

Realistic Constraints:

Economic:

We will try to have the product as feasible as possible, so that it can be easily installed on a large scale. Also it will not become an over burden on electricity service company.

Environmental:

The product will not emit smoke and will not pollute the environment. However it will emit the radiations and we will try to reduce the emission of radiation as much as possible.

Social and ethical:

The product will not cause any problem in the social life of the society, also it will deliver the expected output to the user. The smart meter reading system will be helpful for the local people in India. It will save their time and energy.

Health and safety:

The product may overheat depends upon the voltage, but at standard voltage, ie 230V in India, heating will not be a problem.

Engineering Standards:

The different engineering standards that will be followed in the project are listed below:

- The C12.18 will be used which is written specifically for meter communications via an ANSI Type 2 Optical Port, and specifies lower-level protocol details.
- ANSI C12.21 is an extension of C12.18 will be used which is written for modem instead of optical communications, so it is better suited to automatic meter reading.
- The Open Smart Grid Protocol (OSGP) will be used is a family of specifications published by the European Telecommunications Standards Institute (ETSI) which will be used in conjunction with the ISO/IEC 14908 control networking standard for smart metering and smart grid applications.
- GSM standard modem will used which will be fed the data form the microcontroller.
- The UMTS (Universal Mobile Telecommunication System) standard will be used for the GSM sending the data which is a 3rd generation standard for the GSM.
- For sending the data from the meter to the internet wireless communication will be used. The WCTP protocol will be used which uses http as a transport layer over World Wide Web.

For Office use Only:

Project Proposal is	**ACCEPTED / REJECTED**
Name & Signature of the Reviewer	