Submission and Registration Form

I. Title—Title of presentation:

IoT based Home Energy Management system for Rural Area in Myanmar

II. Author(s)—Full name (First name family name):
(If you are already planning a project, please include the names of all team members)

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III. Organization(s):
(If you are already planning a project, please include the institutions of all team members)
Embedded System Lab., University of Computer Studies, Yangon

IV. Topic selection:
(Select one from the topics listed in "Call for Presentations")
Smart Society: ICT applications for community and environment
IOT

IV. Abstract:
(Describe the purpose, background, objectives, content, plans for connected projects, expected results/outcomes, etc.)

Internet of Things (IoT) consists of several tiny devices connected together to form a collaborative computing environment. IoT is to make things smart. A smart home automation system has been developed in daily life. In this project, an attempt has been made to estimate energy reduction using the smart systems in rural areas of Myanmar. The total population of the country mostly in rural areas have no access to electricity. Most of them has no grid connection and people depends on wood, gas and kerosene oil for their cooking and lighting purposes. The purpose of doing this project has been to forecast the demand of electricity and look for the measures that could be implemented to meet their energy demand. The demand of the energy could be met by using non conventional energy sources especially solar thermal technologies.

The energy management have been considered as one of the major causes of the global climate change. The carbon dioxide emission during fuel consumption for power generation has also been considered. The results could be implemented by the developing countries as an effort to reduce the energy consumption and maintain the growth rate of the country. We should search for better option such as solar photovoltaic and solar thermal for such places for lighting, cooking, heating and agricultural purposes. In this project, an attempt is being made to determine the rate of diffusion of the new technology based on solar power .The solar power based technology is also done and the energy management. Providing solar lantern, solar cooker, solar home lighting system of their daily life needs and at the same time it will reduce the green house gases emissions. The most wastage of energy is caused by the inefficient use of the consumer electronics. Energy-saving solutions have been becoming increasingly essential in recent years because of environmental issues such as climate change and global warming. Save the energy while improving the home comfort and helping the environment by making home more energy-efficient.

The proposed system utilizes multi sensors in order to control a light system and also provides user the ability to automatically perform smart load controls based on utility signals. It provides user to know the demand of the appliances using wireless communication technology. Hardware is developed to showcase the applicability of the proposed algorithm at an appliance control system using various sensors and communication modules. This control systems can support only simple on/off control according to user movement or brightness of surroundings. To conserve electrical energy taking daylight into consideration by using a controller . The concept of the proposed system is to design the intelligent household lighting system with an illumination sensor (LDR), other sensors and wireless communication interface including monitoring and control functionalities for the home owner and load controllers.

USEFUL TO SAVE ENERGY

- Turn off the lights when not in use
- Do not switch on the power when TV and Audio Systems are not in use, it causes energy loss of device.
- Setting computers, monitors, etc to use sleep mode when not in use helps cut energy costs.
- Battery chargers, such as those for laptops, cell phones and digital cameras, draw power whenever they are plugged in and are very inefficient. Pull the plug and save.
- Prefer air conditioners having automatic temperature cut off Today's home require sophistication control .
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System Requirements

- *Arduino Uno Microcontroller*
- *Zigbee*
- *LDR*
- *PIR sensor*
- *Optocoupler*
- *Temperature sensor*
- *Current measurement sensor*
- *PIR sensor*
- *Relay Circuit*
- *Meter*
- *Renewable energy gateway*

Overview of system

Different loads are used in this project and the corresponding priority is adjusted based on the priority of the loads. Meter can be used to provide an interface between utility and home owner in a real life environment. In this case, the meter and board receives a DR (Demand Response) signal from a utility, which is used as an input for   load controller unit focus on controlling power-intensive household appliances, for eg. Water heaters, air conditioners, clothes dryers. After shutting down the devices like computer and its peripherals, Lights, TV, stereo, and , other plug loads completely does not turning off. Solution for this problem can be solved by using automatically detects when turned an appliance off and completely cuts power.

The controller board makes a decision to switch ON/OFF selected end-use appliances based on the utility signal received, as well as service provider load priority and preference settings. It is also responsible for collecting electrical consumption data from all load controllers and providing an interface for service provider to retrieve appliances' status and review their power consumption.

Uses electricity at the same time (peak hour), the demand of electricity at the home increases. To avoid this high peak demand. The smart home is defined as the home with smart sensors, power units with Renewable energy, smart controller with smart electrical appliances. Wireless technologies that can support some form of remote data transfer, sensing and control using ZigBee   to embed various levels of intelligence in the home .

The home server gathers both the energy consumption data through ZigBee and energy generation data through the Renewable Energy gateway(REG). By taking into account both consumption and generation, the home server optimizes home energy use.

The wireless communication protocol module which provide communication paths between load controllers and users to provide information about power values. The main features of this product are:

- Autonomous control based on brightness of the room.
- ON/OFF of the load based on the priority of the load controllers
- Know the readings of the load consumed by appliances using wireless communication protocol .

The proposed system can reduce energy consumption via interaction with the information about surroundings (e.g. brightness of a room) and control the load using controller board. The energy management system will works under four different conditions in the case of automatic load management power supply greater than 220v,greater than 180v,greater than 110v and less than 110v.According to the power supply level and load priority algorithm the loads will ON and OFF automatically. In the case of 220v and above all the loads will have enough voltage to perform their specific functions. The system monitors the luminosity inside the room by automatically changing the light intensity according to the brightness of surroundings . For intelligent light control strategy using LDR sensor can be represented as the light intensity increases the width of the PWM signal will also increases and the inverse occurs as the light intensity decreases.

The system uses embedded system with internet connectivity to communicate with Smartphone. The arduino Uno is the microcontroller used in the Smart Home Energy Management System connected to household devices to perform control and monitor functions. Arduino are connected to the different sensors (eg- LDR, PIR sensor, Temperature sensor, Current measurement sensor etc..) and the relay that provides the capability to switch selected appliances to turns ON/OFF, depending on the command sent by the controller board.

ZigBee is a low-cost, low-power usage allows longer life with smaller batteries allows the technology to be widely deployed in wireless control and monitoring applications, and the mesh networking provides high reliability and larger range. This device is connected to a ZigBee Transceiver and it communicates with each and every node present inside the home. The wireless communication protocol Controller facilitate for the data follow between user and microcontroller. They can communicate with a home automation network through an Internet gateway at the edge of the network and one or more client devices, that can be either smart phones, tablets, or laptops.

In this project, it has how the energy are being wasted in spite of knowing that energy are very much short now a days. Various kinds of electronic sensor devices and equipments have discussed to solve the problem of wastage of energy in the house. Wireless features are now days very popular in the market and in demand by the every person for making the life more luxurious one and very relax able one.

V. Speaker information:

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- Accommodation