

Smart Meter- Multifunctional Electricity Usage Meter

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Abstract

Internet of things (IoT) is the modern concept which makes new approach to make connect people and people, people and devices via internet. This concept is a great solutions for many practical problems of people. Such as connecting people with each other easily, controlling remotely, managing people or devices easily etc. This concept combined with other technologies will make more use for people. Such a modern technology is Multi-Agent technology; connecting these two technologies will make great solutions for many human problems. Software agents are well trained computer programs for certain task with different environment conditions. These agents can act autonomously with sudden changes in artificial environment. (A) Multi-Agent system (MAS) is the collection of software agents who play in artificial environment. Applying IoT and MAS together is great way of creating solutions for major problems of people. One of such problem is uncontrollable power usage. Smart Meter (SM) is the solution for this problem, which is integrated both IoT and MAS concepts. Electricity is the major type of energy which is used for everything in modern world. So electricity plays major role in industry as well as the domestic. More than 50% of domestic use electricity as their first power source. With the great usage of electricity the wastage also becomes higher. This wastage make uncomfortable to domestic economics so people need a better way to eliminate the wastage. And also it will put the world at risk. Because all resources which are used to generate electricity have decaying characteristics, this wastage will make quick reach to end of the resources. Looking at the two tasks of this problem, the key factor of acting on this issue, so people must think on this issue and must act themselves so the wastage must represent to them in manner, which they can feel the problem. Representing current usage in representative manner and predicting future usage according to past usage details will be much easier to understand on how they must act for themselves as well as the world. Implementing the methods to act according to the future plan is one important component for this concept, and remote access and automatic control will add new value to this concept and will make better and easy way to eliminate wastage. Developing countries are struggling to eliminate wastage of electricity because they spend big portion of their economy to generate electricity. If the wastage elimination plan is more expensive it is not feasible for those country. Then it need less expensive power saving equipment. So the smart Meter is such equipment which developed using less expensive equipment such as Arduino, RPI, etc. Complete SM system contains three parts they are, Physical system – which contains a component connected to the home electricity system to collect consumption data of home

areas. This system contains microcontrollers, sensors, etc. Processing Unit – this is the system which contain multi-agents and other software which is used to control micro controllers. This is the core of the SM which does all calculations, and all analytical processes and report generating processes. UI Component is the third system which is used to display analytical results of those generated by Processing Unit and it lets user to control the electricity system remotely. All three units of the SM can be built cost effectively which is appropriate to developing countries. When considering the situation in Sri Lanka another major issue is that there is no good connection between domestic system and service provider so the use manual system of collecting of details of consumption. So it will take more time to process consumption data to service provider and make analysis report of domestic. But using the system SM is the best way of collecting consumptions details and also analyzing the consumption data of domestic to make sense on people to save the power because SM will predict the future data consumption and weaknesses of the power consumption of the user. SM uses an analytical program called R in the core module and it is programmed to generate the forecasting for the users' future consumption of data to represent in understandable manner. This SM concept can be extended for industrial users and this can be extended to make power grid in the area as well as the country. So then it will give new interface for the Power Grid concept. This will lead the whole country to stand for power saving as one. SM is the MAS which is integrated with IoT concept to achieve the above tasks, which is implemented using MadKit agent platform and Java language. Each software agent is assigned for a task. These agents work together to bring out one major task alive. All devices which are connected to the central system communicating with each other as well as with the user, will bring out the concept IoT. Together these two technologies will make a complete solution for electricity wastage.

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