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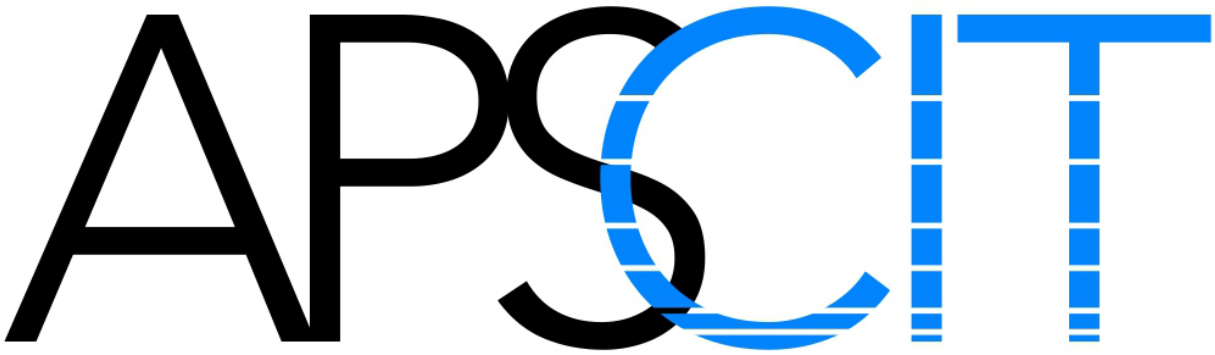

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3. Introduction to the Lossless Source Coding and the Context Tree Weighting Method (T. KAWABATA)
4. Hybrid uplink traffic scheduling algorithm in Fixed Mobile Convergence (FMC) networks: A Comparative Study of Performance (I.S. HWANG)
5. Data analytics and simulation tools for urban mobility of the future (J. DAUWELS)
6. Efficient Tools to Implement Web-Based Systems (L.H. CHANG)
7. Robust texture image representation by scale selective local binary patterns (Z.H. GUO)
11. Error Data Analysis of the Photovoltaic Energy Monitoring System with the confidence interval of Multivariate Linear Regression (E.Y. BYUN)
12. Metamodel based Photovoltaic Monitoring System for Heterogeneous Renewable Energies (W.S. JANG)
13. Analysis of Integrated Renewable Energy Monitoring System Data using KNN for Pre-Processing (J.H. LEE)
14. Improvement for Effective Commination Cost of Solar Energy Integrated Monitoring System based on Long Range, Low Power Wireless Platform (LoRa Technology) (B.K. PARK)
15. A study on Failure Judgement Method of Photovoltaic System based on Logistic Classification (J. PARK)
16. An Experimental Practice with the lightweight test maturity model to improve test process of Korean Small & Medium Sized Companies (K. KIM)

Sat/8/19

No. 2 Meeting Room

Abstract ID: 14

Improvement for Effective Commination Cost of Solar Energy Integrated Monitoring System based on Long Range, Low Power Wireless Platform (LoRa Technology)

Bo Kyung PARK, Hyun Seung SON, R. Young Chul KIM, Hongik University, Korea,

Abstract

In Korea, the renewable energy is a big issue for substitute energy sources. Our cooperator, HS solar energy company, also requires an integrated monitoring system for different power generation devices and continuous management. Existing renewable energy power plants have been installing in a backward rural villages rather than cities. In this case, we got some problems as follows; the first problem is that renewable energy system installed in rural areas is very difficult to access the network. The second problem increases the communication costs. To solve this problem, we propose to adapt Long range, low power wireless (LoRa) platform, which is the prevailing technology choice for building IoT networks worldwide, through improvements in operations and efficiencies as well as reduction in costs. LoRa system between each local server and the monitoring server with the existing RS232. LoRa based on IOT gate can be used in places where network access is difficult and not enough to have electrical power. It also can reduce communication costs.

Key Words: Renewable Energy, Integrated Monitoring System, Long Range Low Power, IoT Networks

1. Introduction

Renewable energy requires an integrated monitoring system for various generation devices and ongoing management. The data generated from renewable energy communicates with the devices of each power plant. Figure 1 shows the monitoring method of existing renewable energy power plants. This system connected between each local server and the monitoring server with the existing RS232 [1]. However, this method is more difficult to apply in rural villages rather than cities. And it requires additional cost. To solve this problem, we propose to adapt LoRa platform, which is the prevailing technology choice for building IoT networks worldwide, through improvements in operations and efficiencies as well as reduction in costs.

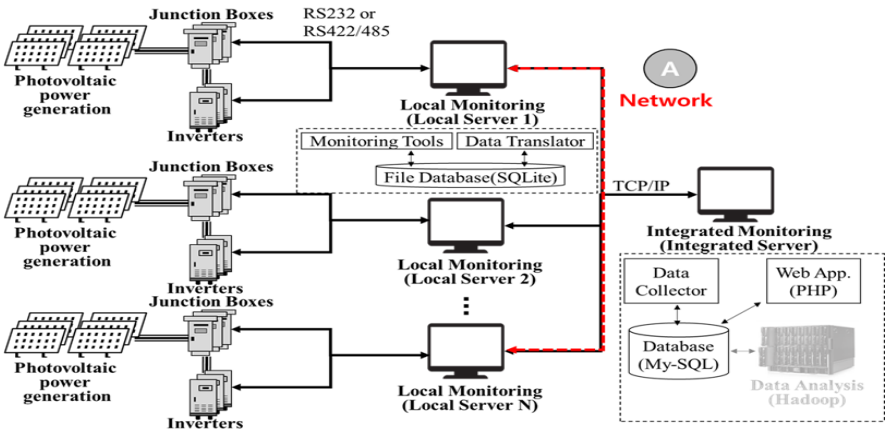

Figure 1. Monitoring Methods of Existing Renewable Energy Power Plants

2. Improvement of Renewable Energy Monitoring System Using LoRa

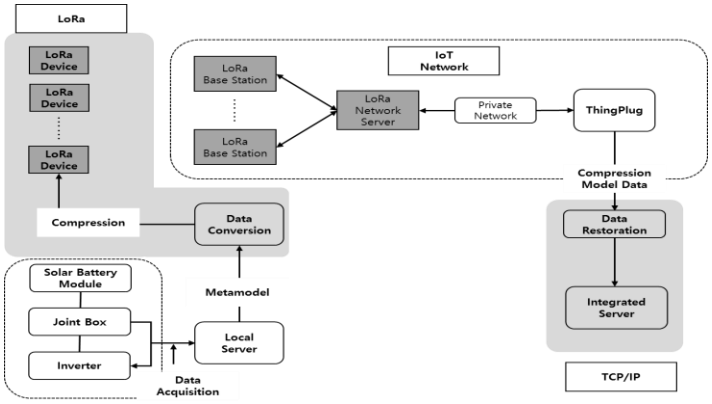

Figure 2. Integrated Renewable Energy Monitoring System based on LoRa Platform

Figure 2 shows an integrated monitoring method for renewable energy based on the LoRa platform. The applicable part of the LoRa platform is 'A' in Figure 1. In LoRa platform, the device is connected to multiple base stations. In addition, LoRa is cheap to build because the connection between the device and the base station is simple [2, 3]. The proposed method is as follows: LoRa devices acquire meta-model data from the local server through data conversion. These data are transmitted to the integrated server through the IoT network. The transmitted data is compressed and transmitted to the integrated server. LoRa obtains coverage of tens of kilometers using base station and small antenna [2]. LoRa can be used in rural villages where it is difficult to build a network. Also, as shown in Table 1, LoRa rates are much more economical because they are cheaper than LTE.

Table 1. Comparison of LTE and LoRa Rates (2017. 3)

Network	Monthly Fee	Basic Data
LTE	16,500~24,200(KRW)	11~22GB
LoRa	385~2,200(KRW)	100KB~100MB

3. Conclusion

In this paper, we propose to adapt our system with LoRa platform to improve the operation, efficiency and cost of the renewable energy monitoring system. Currently, we are operating an integrated renewable energy monitoring system based on the LoRa system. In future studies, we will apply the LoRa platform to geothermal energy.

4. Acknowledgments

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References

1. Hyun Seung Son, R. Young Chul Kim., “Modeling a Photovoltaic Monitoring System based on Maintenance Perspective for New & Renewable Energy.” The 2nd International Joint Conference on Convergence, (2016), AACL 07, pp. 144-147.
2. Alliance, LoRa, “A Technical Overview of LoRa and LoRaWan.” White Paper, (2015).
3. Jaeyoung Jang, Seunggyu Byeon, Jongdeok Kim, “Design and Implementation of Monitoring system for Analysis of Performance of LoRa.”, KIISE, (2016), pp. 318-320.

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