

GIS Based Assessment of Outdoor Coverage of eduroam (education roaming) Service:

A Case Study of Central Area, University of Tsukuba, Japan

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Extended Abstract

1 Motivation

University of Tsukuba is one of the biggest international university in Japan and offering the eduroam service for students, researchers, and staff. Therefore, it is important to assess the coverage of the service to aware the accessibility to the service for the potential users.

2 Introduction

eduroam is a secure, world-wide wi-fi roaming access service developed for the international research & education community and available in over 100 territories. Among them, University of Tsukuba is one of the biggest international university in Japan and offering the eduroam service for their students, researchers, and staff. Therefore, it is important to assess the coverage of the service to aware the accessibility to the service for the potential users. The objectives of this study are to evaluate the eduroam coverage and to aware the students, researchers, and staff about the coverage of the eduroam service of Central Area, University of Tsukuba. The central area is having most of the important places and buildings of the university.

3 Study Area

This case study considered only the Central Area of University of Tsukuba (Figure 1).

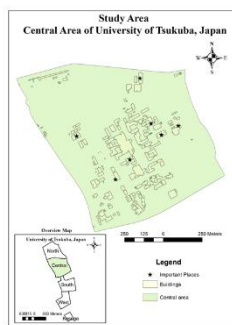


Figure 1: Central Area of University of Tsukuba

4 Methodology

Measured eduroam signal strength of center locations of 50m x 50m fishnet of the study area using the Airport Utility by observing RSSI (Received Signal Strength Indicator) and recorded using Survey123. By using IDW interpolation technique, prepared the map of eduroam coverage and finally did an accuracy assessment by assessing correlation between observed and interpolated RSSI to validate the model. Figure 2 shows the overall workflow of the study.

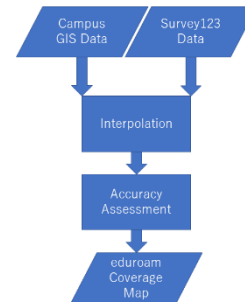


Figure 2: Work flow of the study

Boundary, buildings, and important places map layers of University of Tsukuba from Campus-GIS were used as secondary data and observed eduroam signal strength of sample locations were used as primary data for the study. Survey123, and Airport Utility were used to collect the primary data of the study. ArcGIS, and Microsoft Excel were used to analyze and present the data.

5 Results and Discussion

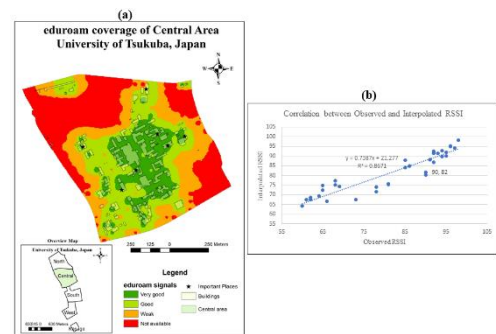


Figure 3: (a) eduroam Coverage of Central Area, University of Tsukuba
(b) Correlation between Observed and Interpolated RSSI

Figure 3(a) shows the eduroam outdoor coverage map of the Central Area of University of Tsukuba. According to the accuracy assessment shows in Figure 3(b), there is a significant correlation (with $R^2 = 0.8671$) between observed RSSI and interpolated RSSI. Therefore, the interpolation technique used (IDW) for the modeling of the eduroam coverage was suitable for the modeling of the eduroam coverage. According to the coverage map, it is possible to access the eduroam service from almost all-important places, buildings and public places. Signal strength of the eduroam service is very good at in and around important places and buildings. In most of public places, the signal strength is good. But there are some public places with weak signal strength. Therefore, it is required to improve the coverage in such places. Anyway, overall coverage of the eduroam service in Central Area, University of Tsukuba is much satisfactory. Further, Survey123 is a very good tool to collect field data for this kind of field survey and interpolation techniques can be used to model the wireless network coverage with the filed data.