

Deployment Support of Temporary Wi-Fi Access Points in Urban Environment

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1. CHANNEL SELECTION SUPPORT BASED ON PREDICTION FUNCTION

Temporary Wi-Fi access points (APs) deployment are required for the big event like Tokyo Olympic to increase the network capacity. However, in urban environment, many APs already exist and 2.4GHz unlicensed band becomes more congested.

In order to support the temporary Wi-Fi AP deployment in such environment, we designed channel selection algorithm according to our proposed prediction function of each channel quality [3]. Our algorithm aims to more effective usage of limited channel resources by considering partial overlapping channel interference. We built channel performance prediction function based on IEEE802.11 MAC frame monitoring to catch the current channel usage. The function is composed of an SVM-based classifier to estimate capacity saturation and regression functions to estimate the channel performance. The training dataset for the machine learning is created by a highly-precise network simulator. We have conducted over 10,000 simulations to train the model, and evaluated using additional 2,000 simulation results. The result shows that the estimated error of frame delivery ratio is less than 10%. By using this function and comparing relative channel quality, temporary Wi-Fi APs can select the best channel.

2. SIMULATION-BASED EVALUATION EXPERIMENT

In order to evaluate our selection method, we create the realistic urban scenario and conduct simulation-based experiment. We create Osaka city scenario by using Wi-Fi Scan Map [1, 2] and traffic monitoring as shown in Figure 1. In this scenario, we confirmed that proposed method can predict the best channel. In addition, we confirm that our method can improve throughput by selecting the best channel in Figure 2. As a result, the throughput of the target AP can achieve 1.73 times higher than that of the AP which randomly selects channels (Average). Also, the throughput of the target AP can achieve 1.41 times higher than that of the AP which selects channels based on the number of surrounding APs in the same channel (AP_Num).

3. ACKNOWLEDGEMENT

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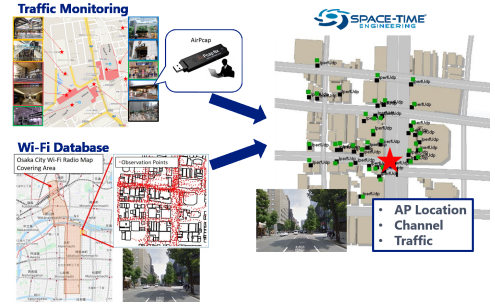


Figure 1: Osaka City Scenario

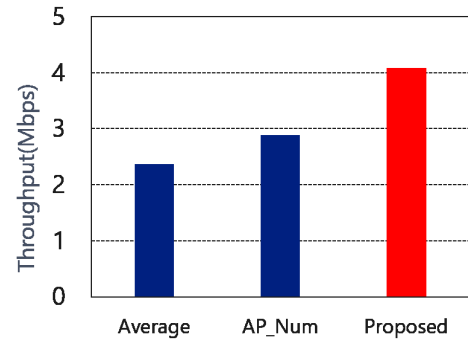


Figure 2: Experiment Result

4. REFERENCES

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