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授与した学位	博士
専攻分野の名称	工学
学位授与番号	博甲第5225号
学位授与の日付	平成27年9月30日
学位授与の要件	自然科学研究科 産業創成工学専攻 (学位規則第5条第1項該当)
学位論文の題目	A Study of Active Access-Point Selection Algorithm for Wireless Mesh Network under Practical Conditions (現実環境下での無線メッシュネットワークの動作アクセスポイント選択アルゴリズムに関する研究)
論文審査委員	教授 船曳 信生 教授 田野 哲 准教授 野上 保之

学位論文内容の要旨

In this thesis, we present the study of the active access-point selection algorithm for wireless mesh networks under link speed changes.

Chapter 1 presents the background of active access-point selection algorithm for wireless mesh networks under link speed changes and contributions of this thesis.

Chapter 2 introduces the related wireless network technologies to this study, including the IEEE 802.11n protocol, IEEE 802.11ac protocol, and the wireless mesh network.

Chapter 3 presents our link speed and throughput measurement results using IEEE 802.11ac/11n WiFi devices under variable conditions.

Chapter 4 presents the extended routing algorithm for WIMNET to consider link speed changes.

Chapter 5 presents the extended active AP selection algorithm to consider the link speed change.

Chapter 6 extends the WIMNET simulator to simulate link speeds based on measurement results.

Chapter 7 evaluates the extended active AP selection algorithm through simulations using the extended WIMNET simulator.

Finally, Chapter 8 concludes this dissertation with some future works.

論文審査結果の要旨

In this thesis, he presented the study of the active AP selection algorithm for wireless Internet-access mesh network (WIMNET) that has redundant access-points (APs) to increase the dependability to link or AP failures under practical conditions.

Firstly, he presented the extension of the active AP selection algorithm to select active APs under practical conditions of link speed changes, multiple GWs, the hop count limitation, and QoS constraints. He also extended the routing algorithm used in this active AP selection algorithm procedure and the WIMNET simulator for throughput evaluations. He verified the effectiveness of the extended active AP selection algorithm through extensive simulations using the extended WIMNET simulator.

Secondly, he presented link speed measurement results when Transmission Control Protocol (TCP) was used with IEEE 802.11ac devices from three vendors. In his measurements, he adopted different conditions for network fields such as AP locations, link distances, one or two-hop communications, wall existences, and repeater existences. His measurement results showed that TCP throughputs are greatly affected by vendors, communication link conditions, and location conditions.

From the overall evaluation of this thesis, the applicant has satisfied the qualification condition for the doctor degree in Engineering from the Graduate School of Natural Science and Technology at Okayama University.