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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　　６４９３　　号
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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４条第１項該当）
学位論文の題目	A Proposal of Android Programming Learning Assistance System （Android プログラミング学習支援システムの提案）
論文審査委員	教授　船曳　信生　　教授　田野　哲　　教授　野上　保之

学位論文内容の要旨

This thesis proposed the *Android Programming Learning Assistance System (APLAS)* to assist students studying *Android programming* independently. APLAS offers various assignments to students that cover the important topics in Android programming so that they can make practical Android applications after completing the assignments. To help the self-studies, APLAS provides instant and automatic validations of the answers from students.

Firstly, I presented Android Programming Learning Assistance System. APLAS offers the three functions to improve learning environments for the teacher and the students. Secondly, I implemented the web-based online platform of APLAS to integrate the roles of teachers and students. Thirdly, I implemented the five learning topics in two learning stages for APLAS. Fourthly, I investigated the performances of the validation process using two testing tools, JUnit and Robolectric, under various PC hardware and test cases on the client-side and the server-side of the online platform. Lastly, I implemented and evaluated the blended learning using APLAS in the online Android programming.

In summary, I presented comprehensive studies of APLAS for the self-learning platform for Android programming. I implemented the web-based online platform for online services to the teachers and students, generated the five learning topics, realized the online validation function of the students' answers using JUnit and Robolectric, and applied APLAS to the students in the online Android programming course for the blended learning in an Indonesian university.

This thesis is organized as follows: Chapter 1 introduces the background, motivation and the contributions of the study in this thesis. Chapter 2 reviews the development process of an Android application. Chapter 3 reviews the software testing of an Android application. Chapter 4 proposes Android Programming Learning Assistance System as the platform to assist students learning Android programming independently. Chapter 5 presents the implementation of the web-based online platform for APLAS to integrate the roles of teachers and students through distributions of learning materials, collections of students' answers, and validations of them. Chapter 6 presents the implementation and evaluation of Basic UI topic. Chapter 7 presents the implementation and evaluation of Basic Actvity topic. Chapter 8 presents the implementation and evaluation of Advanced Widgets topic. Chapter 9 presents the implementation and evaluation of Multiple Activities topic. Chapter 10 presents the implementation and evaluation of Multimedia Resources topic. Chapter 11 presents the evaluation of unit testing performances at the validation process in APLAS. Chapter 12 presents the application of APLAS in an Android programming course. Chapter 13 introduces works related to this thesis in literature. Finally, Chapter 14 concludes this thesis with some future works.

論文審査結果の要旨

In this thesis, the applicant proposed the Android Programming Learning Assistance System (APLAS) to assist students studying Android programming independently. APLAS offers various assignments to students that cover the important topics in Android programming so that they can make practical Android applications after completing the assignments. To help the self-studies, APLAS provides instant and automatic validations of the answers from students.

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The applicant has published three journal paper, six international conference papers, and three domestic conference papers to present the contributions.

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.