

先端科学技術研究科 修士論文要旨

所属研究室 (主指導教員)	数理情報学 (池田 和司 (教授))		
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学生氏名	池田 聖華		
論文題目	Gaze Behavior Analysis for Program Comprehension by Contrasting Human and Machine Attention		
要旨			
<p>Program comprehension is an essential cognitive process for software development and maintenance. Recently, to investigate the visual attention for important components in the source code, some studies have reported the application of artificial "attention" of machine learning models. However, the use of the attention models remains controversial as to whether they are valid models of human attention because there is no eye-tracking study with a sufficient number of subjects to our best knowledge. Our purpose is to confirm the consistency of attention between humans and models by analyzing gaze behavior using machine learning models. We conducted an eye-tracking experiment during a program comprehension task with sixteen subjects. Successively, by using attention mechanism of machine learning models, we quantified the importance of program components and compared them with programmers' visual attention. As a result, we found consistency between attention of models and that of human programmers. In addition, the model trained to be specialized for the tasks resembled human visual attention more similarly than the original model. There was no difference in similarity between humans and models related to the task performance and the percentage of correct answers. Although there was consistency with the model for the programmer as a group, it could not explain the individual differences. It may be due to the lack of memory or knowledge of subjects. For better expression of the cognitive process of program comprehension, it might be necessary to consider various factors such as brain activity in addition to gaze information. Modeling of attention for program comprehension like this study may contribute to improving both human program comprehension and machine learning models.</p>			