

# 先端科学技術研究科 修士論文要旨

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| 所属研究室<br>(主指導教員)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 数理情報学<br>(池田 和司 (教授))                                                 |     |              |
| 学籍番号                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1911136                                                               | 提出日 | 令和 4年 1月 21日 |
| 学生氏名                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 大郷 友海                                                                 |     |              |
| 論文題目                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Asset-Aware Image-to-Code Generation without Domain-Specific Language |     |              |
| 要旨                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |     |              |
| <p>In the development process of a web page, a complete picture of the web page is created at first, then codes of HyperText Markup Language (HTML) and Cascading Style Sheets (CSS) are written based on the picture. Considering this coding process has repetitive simple tasks, it is beneficial for the industry if the process can be automated. The complete picture of a web page is called "comp image", and to create a comp image, smaller images representing parts or components are used. These images are called "asset images".</p> <p>Previous studies in an image-to-code generation used Domain-Specific Language (DSL) which is mapping between short tokens and HTML/CSS to model web pages. This approach has 2 main problems. One is a limitation of expressiveness in the resulting codes, and the other is a large amount of effort needed to define complete mappings between HTML/CSS and DSL. Additionally, previous works do not deal with asset images explicitly. Asset images can give a large effect on the appearance of a comp image. To reconstruct a web page from predicted codes of an image-to-code model, the model should be able to generate file paths of asset images appearing in the comp image along with codes of HTML and CSS.</p> <p>In this paper, we propose a transformer-based method to generate codes from the comp image of a web page. Our method can generate HTML and CSS without DSL by applying the Byte-Pair Encoding algorithm in the tokenization process and generated code includes file paths of assets appearing in the input comp image. We evaluated our model on an extended version of the pix2code dataset and got over 99% in the BLEU score. The error rate for predicted file paths was 19.2%. In the current status, our model requires large memory footprints, and it is not verified whether this method is applicable to real web pages.</p> |                                                                       |     |              |