

AI 活用で挑む学問の革新と創成  
2021 年度採択研究者

2021 年度 年次報告書
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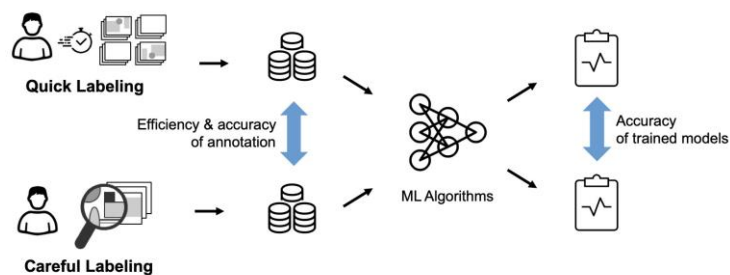
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Design Thinking for Facilitating Data Annotation and Machine Learning  
(データ注釈と機械学習を促進するためのデザイン思考)

## § 1. 研究成果の概要

In the 1<sup>st</sup> year, I conducted a research project to explore the effects of “labeling style” on data annotation and machine learning. In this study, I investigated two labeling styles “quick labeling” and “careful labeling” for an image annotation task, with different data difficulties. I have published the results as a full paper “An Empirical Study on the Effect of Quick and Careful Labeling Styles in Image Annotation” in the 48th International Conference on Graphics Interface and Human-Computer Interaction (GI 2022) [1]. This study was collaborated with Prof. Xi Yang from Jilin University (China).



### Abstract:

Assigning a label to difficult data particularly when non-expert annotators attempt to select the best possible label. However, there have been no detailed studies exploring a label selection style during annotation. This is very important and may affect the efficiency and quality of annotation. In this study, we explored the effects of labeling style on data annotation and machine learning. We conducted an empirical study comparing “quick labeling” and “careful labeling” styles in image-labeling tasks with three levels of difficulty. Additionally, we performed a machine learning experiment using labeled images from the two labeling styles. The results indicated that quick and careful labeling styles have both advantages and disadvantages in terms of annotation efficiency, label quality, and machine learning performance. Specifically, careful labeling improves label accuracy when the task is moderately difficult, whereas it is time-consuming when the task is easy or extremely difficult. Project webpage: <http://chiamingchang.com/labelingstyle.html>

In addition, I am currently working on a project “Dynamic Labeling” which is extended from the “Labeling Style” project. In this ongoing project, I am developing a system that can dynamically control labeling styles during an annotation task for different annotators.

### 【代表的な原著論文情報】

- 1) **Chia-Ming Chang**, Xi Yang, and Takeo Igarashi. 2022. An Empirical Study on the Effect of Quick and Careful Labeling Styles in Image Annotation. The 48th International Conference on Graphics Interface and Human-Computer Interaction (GI 2022), Montreal, QC, Canada, 17-19 May 2022