

Experiments to Verify How Robust the Collective Intelligence is When Summarizing Story Manga

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Abstract—We conducted experiments in which we asked large samples of Japanese students to read approximately 100 frames of story manga. We then requested that the students select between 5-20% of the frames necessary for the abstract. Once completed, we reviewed the n -th frames where the selectivity was the highest to see if it was an accurate summary, regardless of n . Our goal was to investigate whether it is possible to summarize comics by collective intelligence. In this experiment, we made the students read an English version of the Manga. We wanted to see if the collective intelligence still worked if read in a different language. The results obtained show that how robust the collective intelligence is.

Keywords—collective intelligence; manga; summarizing; English.

I. INTRODUCTION

The authors previously proposed a method to summarize story manga as one of the test methods to measure intelligence. In the test, to summarize the story manga of about 100 frames, the subject selects about 5% to 20% of the frames. We conducted an experiment involving 113 female university students [1]. Hereafter, this experiment is called experiment A.

After Experiment A, we sorted each frame in descending order of the rate selected by the 113 students. Next, we rearranged the top k frames in manga frame order. Then, no matter what number k is, it became a good summary of the original manga. From this result, we concluded that collective intelligence worked very well in the summary of manga "The taste of that day".

We were interested in how robust collective intelligence is, so we conducted an additional experiment on another day [2]. The subjects were 60 university students. Other conditions are the same as in Experiment A. 30 are male and 30 are female. Hereafter, this experiment is called experiment B.

As a result of experiment B, the summary by collective intelligence also became a good summary overall.

Furthermore, compared with the result of Experiment A with respect to "The taste of that day", the selectivity of each frame is almost the same. The selectivity of each frame in Experiment A and Experiment B is shown in Figure 1.

When summarizing comics, collective intelligence was more effective than our expectation. So, we decided not to think that "summarizing manga with collective intelligence would be nearly a correct answer", but rather "think collective intelligence is the correct answer to manga summary". In other words, we assumed that "A person's summary ability can be measured by how alike it is to the summary of collective intelligence". Consequently, we proposed an index to measure the summarizing ability of story manga [1].

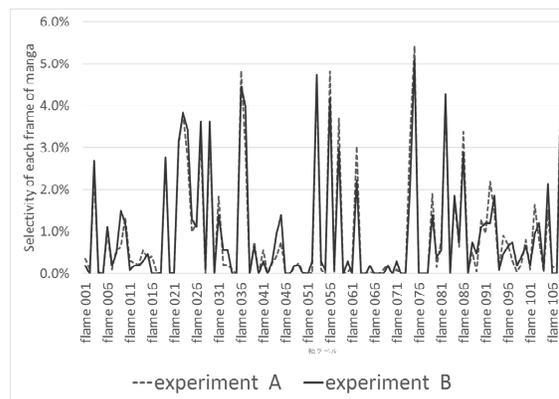


Figure 1. Selectivity of each frame of manga "The taste of that day" in Experiment A and Experiment B

II. PURPOSE

We translated the manga "The taste of that day" into English and we conducted experiments to have Japanese students read the manga under almost the same conditions as experiment A. We compared summaries of manga by collective intelligence between the English version and the Japanese version. The reason for doing the experiment is to investigate whether collective intelligence works even when Japanese students read the English version of manga.

III. METHOD

The experiment participants were 60 university students living in Tokyo.

The materials we used during the experiment are as follows.

- (i) Preliminary survey questionnaire paper
 - (ii) English version and Japanese version of the manga booklet ("Today's Burger Volume 1" second episode "The taste of that day" first 108 flames)
 - (iii) Paper to fill in the selected flames number
 - (iv) Pre-questionnaire paper
 - (v) Post-questionnaire paper
- The experiment schedule is shown in Table 1.

TABLE I. THE EXPERIMENT SCHEDULE

Time	Contents
5 minutes	Answer preliminary survey questionnaire and pre-questionnaire
25 minutes	Summary of manga
5 minutes	Write the numbers of the selected frames on the paper
3 minutes	Collect paper
2 minutes	Distribute Japanese version of manga
10 minutes	Read Japanese version of manga
10 minutes	Answer post-questionnaire

Figure 2 compares the selectivity of each frame in the experiments of this English version (Experiment C) and the past Japanese version (Experiment A + Experiment B). The difference in the selectivity of each frame is larger in Figure 2 than in Figure 1. This shows that when the subjects read the English version, they failed to select frames as accurately as they did for the Japanese version.

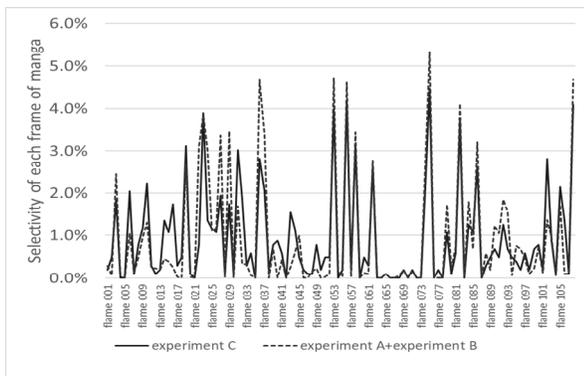


Figure 2. Selectivity of each frame of this experiment (English version) and "Taste of that day" in past two experiments A + B (Japanese version)

Figure 3 shows a plot of the frame numbers from 1st to 108th selectivity in Experiment A (Japanese version) with the horizontal axis and the plots corresponding to the frame numbers on the horizontal axis of Experiment B and Experiment C.

From the viewpoint of the order of selectivity of each frame in collective intelligence, as can be seen from Figure 3, there is no big difference.

Even in the English version, it was a good summary to rearrange the top k of the selectivity in the order of comics in manga. This means that collective intelligence works well even in the English version when summarizing comics. But for individuals, selecting frames to create a summary of the

English version became more difficult than for the Japanese version.

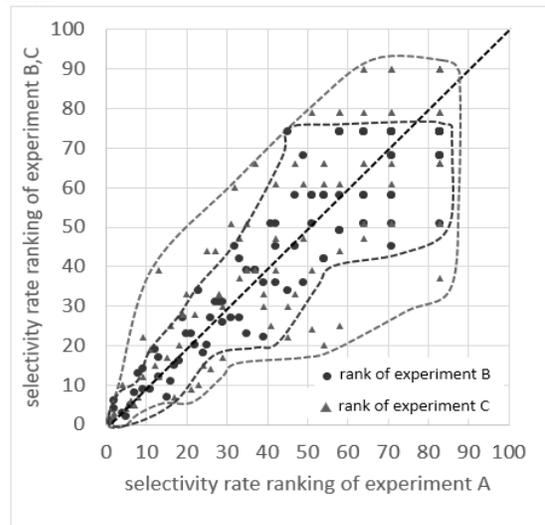


Figure 3. Selectivity ranking of each frame of Experiment B, Experiment C with the selectivity rate ranking of experiment A as the horizontal axis

IV. CONCLUSION

In order to verify the robustness of collective intelligence, we gave about 60 Japanese university college students the story manga, English version, which was about 100 frames in length. The students were asked to summarize the story using 5% to 20% of the frames. Then, we compared the result obtained here with the result of the Japanese version for the story manga from our previous studies.

Choosing the n-th highest selectivity resulted in an excellent summary of n. That is, in the summary of comics, collective intelligence also worked in the English version. However, the summary by collective intelligence was slightly less accurate in the English version than the Japanese version.

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