

A New Physical-Digital Environment for Discussion and Presentation Skills Training

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Abstract. Our university is currently developing an advanced physical-digital learning environment that can train the students with better discussion and presentation skills. The environment guarantees an efficient discussion among users with state-of-the-art technologies such as touch panel discussion tables and posters. It includes a data mining system that efficiently records, summarizes, and annotates the discussion. It will be further enhanced by using a vision system to facilitate the interactions enabling a more automated discussion mining.

Keywords: learning environment, skill training, discussion skill, presentation skill, discussion mining

1 Introduction

Recently, a lot of attention has been paid to evidence-based research, such as life-logging [1] or big data applications [2], that proposes techniques to raise the quality of human life by storing and analyzing data of daily activities in large quantities. This technique has been applied in the education sector but a key method has not been found yet because it is generally hard to record intellectual activities, accumulate and analyze data in a large scale, and compare it with a person's physical activities, position, movement information, and the like. Although there are some recent studies on the automated recording of intellectual activities in more detail, their techniques are not sufficient to be applied to an automated evaluation of a person's intellectual activities. Thus, this study aims to develop a new environment to empower the skills of students based on the abundant presentation and discussion data analyses.

This study focuses on the new graduate leading program of Nagoya University that aims to cultivate future industrial science leaders (<http://www.rwdc.is.nagoya-u.ac.jp/index-e.php>). The leading graduate program has a new physical-digital environment for facilitating presentations and discussions among the selected students of the program. In particular, the presentations and discussions of the students are recorded in detail, and the mechanism for knowledge emergence is analyzed based on a “discussion mining” system.

2 Discussion Mining System

The “discussion mining” system generates knowledge discovery from discussion contents during face-to-face meetings. This previously developed system [3], shown in Fig. 1, generates structured minutes for meetings semi-automatically and links them with audiovisual data. This system summarizes discussions by using a personal device, called “discussion commander.” The created content is then viewed using the discussion browser, which provides a search function that lets users browse the discussion details.

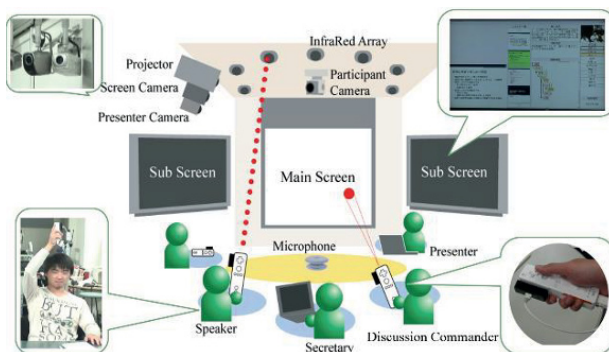


Fig. 1. Discussion mining system

Since it is difficult to apply the discussion mining system to informal discussions and poster presentations, the current system was extended and new facilities were built, which led to the creation of the Leaders’ Saloon.

3 Leaders’ Saloon: A New Physical-Digital Learning Environment

The Leaders’ Saloon shown in Fig. 2 is capable of creating discussion contents using the discussion tables, the digital poster panels, and the wall-size whiteboard.

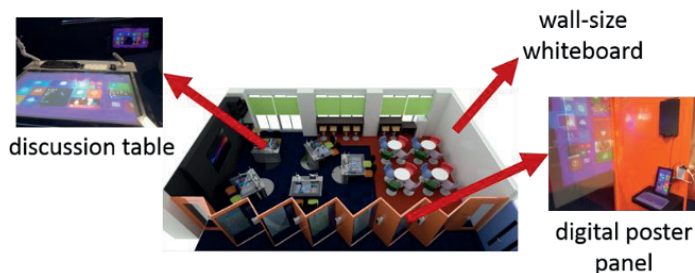


Fig. 2. Leaders' saloon environment

3.1 Discussion Table

Each student uses a tablet to connect with the facilities including the discussion table. The content and operation history of the whiteboard are automatically transferred and shared to the server, the “meeting cloud.” Previous whiteboard contents can easily be retrieved and any texts or images can be reused. Such reference and quotation operations are recorded and analyzed to discover semantic relationships between discussions. Furthermore, a software that analyzes temporal changes of the whiteboard contents with the corresponding users is also being developed.

3.2 Digital Poster Panel

For poster presentations, a digital poster panel system is used for content and operation analyses. The system helps the users create digital posters and analyze their creation process. The system also supports the retrieval of previously presented posters and allows the users to annotate them, which are automatically sent to the author and analyzed to evaluate quality. The poster presentations are also broadcasted by streaming on the Web as well as the regular slide-based presentations. The system collects and analyzes the feedbacks from comments and reviews by Internet viewers.

3.3 Discussion Mining

In this study, machine learning techniques are employed to obtain deep structures of presentation and discussion contents. Techniques like deep neural networks integrate several context information such as users' operation histories. By integrating the results of subject experiments on presentations and discussions, different methods to evaluate the quality of students' intellectual activities and to increase their skills are

discovered. The system tries to perform some consensus building processes to make evaluation results appropriate for each student.

4 Future Features of the New Learning Environment

The current training environment contains a 2D interactive system, such as touch panel discussion tables and posters, facilitating the interactions of users with the system. However, to further enhance the performance of the current learning environment, a vision system will be incorporated to increase the interaction dimension to 3D. The system will consist of a multi-camera system, or Kinect that has a camera and rang sensor device. Moreover, an automated evaluation and facilitation of intellectual activities will be applied to confirm whether the skills of the students improve, and whether their created contents obtain a higher evaluation than previous ones.

5 Conclusion

A novel physical-digital learning environment for discussion and presentation skills training has been developed at our university under the leading graduate program. By using state-of-the-art technologies, the selected students of the program will achieve an effective, interactive, and smooth discussion with the discussion mining system simultaneously summarizing and annotating the ongoing discussion. The discussion contents are available to the community or to the faculty for evaluation, feedback, and follow-up activities. With this prototype environment, a new education system may emerge promoting an efficient and advanced learning.

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