A Tablet-based Chinese Composition Assessment System

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Abstract: Chinese composition is an important aspect for students to learn the Chinese language. In this paper, we present our tablet-based Chinese composition assessment system. We have implemented a system to be run on a pen-based tablet device to help teachers assess student's composition. Our system is able to display student's composition work on the tablet device, allowing teachers to markup on the student's work to provide written comments and record his/her voice to provide oral comments. The recorded assessment session can be played back such that the written comments can be shown which are synchronized with the oral comments. Our system facilitates teachers to provide both written and oral comments easily which can be stored and played back. Our system can also be used by researchers to analyze teachers' assessment process by studying their feedback.

Keywords: Chinese composition, tablet, assessment, written and oral feedback

1. Introduction

Various new technologies have been proposed to help students learn different aspects of the Chinese language. Novel technology has been developed for mobile device to help teachers implement reading strategy instruction and support students' individual and co-operative reading activities in Chinese language classes (Chang, Lan, Chang, & Sung, 2010). A measure has been proposed to assess the ability of Chinese character recognition made by foreigner Chinese learners and a two-phase learning strategy has been presented for these learners to learn Chinese characters (Ho & Lin, 2010). A mobile-assisted game was adopted to let students learn the formation of Chinese characters and the social interactions have been examined to analyze how student grouping can affect the learning outcome (Wong, Hsu, Sun, & Boticki, 2013).

Many research papers focused on Chinese composition which is an important component in learning the Chinese language. Various strategies and activities have been proposed which aims to enhance the students' skill in Chinese composition. Blogging was adopted in a Chinese composition class in a high school in Taiwan (Lou, Wu, & Smith, 2010). They concluded that students' writing skills were enhanced in a positive way. In the study by (Ying, Leung, Lee, & Chow, 2014), the authors focused on identifying the role of teachers in Chinese composition marking as well as determining the difference between traditional paper-based marking and tablet-based marking. Two teachers reported the usual time taken to mark a composition in the traditional paper-based marking which was found to be similar to the time required for them to mark a composition using our proposed tablet-based composition marking system.

In terms of teaching Chinese composition, Li (2005) proposed two new methods for teaching Chinese composition and described some example lesson plans with games that aimed to increase students' interest in doing composition in class. They had shown significant increase in writing speed for junior secondary students over 13 weeks after applying their proposed method. Sim (2005) described the teaching of Chinese composition in Singapore by comparing the past and the present. So (2005) believed that information technology can bring new opportunities in teaching Chinese

composition. In particular, So (2005) gave a visionary example that "the students can also watch their essays being marked from their computer terminals at any time".

Shum (2005) compared four different methods in evaluating Chinese compositions of senior secondary school students in Hong Kong: 1) teacher provided detailed feedback to the students; 2) teacher used symbolic codes to mark the mistakes; 3) the evaluation was based on peer assessment according to a checklist; and 4) the evaluation was self-conducted according to a checklist. The survey results showed that the first group, i.e., the detailed teacher evaluation, was a much more popular method perceived by the students than the second group, i.e., the teacher evaluation with symbolic codes. This indicated that students prefer detailed feedback and our system provides an easy way for teachers to give written as well as oral feedback. Lo (2006) stated that two methods are commonly used to provide formative assessment in school: 1) individual, face-to-face, oral feedback in class; and 2) assessment paper review with follow-up remedial work or activities. Lo (2006) also mentioned that one of the challenges in employing the first method is the heavy workload of the teachers for preparing the oral feedback. The sound recording feature in our system allows teachers to record their voice feedback while they assess the student's composition so that it will take less time for the teachers for preparing the oral feedback.

In this paper, we present our tablet-based Chinese composition assessment system. We have implemented a system to be run on a pen-based tablet device to help teachers assess student's composition. Our system is able to display student's composition work on the tablet device, allowing teachers to markup on the student's work to provide written comments and record his/her voice to provide oral comments. The recorded assessment session can be played back such that the written comments can be shown which are synchronized with the oral comments. Our system facilitates teachers to provide both written and oral comments easily which can be stored and played back. Our system can also be used by researchers to analyze teachers' assessment process by studying their feedback.

2. Chinese Composition Assessment System

2.1 System Overview

Our system design is illustrated in Figure 1. The student first composes a Chinese passage as instructed by the teacher. The student then submits the composition to the teacher. The teacher can use our system to open the composition and provide oral and written feedback in this assessment stage. After the teacher finishes the assessment, the marked result is sent back to the student. The student can use our system to playback the teacher's assessment to receive the oral and written feedback in this playback stage.

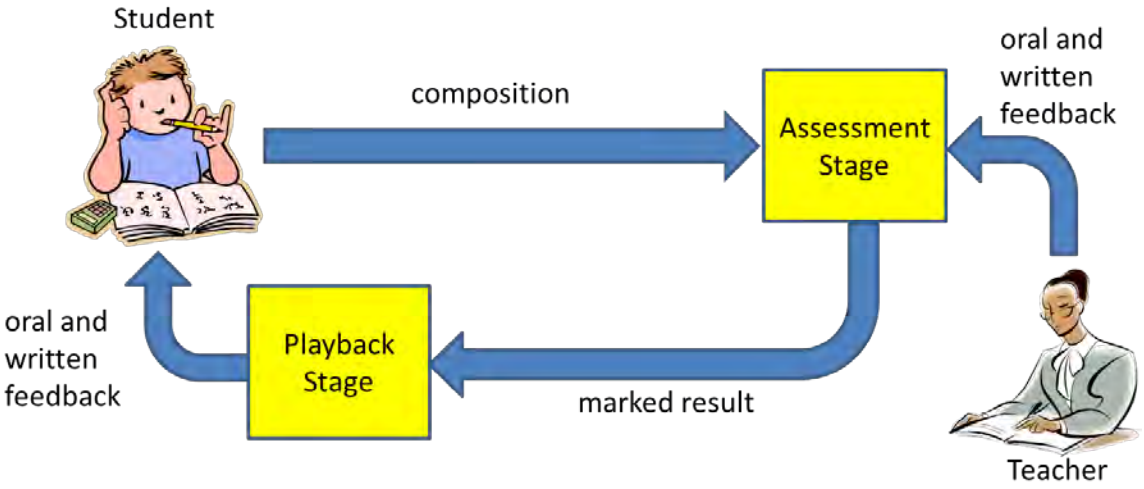

Figure 1. System Design.

The assessment stage and the playback stage will be explained in more details in the following sections.

2.2 Assessment Stage

In the Assessment Stage, the teacher opens the student's composition and reads it using our system. The teacher can markup directly on the student's work to provide written comments. The teacher can also record his/her voice to provide oral comments.

2.2.1 Opening Student's Composition Work

The student forms his/her composition on normal grid paper in the traditional way. The finished composition is scanned and stored in the commonly used JPEG format. Sometimes the composition work may consist of several pages and they will be stored with the same prefix and numbered in sequence. The teacher can run our system on a tablet and open the student's composition. The scanned composition will be displayed using our interface. Besides, since the grid paper may be in landscape or in portrait, our system can also be run in the landscape mode or in the portrait mode in the tablet to accommodate both options, and the composition work will be displayed with the correct aspect ratio, as illustrated in Figure 2 and Figure 3. We also provide a list box in our interface which can show a list of possible teachers' names and a particular teacher can choose his/her name there to identify who performs the assessment in case the students' composition get distributed among different teachers or the same student's composition is marked by more than one teacher. The assessment date is also shown and will be saved together with the teacher's feedback.

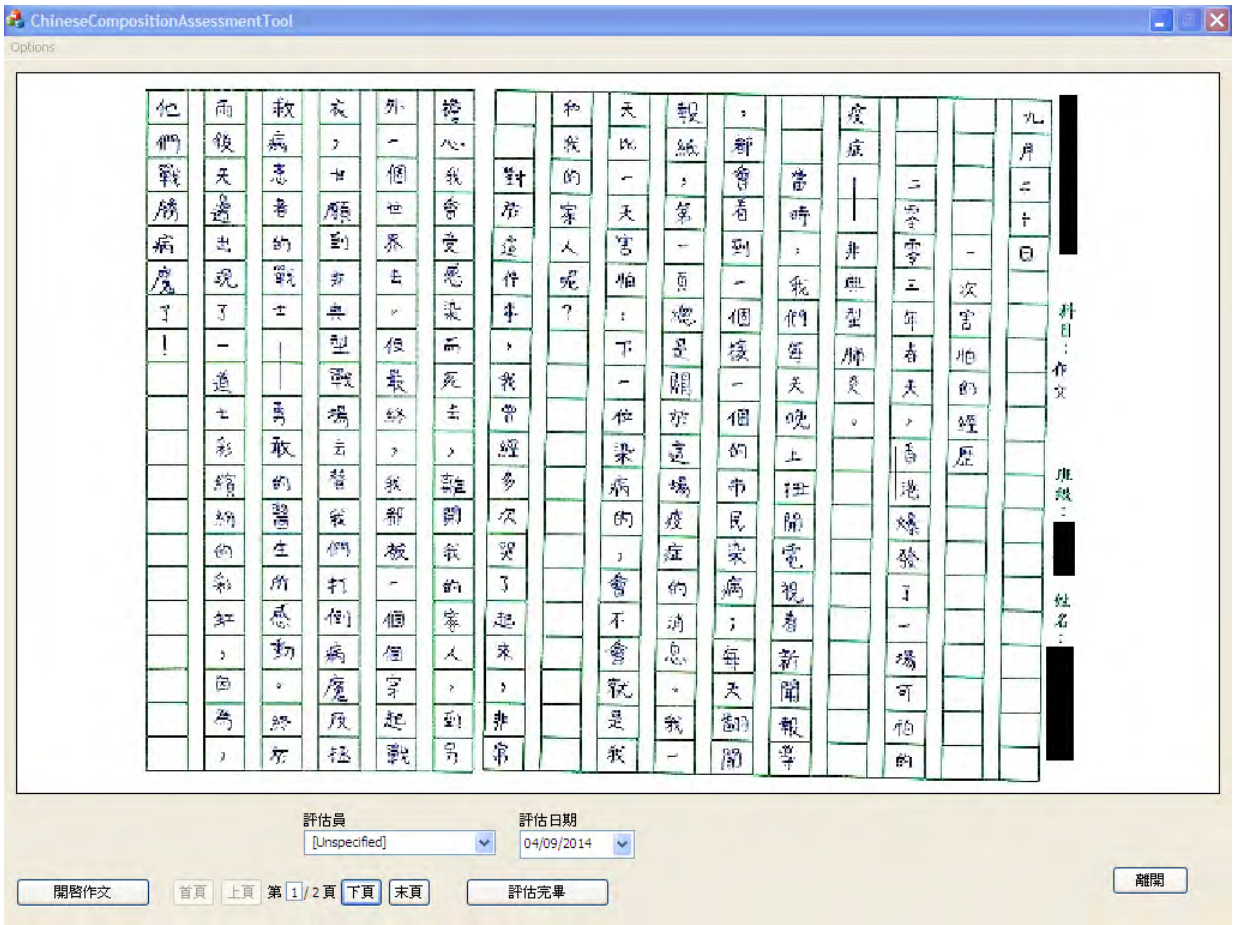

Figure 2. Display of Student's Composition Work in Landscape.

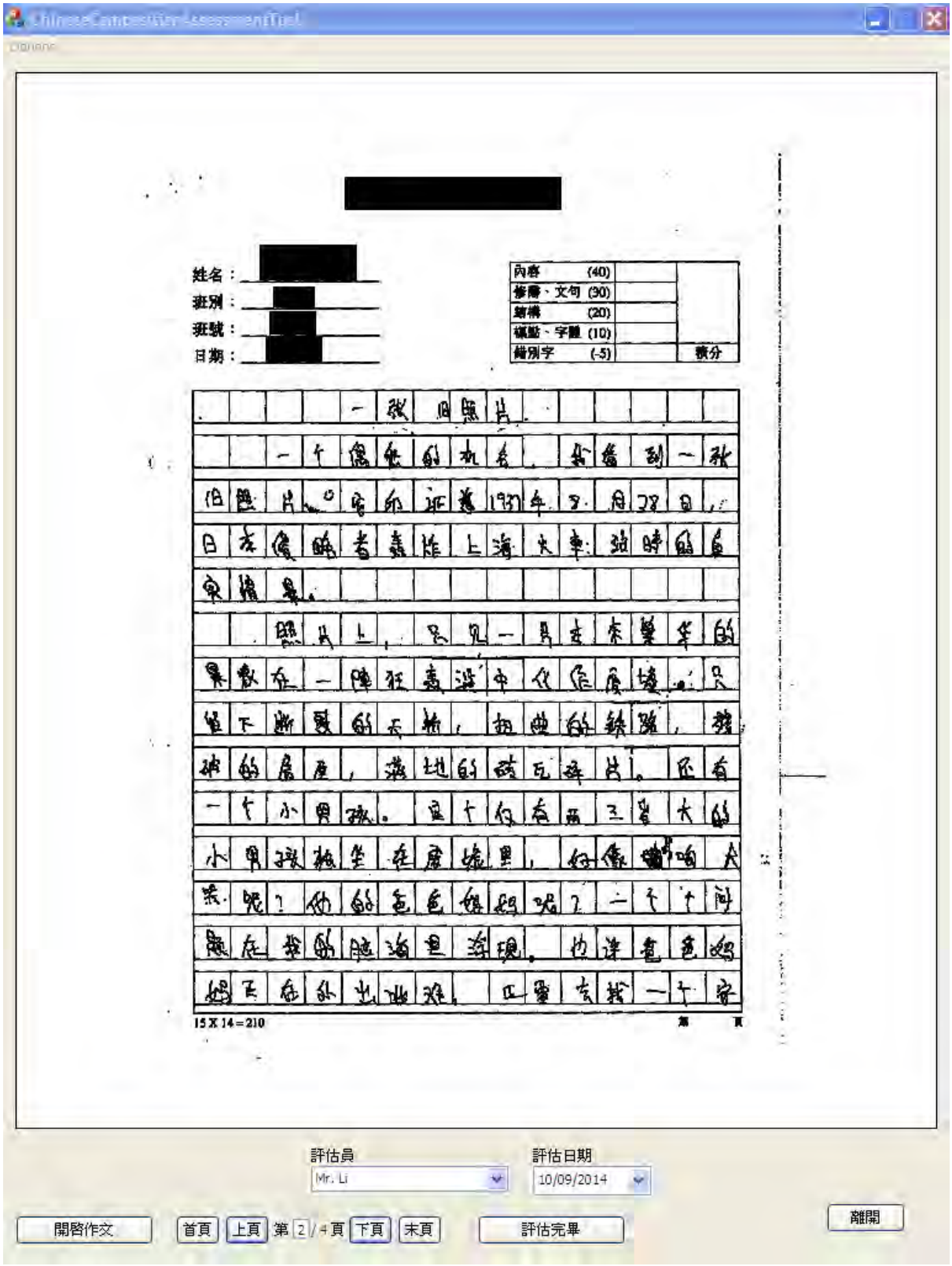

Figure 3. Display of Student's Composition Work in Portrait.

Some people may argue why we do not let the students form their composition directly in the tablet to save the trouble of paper writing and scanning. Our existing approach for scanning the paper-based composition has the benefit that existing work by the students can be scanned and ready to be used by our system for the assessment. Besides, some students may find it easier to compose their

work with pen and paper in the traditional way. Nevertheless, we agree that allowing students to provide input directly to form their composition in the tablet can be a good option and we may add this feature in our future work.

2.2.2 Navigating to Different Pages

A student's composition work may span several pages. As mentioned in the previous sub-section, each page will be scanned with the same prefix in the file name which is numbered in sequence. Our system will detect automatically the total number of pages exist in the student's work after the teacher opens it with our system. In our interface, we have provided several buttons to facilitate the easy navigation of the pages. In particular, there are 4 buttons that allow the teacher to navigate to the previous page, the next page, the first page and the last page.

2.2.3 Providing Written Comments

Once the composition is displayed in our interface, the teacher can markup on the tablet using a stylus. The teacher's markup will be shown in red. With this function, the teacher can circle the characters that are written wrongly or underline some sentences whose structure is not well organized. The teacher can also write down explicit comments for the students to improve their work. This function simulates the actual scenario in which a teacher marks a student's composition work on paper with a red pen such that the teacher does not need much extra time to learn to use our system for the assessment.

Figure 4 and Figure 5 illustrate two example pages of student's composition with the teacher's markup made using our system.

2.2.4 Providing Oral Comments

In addition to written comments, our system is able to allow the teacher to record his/her voice during the assessment such that the teacher can provide oral comments. This function can be complement to the written comments. For example, the teacher can circle a character while saying which part of the character is written wrongly. The teacher can underline some sentences and voice out how they can be revised to improve the flow. The teacher can also provide general comments to the student to provide advice about how to improve the composition skill in the future. This feature can also save the teacher's time such that the teacher does not write down too much details in the written comments as the feedback can be included in the oral comments.

This voice recording feature can also be used by researchers to study the way teachers mark students' composition. Researchers can ask the teacher to voice out what they are thinking while they are assessing the composition. Under this "Think Aloud" approach, the teacher's oral comments can be saved and analyzed by the researchers together with the written comments.

2.3 Playback Stage

The assessed composition can be played back by the student. First the student can open the marked result using our system to view the markup by the teacher. The student can navigate to the previous page, next page, first page and last page using similar buttons as introduced in the previous section for the assessment stage. The student can also playback the assessment session such that the student can see when the teacher writes down the comments with the exact timing and listen to the teacher's oral feedback which is synchronized with the written comments. Our interface provides control buttons to let the student to play, pause and stop the playback session.

This feature can also help researchers to playback the teacher's oral comments and the written comments to study the assessment process made by the teacher. As mentioned previously, the researchers may ask teachers to voice out their thoughts in a "Think Aloud" approach which are stored

as oral comments. The researchers may analyze different assessment strategies adopted by the teachers and try to devise novel ways for students to improve their composition skills.

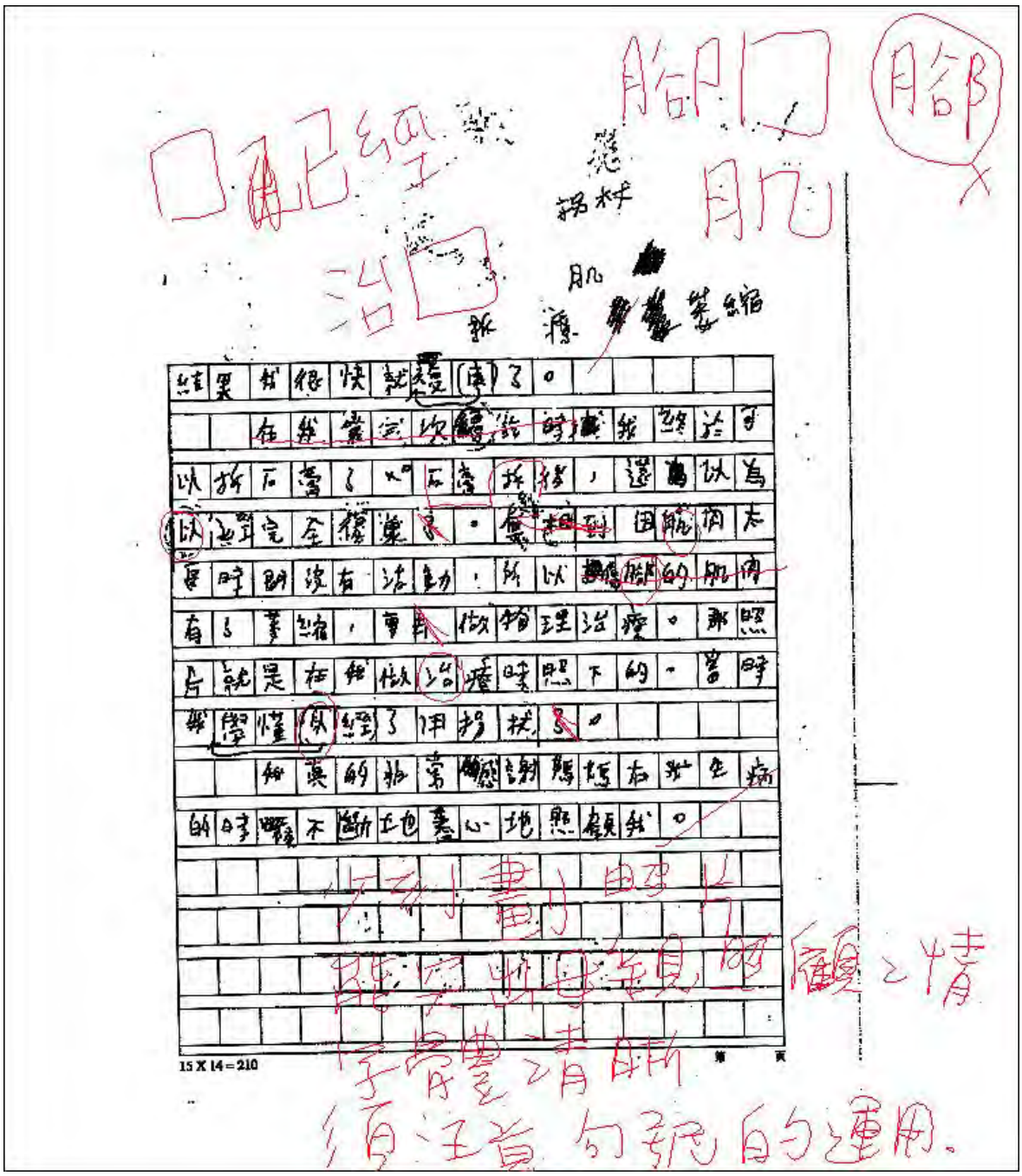

Figure 4. Example 1 of Student's Composition with Teacher's Markup.

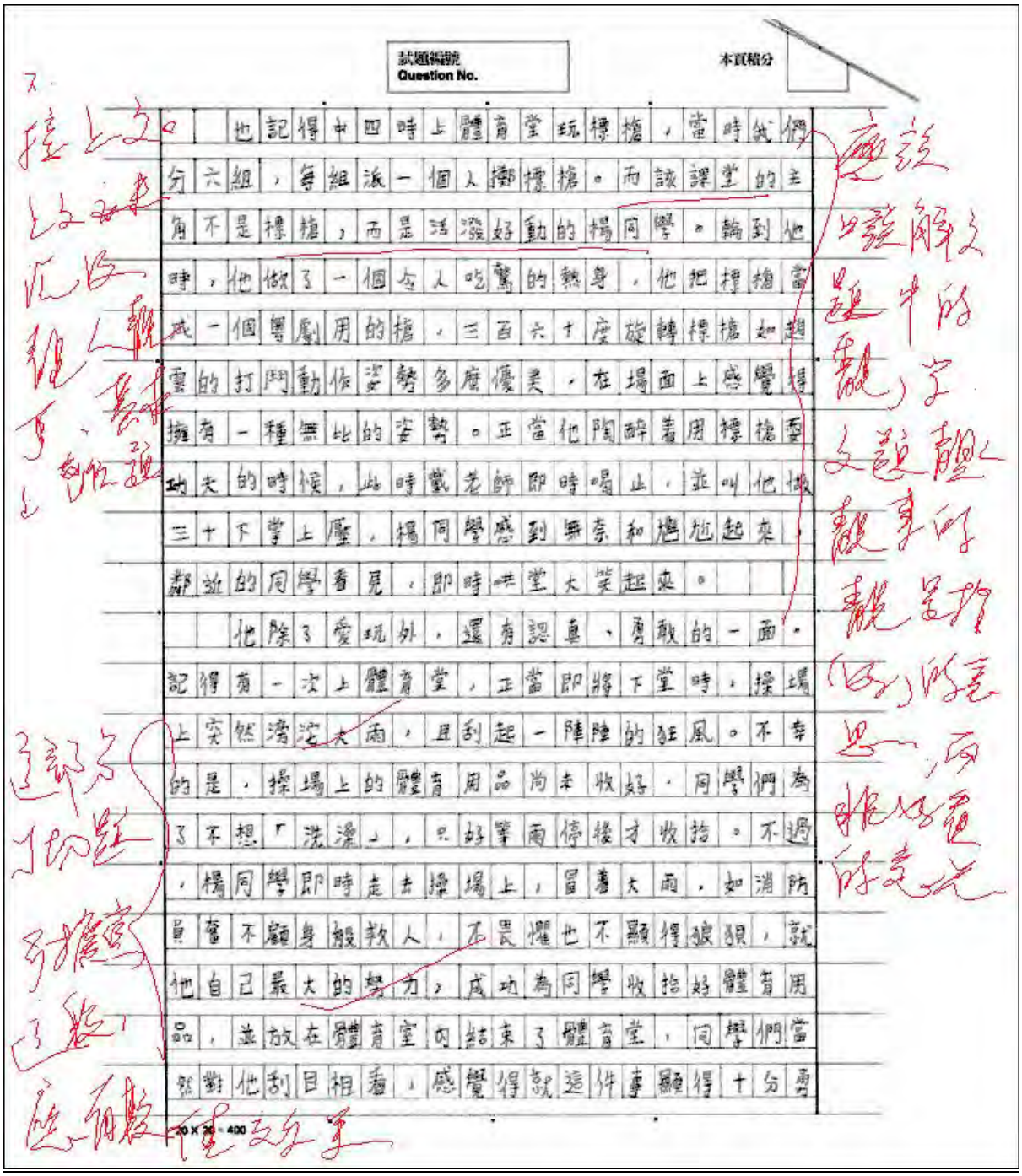

Figure 5. Example 2 of Student's Composition with Teacher's Markup.

3. Conclusions and Future Work

Chinese composition is an important aspect for students to learn the Chinese language. In this paper, we propose a tablet-based Chinese composition assessment system which can help teachers to provide written and oral feedback. We present our implementation of the system and introduce the features. The recorded assessment session can be played back for student to receive the feedback. Our proposed technology enhances students' Chinese composition skill as detailed feedback can be made available with the teacher's written comments synchronized with the oral comments. Researchers can also extract different patterns from the teachers' assessment to devise strategies to help students improve their Chinese composition skill.

As future work, there are many potential additional features that can be incorporated into our system. For example, we can implement the input function that allows students to write or type their composition directly into our system such that there is no need to scan paper work. In addition to applying our tablet-based assessment for helping teachers to provide feedback of Chinese composition, we will look into the issues of developing more advanced technologies to support peer assessment such that students can work together on their Chinese composition in a more collaborative manner. As included in the study of Shum (2005), the adoption of peer-assessment by classmates was shown to motivate students to revise their Chinese composition. We can explore some pattern recognition techniques that can be used to categorize the teachers' comments in a more automated fashion and provide some quantitative analysis.

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