



Title	An extendible software for learning to write Chinese characters in correct stroke sequences on smartphones
Author(s)	Tam, V; Huang, C
Citation	The 11th IEEE International Conference on Advanced Learning Technologies (ICALT 2011), Athens, GA., 6-8 July 2011. In Proceedings of the IEEE International Conference on Advanced Learning Technologies, 2011, p. 118-119
Issued Date	2011
URL	http://hdl.handle.net/10722/140242
Rights	IEEE International Conference on Advanced Learning Technologies Proceedings. Copyright © IEEE, Computer Society.

An Extendible Software for Learning to Write Chinese Characters in Correct Stroke Sequences on Smartphones

Vincent Tam

Dept. of Electrical & Electronic Engineering
The University of Hong Kong
Hong Kong
e-mail: vtam@eee.hku.hk

Chao Huang

Dept. of Electrical & Electronic Engineering
The University of Hong Kong
Hong Kong
e-mail: holywit@hku.hk

Abstract—With the fast economic development in China, learning to understand Chinese becomes very crucial and popular worldwide. To most foreigners and even native Chinese students, one of the major challenges in learning Chinese is to write Chinese characters in correct stroke sequences since the correct stroke sequences of writing any Chinese character is regarded as crucial in the Chinese culture. Intrinsically, there were very few available character recognition techniques that can tackle the complexity of structures of Chinese characters together with their stroke sequences. In this paper, we propose an extendible and intelligent e-learning software based on learning objects to facilitate the learning of writing Chinese characters in correct stroke sequences. To demonstrate the feasibility of our proposal, a prototype of our proposed e-learning software was built on smartphones. Our proposal represents the first attempt to reduce the complexity while increasing the extendibility of the e-learning software to learn Chinese through learning objects. More importantly, it opens up numerous opportunities for further investigations.

Keywords—Chinese characters; e-learning systems; learning objects; stroke sequences.

I. INTRODUCTION

The learning of Chinese has become very important for both Chinese and foreigners due to the alarmingly fast economic development and increasing political influence of China in the global stage in the past decade. Conventionally, there were very few available e-learning systems integrated with intelligent character recognition techniques that can effectively handle both complex structures and correct stroke sequences of Chinese characters in a timely manner. Besides, students may not have sufficient time in class to practice the writing of Chinese characters in correct stroke sequences during classes. There was Web-based e-learning software that allows students to practise the writing of Chinese characters mainly on desktop computers with the Internet access. With the decreasing prices and increasing processing speeds of mobile devices nowadays, smartphones [1] may provide a more potential e-learning platform with great convenience for students to practise the writing of Chinese characters at their own pace anytime and anywhere. Therefore in this work, we propose to develop an extendible e-learning platform, namely the iWrite system, integrated

with learning objects for foreigners or Chinese students to practise the writing of Chinese characters in correct stroke sequences on iPhone.

II. OUR PROPOSAL

Our proposed e-learning system, based on smartphones for higher portability, has implemented the concepts of learning objects since the basic strokes of Chinese characters will be implemented as learning objects with animations to better the learners' understanding of the specific semantic meanings of the concerned basic strokes. The proposed system has three main components to serve for the functions of illustration, practice, and feedbacks as clearly shown in Figure 1.

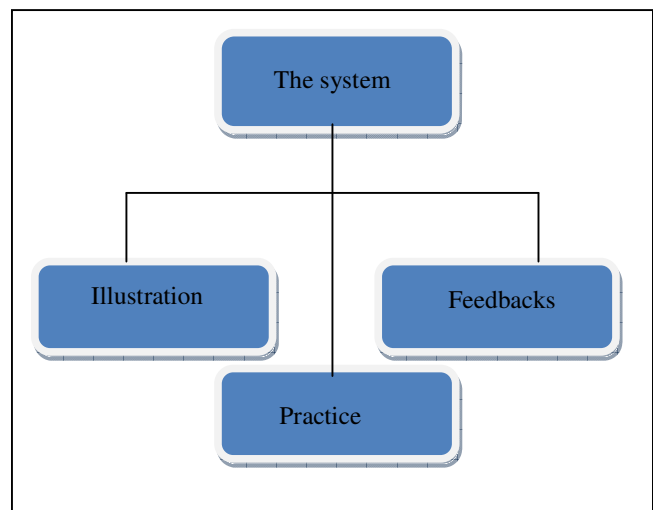


Figure 1. The basic system architecture of our proposed e-learning system for smart-phones.

For the illustration part, the e-learning system will provide motion pictures of writing Chinese characters with their correct stroke sequences. For the practice part, the system will provide Chinese character templates for students to follow in writing. The system will check the stroke sequences after (s)he finishes writing on the template. In the returned result, the system will give a detailed analysis of the

student's performance including the average rate of errors over all the Chinese characters the student has practiced, and also providing suggestions via the feedbacks subsystem to each individual student on the specific structure(s) that (s)he may work hard to improve.

III. AN EMPIRICAL EVALUATION OF OUR PROTOTYPE

To demonstrate the feasibility of our proposal, we implemented a prototype of the smart e-learning platform [2] using the Objective-C programming language and the Xcode Integrated Development Environment (IDE) tool for execution on iPhones for its high popularity and portability. The current prototype implementation consists of approximately 2,000+ lines of source codes. It took around 3 man-months for the design and implementation of our e-learning system.

For a better evaluation, the Chinese character templates were built into one of the four basic structures of the underlying Chinese characters. The four basic structures include single structure, up-down compound, left-right compound and bounded structure. Table II shows some of the examples for each of the four basic structures.

Structure	Examples
Single Structure	天, 上, 下, 中, 大, 甘, 日, 早
Up-down Compound	美, 金, 合, 雷, 笑, 哭
Left-right Compound	地, 和, 換, 江, 河, 明, 清, 好
Bounded structure	圓, 周, 同, 國, 回, 風

TABLE I. EXAMPLES OF THE 4 BASIC STRUCTURES OF CHINESE CHARACTER TEMPLATES USED IN OUR IWRITE SYSTEM

Figure 2 shows the graphical user interface of our e-learning system with a selected template being displayed and ready for the user to practice on the iPhone simulator of the Xcode IDE tool. It shows the system response when a user's inputs for the correct stroke sequence are given. Basically, the interface of the system is divided into three parts. The left panel of the interface is the input area which will provide the template for a student to write on it. The right of the system will have two functions. The upper part is the control panel with the demonstration part being under it.

An evaluation was planned and would be conducted in a Chinese course offered to foreign students in the upcoming Fall Semester in the University of Hong Kong. By then, a more detailed analysis will be performed with its result to be published by the end of that semester.



Figure 2. The User Interface of Our eLearning System for correct inputs on the iPhone Simulator

IV. CONCLUDING REMARKS

In this paper, we propose to develop an adaptive and extendible e-learning platform based on the concept of learning objects for foreigners or Chinese students to practise the writing of Chinese characters in correct stroke sequences on smartphones [1]. To demonstrate the feasibility of our proposal, we implement a prototype of our e-learning system using the Objective-C and the Xcode IDE tool for execution on iPhones/iPod touch.

Basically, there were some initial and positive feedbacks about our work collected from different researchers in the Faculty of Education, and also School of Chinese in our university or other institutes in Hong Kong. A thorough evaluation is planned to be conducted in a Chinese course offered to foreign students in the upcoming Fall Semester in the University of Hong Kong, for a careful analysis. All in all, our work is very promising, and shed sheds light on many interesting directions including the integration with existing online course materials for further investigation on both the pedagogic and technological impacts.

ACKNOWLEDGMENT

The authors are grateful to the generous supports from Department of Electrical and Electronic Engineering, the University of Hong Kong. Furthermore, the authors would like to express their gratitude to Dr. Daniel Churchill for his fruitful discussions on e-learning systems.

REFERENCES

- [1] The Wikipedia development team. (2009). *Smartphone – Wikipedia, the free encyclopedia*. Retrieved: January 10, 2011, from <http://en.wikipedia.org/wiki/Smartphone>
- [2] The Xcode development team, *the Xcode - Developer Tools Technology Overview website*, Retrieved: January 21, 2011, from <http://developer.apple.com/technologies/tools/xcode.html>.
- [3] Yeung, K.W. (2009). *Mobile Learning of Writing Chinese Characters on UMPCs. A Final-Year Project Report 2008-09*, Department of E.E.E., The University of Hong Kong, Revised: March 10, 2009.