Developed of A Computer Aided Instruction (CAI) package in remote sensing educational

Sultan AlSultan [1], H. S. Lim [2], M. Z. MatJafri[2], K. Abdullah[2]

[1]Qassim University, College of Computer Sciences & Information Technology, Saudi Arabia
Tel: +966600050 ext. 4098   Mobile: + 966 50 489 0977
http://www.commission7.isprs.org/wg7/
E-mail: computer_305@yahoo.com

[2]School of Physics, Universiti Sains Malaysia, Minden 11800 Penang, Malaysia.
Tel: +604-6533888, Fax: +604-6579150
E-mail: hslim111@yahoo.com.sg,
mjafri@usm.my, khirudd@usm.my

Commission VI

KEY WORDS: CAI, remote sensing eduction, Macromedia Flash and SWiSH Max.

Abstract

Computer Aided Instruction (CAI) is an application of computer in implementating instructions. It is an integration of software and hardware. A variety of software has been used to build up CAI packages such as Macromedia Director MX, Macromedia Flash and SWiSH Max. In this study, Macromedia Flash was used to make this CAI package. The aim of this remote sensing education project is to create a CAI package entitled remote sensing processing and to develope of international cooperation and capacity building on remote sensing education collaboration between Universiti Sains Malaysia (USM) in Malaysia and AlQassim University in Saudi Arabia. In this study, all the information is presented by implementating the CAI package. The knowledge of the digital image processing can easily reacquired by using CAI package. The main objective of study is to introduce a fundamental of this digital image and a few common methods to process a digital image which have a very wide range of application in our modern world. This CAI package is very useful to those who are interested to continue their studies or research in the fields of remote sensing. The package is also particularly designed to ensure all the users to understand the information easily compared to other learning materials in markets. The intergration of latest educational technology such as personal digital assistants (PDA) provides an opportunity to promote student centered learning was discuss in this study. For the conclusion, this CAI package can play an important role as an alternative material to all users in the near future.

1.   Introduction

Acronym for computer-based training (CBT), a type of education in which the student learns by executing special training programs on a computer. CBT is especially effective for training people to use computer applications because the CBT program can be integrated with the applications so that students can practice using the application as they learn.

Historically, CBTs growth has been hampered by the enormous resources required: human resources to create a CBT program and hardware resources needed to run it. However, the increase in PC computing power, and especially the growing prevalence of computers equipped with CD-ROMs, is making CBT a more viable option for corporations and individuals alike. Many PC applications now come with some modest form of CBT, often called a tutorial (Webopedia). "Computer-assisted instruction" (CAI) refers to instruction or remediation presented on a

computer. Many educational computer programs are available online and from computer stores and textbook companies. They enhance teacher instruction in several ways.

Computer programs are interactive and can illustrate a concept through attractive animation, sound, and demonstration. They allow students to progress at their own pace and work individually or problem solve in a group. Computers provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, the program shows students how to correctly answer the question. Computers offer a different type of activity and a change of pace from teacher-led or group instruction.

Computer-assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Many computer programs can move through instruction at the student's pace and keep track of the student's errors and progress. Computers capture the students' attention because the programs are interactive and engage the students' spirit of competitiveness to increase their scores. Also, computer-assisted instruction moves at the students' pace and usually does not move ahead until they have mastered the skill. Programs provide differentiated lessons to challenge students who are at risk, average, or gifted (The Access Center).

CAI package was an interaction media play an important role in computer context act as a teacher. CAI package can provide a more stability presentation. Audience can obtain the message and information in dynamic form through CAI package. CAI package will be present in various computer interfaces either in two or three dimension. CAI package also present in good visual looking with nice graphic and animation. CAI package also can included hundred of note in a small right package. The main objective of this study is to introduce a fundamental of this digital image and a few common methods to process a digital image which have a very wide range of application in our modern world.

Personal Digital Assistants (PDAs) such as Palm Pilots and Pocket PCs are handheld computers that serve as an organizer of personal and professional information. PDAs are now being broadly accepted in a variety of educational settings. PDAs come with software that allows educators and students to perform a range of tasks, including synchronizing data with desktop or laptop computers, accessing e-mail, managing appointments and course assignments. PDAs have been used to augment and supplant computers in classrooms because they are readily available, inexpensive, and easy for educators to use (Ray, 2002). PDAs are effective classroom organizational tools for educators. Student can use the PDA as an education tool for learning with this developed CAI package.

2. Software and Hardware

Our packages are developed on the Microsoft Window platform. For this study, a personal computer with Intel Pentium 4 Processor with Hyper-Threading technology - 3.0GHz, Microsoft Window XP in the Engineering Laboratory, School of Physics, Universiti Sains Malaysia, Malaysia was used. The software we used for generating CAI package was Macromedia Flash and supported by some other computer software like Adobe Photoshop and Sound Forge. Adobe Photo was used for graphic and picture editing and Sound Forge was used for sound editing.

3. What is remote sensing

Remote sensing is a technique for collecting information about the earth without touching the surface using sensors placed on a platform at a distance from it. The major applications of remote sensing include environmental pollution, urban planning, and earth management. We have to understanding the basic concept of electromagnetic waves well enough to apply remote sensing techniques in our studies. We classify electromagnetic energy by its wavelength. This electromagnetic radiation give an energy source to illuminate the target except the sensed energy is being emitted by the target.

There are two types of remote sensors: active and passive. Passive remote sensors detect reflected energy from the sun back to the sensor; they do not emit energy itself. But active sensors can emit energy or provide its own source of energy and detect the reflected energy back from the target.

There are two types of remotely sensed data: airborne and space-borne. Airborne images are captured using sensors placed on aircraft platform while space-borne images are captured using sensors placed on a satellite platform. Remotely sensed data began with the traditional black and white aerial photography and followed by colour photography. However hyperspectral airborne or space-borne images are readily available nowadays. We use both the multispectral space-borne digital images in our studies. The major advantage of using remote sensing data is that we can produce the final output as maps of the Earth's surface phenomena being studied.

4. Development of International Cooperation and Capacity Building between USM and QU in Remote Sensing Education

Focus had been mad of the development of international cooperation and capacity building on five remote sensing education applications for our research joint activities, including technology transfer and training between Univerisiti Sains Malaysia (USM) in Malaysia and AlQassim University in Saudi Arabia.

1. Land surface temperature
2. Land cover / Land use mapping
3. Changes detection
4. Air quality mapping
5. Land surface temperature and urban heat island.

Research collaboration between USM and AlQassim University has established and many research articles have been published either in journal or conference proceedings such as:

1. Estimation of seasonal agricultural vegetation coverage for two seasons over AlQassim, Saudi Arabia
2. Environmental impact assessment and evaluation of the land cover features from Landsat TM and SPOT over Makkah Almukaramah in Hajj Season
3. Land surface temperature estimation over Palestine and Mediterranean.
4. Urban heat island evaluation over Makkah and Madinah by remote sensing.

5. Area estimation from Landsat TM data over Makkah.

5. Methodology

Firstly, the computer must be installed with the Macromedia Flash MX software. To begin, open Macromedia Flash MX. The screen shown below here will be presented (Fig. 1).
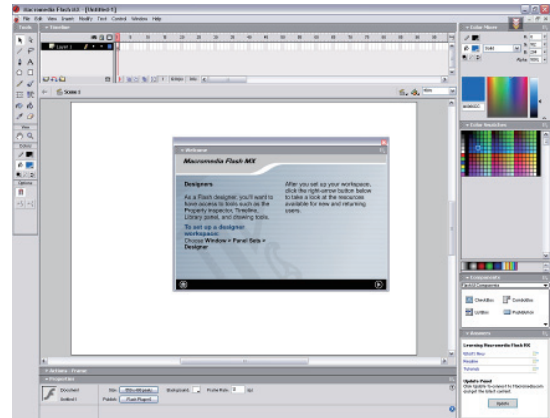

Fig. 1. Main screen of Macromedia Flash MX.

To create a new document, click Flash Document. The screen shown here appears (Fig. 2):
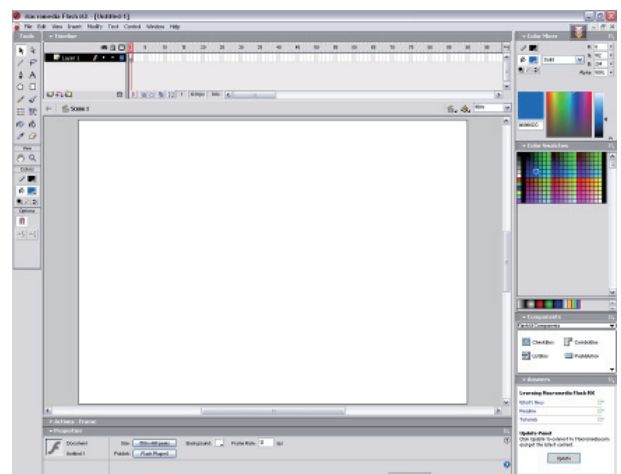

Fig. 2 New document in the Macromedia Flash MX.

The upper left corner of the screen displays the Tools palette, which contains tools to create or modify graphics and text. We can select a tool by clicking on it. Tool modifiers for the selected

tool display below the Tools palette. We use modifiers to set tool options. The Timeline appears in the upper portion of the screen. We use the Timeline to lay out the sequence of your movie. The Stage displays in the center of the screen. We create our movie on the Stage. We set these properties in the Movie Properties dialog box. To set the properties for the movie:

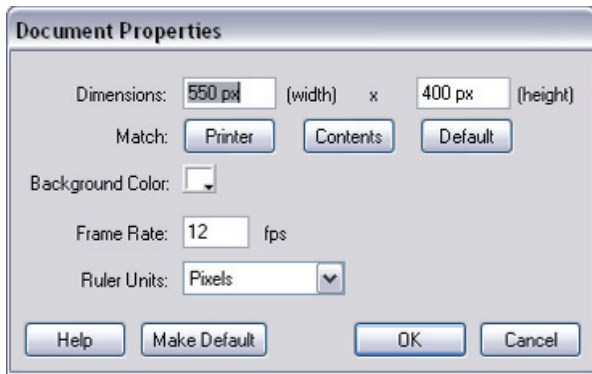1. Choose *Modify > Document* from the menu. The Document Properties dialog box opens (Fig. 3).

Fig. 3. The document properties dialog box.

In the Macromedia Flash MX, the entire cast members that we want to use have to be imported into Library. The timeline or the scope for the Macromedia Flash MX was formed from the layer as a location for the sprite cast member. The length of the CAI package can change with the frame on the layer in the timeline function. If your timeline window is not open, press (Ctrl+Alt+T). Select the first frame. Import the picture or change a subject onto stage, upon which you would want to implement motion Tween. Now select your object on the stage and press F8 to convert this image to a Symbol. Convert to Symbol window will pop-up. Name your Symbol what ever you like. Select Graphic behavior and press OK. Right now your Symbol is in frame1 of Layer1 (Fig. 4). Select frame 20 and press F8 to insert a new keyframe.
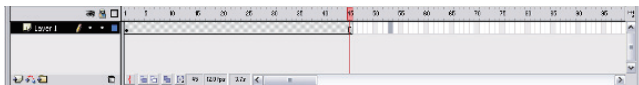

Fig. 4.Layer of Macromedia Flash MX.

Besides that, we can change the effect for the picture. Such as we can click the button of modify – Transform – Scale – Rotate to rotate our picture. In this case, we just need to identify the scale and the rotate degree.

We also can insert an image, convert it to a button, and add a URL to it so it becomes a link. First, we need to import an image that will become a button. We also can create our own symbol as our button using Macromedia Flash MX. The image will be saved in the Library. Second select the image with the Arrow tool and convert the image to a symbol. Next we need to right click on the image and choose Actions from the pop-up menu. Then enter a full URL in the URL field (like http://www.CAIPackage.com) and choose the target in the Window field that want to link.

We also can insert the sound into our CAI package. We just need to import a sound file into our CAI package. Finally, we just click on Controls and play or just press Ctrl+Enter to view our animation. We also can embed this CAI package in HTML pages by using Macromedia Flash MX.

6. CAI Package

Macromedia Flash was used in this study to generate a media interaction in animation format. Macromedia Flash was a powerful tool to produce animation. All the information presented by this CAI package was the basic theoretical of remote sensing and some information on the research articles carried out between Universiti Sains Malaysia (USM) and AlQassim University.

Firstly, all the information regarding the basic theoretical of remote sensing and the research collaboration between Universiti Sains Malaysia (USM) and AlQassim University was gathering for this CAI package. After that, Adobe Photoshop was used for picture and graphic editing. Adobe Photoshop software is the professional image-editing standard and leader of the Photoshop digital imaging line. Groundbreaking creative tools help achieve extraordinary results.

Macromedia Flash was use to create all graphics presentation in animation format. Macromedia Flash is the industry's most advanced authoring environment for creating interactive websites, digital experiences and mobile content. Finally, sound edition was performed and included into the CAI package.

Sound Forge software was used in this purpose. Sound Forge software is the professional's choice for audio editing, recording, effects processing, streaming content creation, and more. Now, Sony Media Software introduces Sound Forge Audio Studio - an easy-to-use home version of professional program. Fig. 5 shows some frame of research between USM and AlQassim University in this CAI package. Fig. 6 (a and b) shows the location of Malaysia and Saudi Arabia. Fig. 7 shows the research collaboration between Universiti Sains Malaysia (USM) and AlQassim University. Fig. 8 shows the results produced by the research collaboration between Universiti Sains Malaysia (USM) and AlQassim University of land cover change. Fig. 9 shows the raw satellite images of Mina, Arafah and AlHaram. Fig. 10 shows the heritage of the Desert.
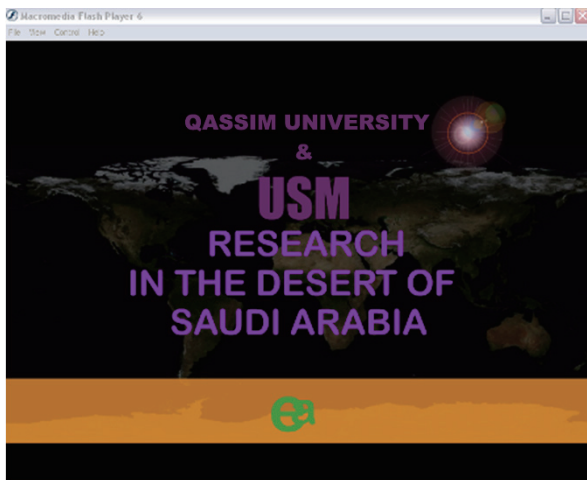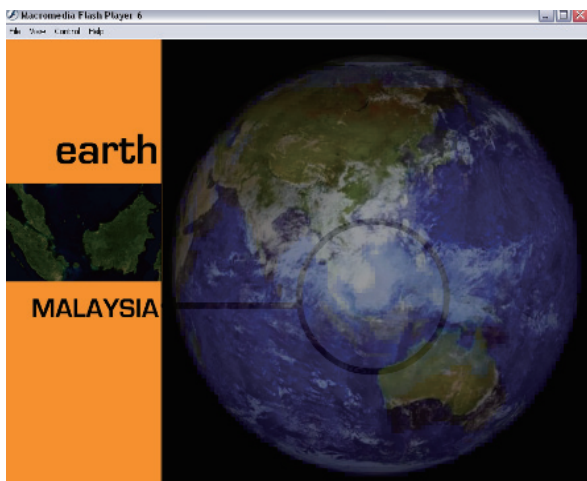

(b)

Fig. 6. The location of Malaysia (a) and Saudi Arabia (b).

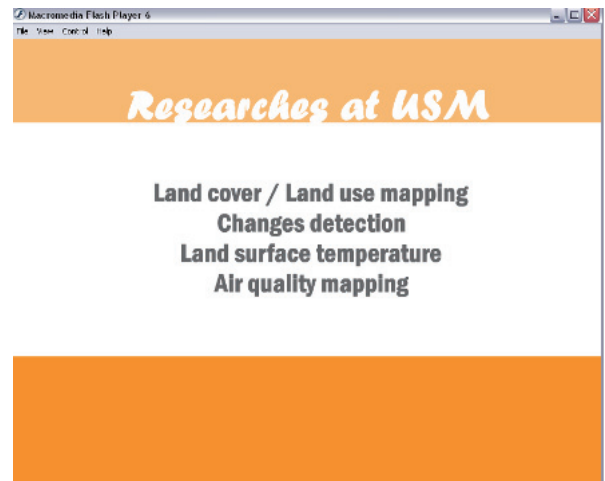Fig. 5. Research between USM and AlQassim University in this CAI package.

Fig. 7. The research collaboration between Universiti Sains Malaysia (USM) and AlQassim University.
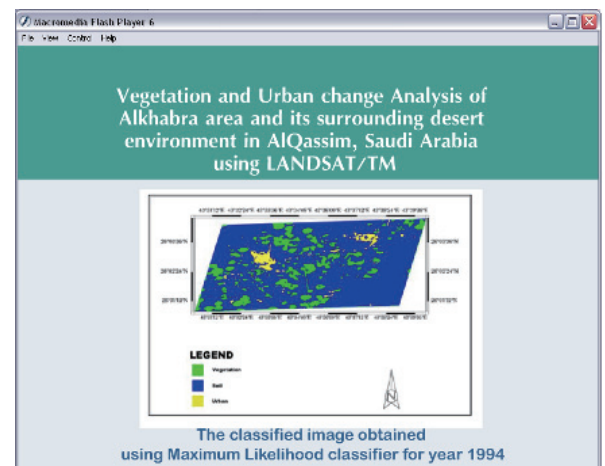

(a)

Fig. 8. The land cover change produced by the research collaboration between Universiti Sains Malaysia (USM) and AlQassim University
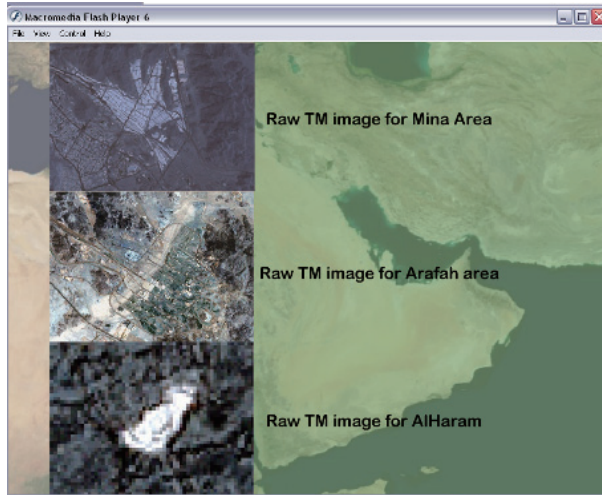
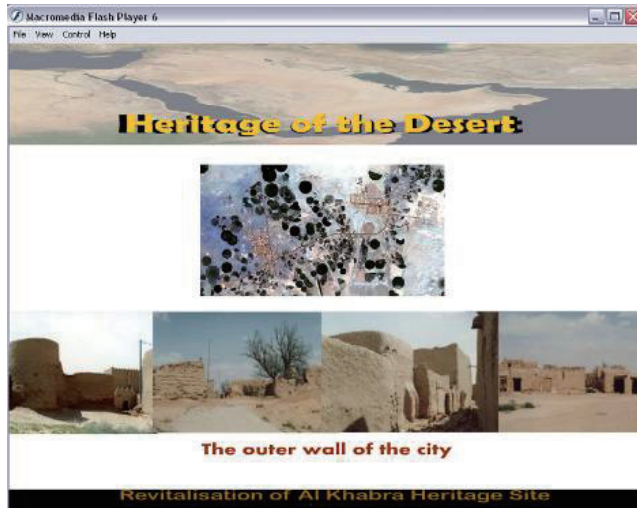Fig. 9. shows the raw satellite images of Mina, Arafah and AlHaram.

Fig. 10. The heritage of the Desert.

With this CAI package and the latest technology nowadays, such as PDA, student can access this CAI package and learning through PDA anywhere. PDA can quickly take over the classroom as a portable learning tool, allowing anywhere, anytime access to speeches, audiobooks, and lectures. We can build a paperless environmental using the latest technology like PDA. At the same time, we also can use PDA for daily assignments such as reading, word processing, wireless internet access and laboratory analysis. Besides that, publishers are beginning to offer electronic versions of their textbooks. So, we also can use PDA to access the e-books. Advanced technology should be proposed and use in the education activity. We also can edit and update our information in a short time.

This developed CAI package also can upload into web, so public people that who interested can access through the web. With the latest technology, we can develop and make technology transfer in remote sensing for environmental management or application. We also can provide wider education in photogrammetry and remote sensing with the latest technology such as wireless internet access. We also can make useful of this CAI package to include more research activities proposals that we can joint research including technology transfer and training with international institution. So, we can build a collaboration networking connections with international institution in the field of photogrammetry and remote sensing.

7. Conclusion

This CAI package was successfully developed to provide useful information on basic theoretical of remote sensing and the research articles between Universiti Sains Malaysia (USM) and AlQassim University in animation format. This CAI package has the advantage compared to traditional hardcopy output. This CAI package provides more flexible, easily and interesting way to get information. CAI package was playing an important role as an alternative material to all users in the near future.

References

Webopedia, CBT,
 http://www.webopedia.com/TERM/C/CBT.html.
Ray, B., 2002, PDAs in the Classroom: Intergration strategies for
 K-12 Educators. The Access Center, Computer-Assisted
Instrution and Mathematics,
http://www.k8accesscenter.org/training_resources/computeraided
_math.asp