Chapter 23
Automated Lesson Plan Converter Using Optical Character Recognition Integrated With Google Calendar

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Abstract
Filling up digital forms would be a hassle, especially if the form requires too many compulsory information to be given in order to complete a task or transaction. By utilizing optical character recognition (OCR), a technology that allows conversion of printed or non-editable documents to editable document, together with additional algorithms to detect and categorize information within the converted document, the process of transferring information from printed document to a digital can be simplified. This system development project aims to assist students of Universiti Teknologi Mara to generate calendar entries of their 14-week lesson activities using information provided in course information document so that they can be notified of important dates through their mobile devices.

Introduction
University Teknologi Mara, or UiTM is the biggest higher learning institution in Malaysia. ("Universiti Teknologi Mara (UiTM) Official Website," n.d.). Having approximately 24 faculties and 373 education programs, UiTM has at least 1 campus in each state in Malaysia. UiTM adopts the outcome based education (OBE) alongside student centered learning (SCL) as their method of teaching, focusing on students’ capacity in understanding and apply what has been taught at the end of their learning period.

By implementing the course information document, the objective of OBE and SCL can be realized as students are given the insight of what should and would be learned and what need to be done by them throughout a 14-week semester. It also contains information on the description of the course such as level, credit unit, contact hour, course status, prerequisite course and many more, including activities that will be conducted throughout the term.

Despite being well documented, there are a few occurrences that may hinder the process of carrying out outcome based education (OBE) and student centered learning (SCL) using the course information. Being susceptible to being damaged or loss, the hassle in retrieving information from the document frequently may be some of the occurrences mentioned. However, by converting the machine-printed information back to its digital form, the availability of the information can be preserved as well as making the process of retrieval of information easier. This can be achieved by implementing the optical character recognition (OCR), an image processing technology. Scanned images of handwritten, typewritten or machine-printed text can be converted into machine-encoded text using optical character recognition (OCR) (Rana, Azza & Mohamed, 2015).

By developing a system that is able to process scanned image of the document and retrieve the textual data contained in the lesson plan using optical character recognition (OCR), students and lecturers can keep track of their lesson plans. Retrieved texts will then be categorized by weeks and stored as weekly reminder. The reminders generated would be stored by using third-party scheduling or calendar system, Google Calendar, which allows user to synchronize the reminders to multiple devices and platforms.

Content
In order to accomplish the aim of this project, a few objectives need to be fulfilled. These objectives were made to be used as roadmap and guidelines to stay focused towards the aim of the project and to assure that the end product can be delivered within given and planned time frame.

The first objective is to gather and analyze the requirements of the system. A preliminary study has been conducted prior to the project proposal. An online questionnaire was published, collecting 101 responses from students and lecturers that is then used to further support the proposal as well as gathering initial requirement from them as they are the system potential users. The result of the study shows that 95% of the respondents would want...
a system that could help in notifying them of the activities or tasks for each course while the other 5% does not. By analyzing the responses gathered from the questionnaire and from studying the standard procedure of creating and using the course information document, core functional requirements can be derived from it. Second, from the derived functional requirements acquired the design and development of the system is done. The project adopted the iterative software development methodology, making the core phases of the software development life cycle can be carried out concurrently and repeatedly producing a working prototype on each iteration. An iterative model is a part of plan-driven methodology with agile properties. In contrast to traditional approach or waterfall, this approach finishes a core component of a currently developed system first, then further use cases of the whole system are added in a repetitive process until the system requirements are fully met (Satzinger, Jackson & Burd, 2014). The last objective to accomplish the aim of the project is to perform user acceptance test, prompting interaction between the developed system and target user to test the performance and behavior of the system using a set of test cases. By following the guide form provided test case, users can explore functions of the system and then provide feedback to assess the level of acceptance of the users toward the system itself.

By adhering to the development methodology, works can be planned beforehand and waste of resources can be diminished.

![Fig. 1 Iterative methodology model for the project](image)

**Conclusion**

Being able to exploit information converted from machine-printed state into digital text to be used as input for digital forms which will indirectly improve human-computer interaction (HCI). However, the conversion of the information from image to editable text needs to be efficient or at least minimum error rate so that there would be no erroneous data input to the digital form.

**References**

