

**Internet of Thing (IoT) for Agriculture Technology  
Development at Faculty of Plantation and  
Agrotechnology,  
UiTM, Jasin, Melaka**

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**ABSTRACT**

Recent advances in Industrial Revolution 4 (IR4) claimed virtually that all industries will be integrating digitized with automation and robotics. In agriculture, Internet of Thing (IoT) of communication technology and wireless sensor networks have paved way to new trends to emerge in agriculture sector. This study introduced the development on contemporary solicitation to expedite students Faculty of Agrotechnology and Plantation, Universiti Teknologi MARA (Melaka), the tool used in this study is Garmin etrex. Its function is to find waypoint and track of the location. Simulation and Modeling is the key behind the learning process while for growing up towards research ethics for the student. During the time of teaching and learning process, student can use their smartphones to scan Quick Response (QR) code that labeled on the physical model to explore more for the knowledge of internal engine mechanism. The data that been observed out in the field also can be transfer to the computer for further editing analysis. ArcGIS software was used to analyze the location and able to determine the elevation, distance and coordinates (latitude and longitude). The benefit on elements of IoT teaching development is for helping student to do their revision and understanding.

**KEYWORDS**

Computer Integrated Agriculture, Mechanization, E-Learning, Engine, QR Code, Mechanism System,

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## INTRODUCTION

The term Edutainment mix from the concept of education and entertainment [1]. This term is used to describe various forms of entertainment that also to educate. Edutainment is a computer system that allows a user to access the information. Integration of technology allows edutainment to perform a wide range of functions, evolving into self-service Edutainment.

A geographic information system (GIS) is a system for the management, analysis and display of geographic information. In addition, geographic information is used as represented by a series of geographic database that show as model geography by using simple, and genetic data structure. The components of Arcgis contain such as Arcmap, ArcCatalog and ArcToolbox. Besides, the extensions of Argis are included spatial analyst, geostatistical analyst and 3D analyst. As part of a GIS geodatabase design, we can specify how the certain features will be represented in Arcmap software, the track added can be projected from the map. For example, building typically represented as polygons, streets will be mapped as centerlines or point, and others features [2].

A GPS is like a mobile phone, except that instead of receiving radio signals from telephone companies, it receives signals from satellites that are going around the Earth. By receiving these signals from the satellites, a GPS can calculate your exact location on the planet. It records this location in coordinates, which are two long numbers. One number tells you how far east or west you are – this is called longitude. The second number tells you how far north or south you are – this is called latitude [3].

## METHODOLOGY

An Interactive Edutainment is a computer terminal featuring specialized hardware and software designed within a public exhibit that provides access to information and applications such as for communication, commerce, entertainment and education [4]. So, this project is specialized for education as learning tool by using hoary actual tractor and virtual tractor software application. Virtual tractor is referring to the combination of multimedia elements which is graphic and interactivity [5]. The user can click to the Edutainment application to explore the content or information in this university course of Agriculture mechanization.

As in figure 1, the interactivity means the relation between the user and Edutainment itself, which is the user free to click to any buttons or image that they want to display in the Edutainment [6] and the students also can use their smartphones and view an animation multimedia of related syllabus. In order to do that, the students need to download into his smartphones, the QR code Scanner and Generator Apps that can get freely available in website. The virtual tractor which is in graphic multimedia (Edutainment) will attract students to explore and learn more about the tractor. It is because by the combination of multimedia element like graphic and interactivity, it will attract students to learn and explore more about the specifications and all about the parts of tractor.



Figure 1: The QR codes marked on tractor engine model are contained multimedia link to tractor engine mechanism that can be viewed in student smartphones.



The teaching of fundamental tractor engine that cannot see visually because it is in the tractor engine now can learn virtually which assist by multimedia element. Nowadays, the student has their own smartphone to access this technology. The combination of element for education and entertainment that make attractive dynamically and more understanding compare static information. The virtual tractor edutainment is the combination of multimedia element of video, text, animation graphic and interactivity will attract students to learn and explore more about the specifications and all about the parts inside the tractor especially for engine that cannot see visually. This study also will provide to publish through Open Course Ware (OCW) in UiTM academic system.

## RESULT AND DISCUSSION

The virtual tractor (Edutainment) has an accessibility to link to internet and everyone will have the chance to explore it at World Wide Web by using their mobiles. The students and peoples that want to know about the tractor especially on internal engine mechanism, so it can get the information through multimedia elements by accessing the internet. Therefore, this study was designed in order to focus towards the tractor as a learning tool at a farm. Besides, Edutainment was developed in which of combination of multimedia elements between graphic and interactivity by using suitable software to develop interactive learning program. The virtual teaching tractor Edutainment is the complementary for the actual teaching tractor [7 and 8]. The Edutainment is more interactive rather than actual teaching tractor because of the information and tractor's part in Edutainment is much compare to actual teaching tractor. Then, for actual teaching tractor only certain part was labeled, but for the virtual Edutainment, all the part including main part, part's type, control and instruments part were included.

Spatial analysis is the most intriguing and remarkable aspect of GIS. Using spatial analysis, the information can combined from many independent sources and derive new sets of information (results) by applying a sophisticated set of spatial operators [9,10 and 11]. This comprehensive collection of spatial analysis tools extends ability to answer complex spatial questions.

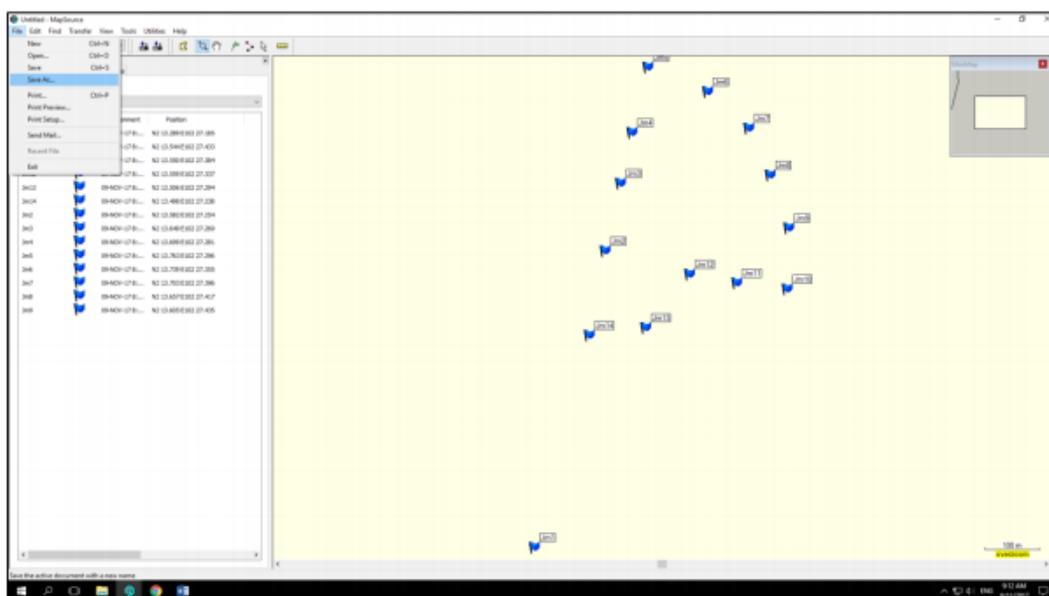


Figure 2: Waypoint and track marked by Garmin tool.



Figure 3: Simulation and model on UiTM mapping and shapefile.

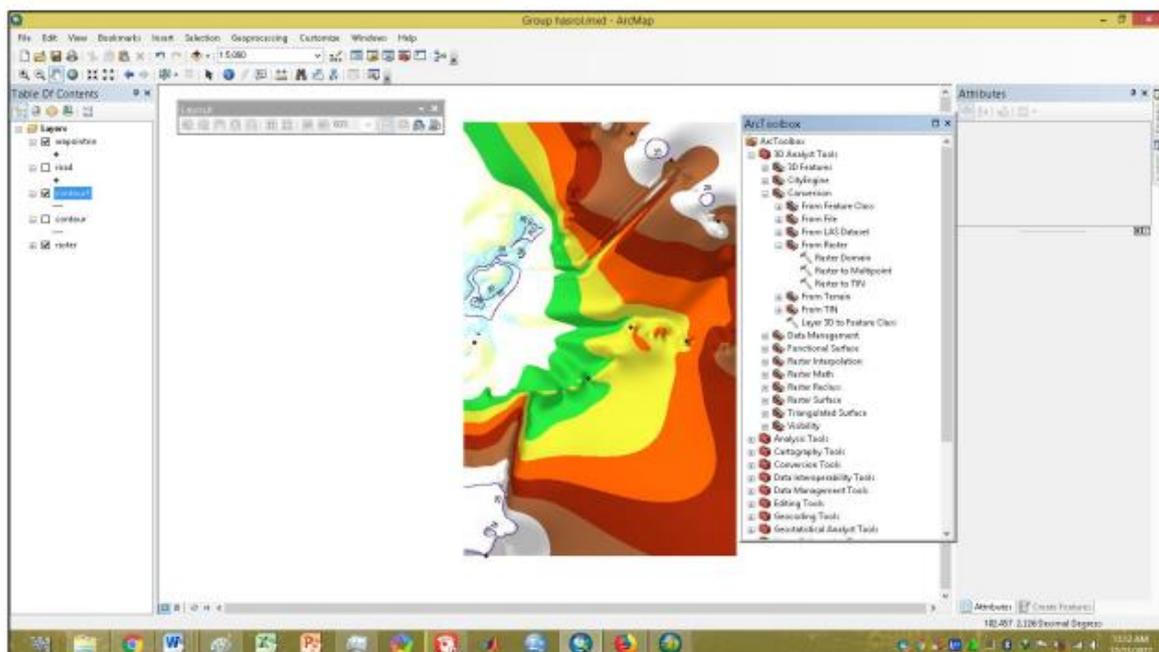


Figure 4: 3-Dimensional generator in ARCGIS.

The benefit that will be gained when acquiring the knowledge of this. Successful adoption, however, comprises at least three phases including exploration, analysis and execution as in figure 2,3 and 4. Precision agriculture can address both economic and environmental issues that surround production agriculture today [12 and 13]. Although the steps are quiet complicated but it is worth to learn as it will make fieldwork to become easier. Questions remain about cost-effectiveness and the most effective ways to use the technological tools we now have, but the concept of “doing the right thing in the right place at the right time” has a strong intuitive appeal [14 and 15].

## CONCLUSIONS

Assessing on computer modelling and application is approaches to strength in teaching and learning process. The Edutainment is virtual way of learning by adding some value of attractive and interactive with the combination of graphic (images). The role of innovation in future is more pervasive by treating on Science , Technology, Engineering and Mathematic (STEM) etc., to be at the forefront and much more popular in terms of acceptance in the education system in UiTM and Malaysia respectively.

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