

CELEBRATING
COMMERCIALISATION
YEAR 2014

iiindex 2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

invention
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exposition 2014

INNOVATEUR
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2014

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UNIVERSITI TEKNOLOGI MARA
MALAYSIA

*Bridging
the valley of death :
advancing the
commercialisation
of research*

RESEARCH BOOK

iiindex2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

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FOREWORD

The Honourable Minister of Science, Technology and Innovation (MOSTI) has launched 2014 as Malaysia Commercialisation Year 2014 (MCY2014) with the theme Science Technology and Innovation (STI) for Wealth Creation. In line with this theme, Invention, Innovation, Design & Exposition 2014 (iidex2014) is an annual exposition organized by UiTM and is the ultimate platform to highlight and commercialise new inventions and innovations. Researchers and inventors will exhibit their products which cater to the needs and wants of the community and the country.

The iidex2014 creates a new dimension by fusing two competitive concepts, a competition among innovative products and a competition to invite Innovateur Wannabes to perform live pitching of their products to the audience. The iidex2014 focuses on comprehensive commercialization and creating opportunities for entrepreneurs to carry out R&D as well as to provide avenue to commercialise their products. Through expositions such as iidex2014, MOSTI hopes to inculcate the culture of commercialisation of new technology designed and created by Malaysians.

I wish to congratulate all the participants of the iidex2014 and this is the opportunity for all researchers to show their ideas and exhibits their products and creativity. Apart from showcasing their products, innovators will have the opportunity to provide a window to the industry for business matching during the exposition.

Tan Sri Dato' Sri Sallehuddin Mohamed
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INNOVATED COSMIC FUNCTIONAL SIZE MEASUREMENT CALCULATOR FOR MOBILE APPS DEVELOPMENT COST ESTIMATION

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Video Games sales valued at (RM192 billion) and Mobile Applications at (RM88.5 billion) show significant contributions to the country's economy, as stated in MSC's Creative Industry Outlook (2011-2014) report. Recognizing the vast potential in the Creative Multimedia industry, MSC Malaysia focuses on the fundamentals of Creative Multimedia by investing in the long term prospects. These facts offer vast opportunities to Malaysian technopreneurs to gain incredible returns by venturing into the mobile games businesses. Previous studies show that modern games software development requires new set of metrics to estimate the software effort (Giudice, 2013). Currently, several types of software effort metric exist in the market. However, none have been specifically formulated for mobile games functional complexity and interactive 3D graphic features. The COSMIC Functional Size Measurement Method (COSMIC FSM) is one of the evolutions from Function Point Analysis (FPA), which can cater to different scenarios of software development, especially in embedded software and real time system (Meli et al., 1999; Lind et al., 2009, Soubra et al., 2011). Therefore, in this research, COSMIC FSM is innovated to be used for sizing the mobile game application cost since we consider mobile apps as one type of embedded software. The objectives are, i) to identify game components for software effort estimation, ii) to innovate COSMIC FSM metric for estimating the game software effort, and iii) to develop a calculator for estimating the game software cost. The research method involves four phases. First phase identified mobile game components required for game software, which entailed critical review of popular open source mobile game engines to identify all possible components. The second phase constructed the structure and modelling the game components. During modelling, UML diagrams such as use case diagram, component diagram, object diagrams and sequence diagrams are derived based on Unity3D game engine. The third phase formulated functional measurement rules and game components mapping to propose an enhanced COSMIC FSM metric. The component diagram of Unity3D game engine is used as a platform in deriving the functional requirements of mobile game application development and mapping the requirements into COSMIC FSM rules and measurement. Data movements are classified according to COSMIC-UML mapping. Finally, 3D mobile game calibration dataset is used to regulate the metric. This innovated metric is then used to develop an estimation calculator, which is called Innovated COSMIC Functional Size Measurement Calculator. This calculator is specifically targeted to demonstrate the COSMIC FSM counting process and make the estimation for the mobile game application development effort and cost. The calculator suggests the number of programmers needed for developing a mobile game application based on the user's duration as an input. The calculator can also estimate the total software cost based on the amount of salary entered by the user. All the estimation output can be displayed and printed as hard copy for documentation purposes. Three case studies of calculations have validated the functionality of the estimation by using the calculator. The accuracy of the calculator is reliable as compared to the result from the manual counting. As a conclusion, the resulting metric can be embedded to any software calculator to estimate game application development cost. The innovated calculator will be able to assist technopreneur advocates to estimate software cost in the future. Accuracy of software metric helps to boost the success of technopreneurs and thus promote better Business Services (5th NKEA) by nurturing innovation and extending the outreach potential of the economic growth of the nation.