Submission and Registration Form

I. Title:

IoT Mobile Micropayment to Support Government Related Services for Smart City: A Case Study in City Parking.

II. Author(s)—Full name (First name family name):

- 4 members from 3 organizations

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III. Organization(s):

1. Faculty Of Electrical Engineering, Universiti Teknologi Malaysia, Malaysia.
2. Neonusa, Telekom Malaysia, Malaysia.
3. Mobile & Fixed Mobile Convergence, Telekom Indonesia, Indonesia.
4. Digital Service and Data Platform, Malaysian Communications and Multimedia Commission, Malaysia.

IV. Topic selection:

Topic (2) Smart Society: ICT applications for community and environment.
Under sub-topic (B) Smart City

The focus of this project fall under the ICT infrastructure in providing a smart parking solution to cater demands in the dense metropolitan areas within the ASEAN region.

Keywords: Smart Parking, Smart City, Mobile Application, Micropayment, SMS technology, Online Parking Enforcement, Online Monitoring.

IV. Abstract:

(i) Overview

Mobile micro payment which revolutionizes the conventional payment through the use of mobile airtime or e-wallet is now penetrating the worldwide market with the advantage of the fact that mobile phone has become a necessity to the modern world. It can be defined as both content delivery (notifications and reporting) and transactions (purchasing and data entry) on mobile devices. It has strong growth potential as smart phone devices will become

more affordable and prevalent among public users in the near future. Furthermore, since future wireless infrastructure will be more mature at lower cost, the engagement of mobile solutions across various commercial activities will be a norm. Even so, a successful implementation of mobile solution in the commercial world requires careful judgment, with realistic expectation on business value proposition that relies heavily on the perceptions of consumer groups and subject to a series of regulatory procedures. In particular, the motivating factors need to be identified where a mobile application should be able in helping to resolve the existing problems, create new opportunities or add competitive edge.

The application of mobile micropayment as an integral part of Internet of Things for the smart city purpose has gained a worldwide interest. Government related services like parking is an area that can benefit from it as it will greatly reduce the complexity of payment process and parking enforcement. This project proposes for open and close parking management supported by an integrated enforcement system that utilizes user-friendly, innovative and secure mobile micro payment (via SMS and mobile apps) that is supported by an ICT based platform enables real time monitoring and more efficient data management. Its ultimate aim is to address the current parking issues in the big cities within the ASEAN region such as cumbersome parking payment method and weak enforcement approach. The local councils in Malaysia that use printed coupons for instance suffer from issues such as manipulation, forgery, coupons transferred to different cars and parking summon systems without the necessary back-end hardware and appliances to support it. This innovative product was developed to improve and simplify services provided by the local councils that is designed customized to the needs of the local market environment.

(ii) **Intellectual Merit**

Currently, the use of coupons and coins when parking is more widely used in the ASEAN region, especially in the very busy areas such as the urban areas. The increasing number of car parking has resulted in the higher demands for parking meters. Consequently, government agencies will be burdened by the cost to install new meters and at the same time they also need to maintain the existing parking meters. Car parks can become a cause of frustration as customers would prefer to park their cars as soon as possible. Nevertheless, significant amount of time might need to be spent for parking process considering some of the worst-case situations e.g. broken parking meters or difficulty in getting parking ticket especially if users have to extend the parking duration. Thus, the implementation of a mobile micropayment system can efficiently replace the existing ticketing and pay and display parking. It is now the right time that Malaysia implements an IoT based parking system that is also user friendly. It is also considered a green initiative since the use of paperless parking system and an IoT based mobile enforcement module which helps in reducing paper and petrol respectively. In this collaborative project, our focus is on the enhancement and

customization of existing smart parking solution that has been implemented in Malaysia to the other ASEAN neighboring countries like Indonesia, Thailand and Singapore. The current mobile micropayment rules and regulation are some of the distinguished aspects between countries. In the end, the performance of the newly proposed solution will be compared to the other competing technologies which may include deployment cost and Quality of Service. Research output from the member will be shared in term of joint publications, regulatory activities and joint proposal for future works.

(iii) **Broader Impacts**

This project marks a smart collaboration between the regional research communities by utilizing the existing research facilities, knowledge and network of each participating institution. To date, a smart and holistic parking solution has yet to reach the South East Asian region including Malaysia. Mobile micropayment and smart parking has gained strong interest in the worldwide market with the advancement and widespread penetration of technologies such as cloud computing, smartphone and open source operating systems. This solution is believed to be timely given the fact that this region is rapidly progressing in adopting new wireless technology and infrastructure. Recent report shows that Malaysia places third in the Mobile Payment Readiness Index (MPRI) among the South East Asian countries (MPRI, 2011) and with 124% mobile penetration, in average each individual in the country has more than one mobile phone. This project requires support from the ASEAN-IVO funding bringing together researchers in the field of smart city parking technology to promote and encourage more solutions that can benefit the society within the IVO members. In addition, this project would benefit to many parties such as researchers, government, parking operators and Telco provider of ASEAN community by introducing a better and affordable service through a comprehensive regional study. This solution can become recommendations to the government policy where research findings will be useful inputs to the international standardization bodies such ITU-T.

(iv) Targets, Methods and Implementation

Detail methodologies and implementation for this project can be done in the following stages:
- Contextual background study on local parking operation and regulation
- Localization of the smart parking solution platforms that fulfill the below features:
  - User-specific features:
  - Parking Operator-specific features
- System integration of open and confined parking solutions for a commercial prototype
- Field test for up to 5000 parking lots in the urban area
- Optimization of the system based on the feedback

- Construction of regulation and business plan upon finalization of the involved system components and process.

(v)   Leveraged Resources and Participants

The proposal would be an important platform to gather researchers in this region to come out with practical solutions for mobile micro payment and smart parking system. Since different region may have different issues, the aim is to have customized solutions that address local context at affordable prices. Relying on foreign technologies especially from the developed countries is a costly option due to the high exchange rate and unnecessary logistic expenses. On top of that, there are many other potential institutes and research centers in the ASEAN region could be invited later during the project implementation to create bigger impacts in the field of the smart city specifically in improving smart city solutions. The strong advantage of the project is the fact that the part of the system which targets open parking has been implemented in one of the local councils in Malaysia, Johor Bahru Tengah Local Council. As such, the proposed project aims is to leverage on existing capabilities and use resources among IVO-ASEAN members and associates in order to expand the target market.

V. Speaker information:

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- Round trip fare at discount economy class
- Accommodation