Talk On "Open Source Is Eating the World - Understand How OSS Influences Industry 4.0"

Organised by the Information and Communications Technology Special Interest Group (ICTSIG), IEM

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Date	:	**21 August 2019, Wednesday** *(Rescheduled from 25 July 2019)*
Time	:	**5.30 pm – 7.30 pm**
Venue	:	**Auditorium Tan Sri Prof. Chin Fung Kee, Third Floor, Wisma IEM, Petaling Jaya, Selangor**
Speaker	:	**Mr. Tan Chin Luh & Mr. Joshua Teoh**

SYNOPSIS

This event is dedicated for all engineers, data scientists and simply anyone who would like to explore on the use of the open source software for the use in their working environment. This event focus on sharing real and practical experience and development of the software by Scilab (OSS for numerial computing) consultants on the latest trends used for teaching, research and industry applications especially in the fields of computer vision, machine learning, predictive maintenance, and Internet of Things.

You are also able to network and exchange experience with other users of Scilab.

We strongly encourage exchange of information and ideas for the betterment of all.Being a high-level language, Scilab's numerical oriented programming language is widely used in areas not limiting to engineering, science and mathematics. This language provides an interpreted programming environment, with matrices as the main data type. If you are familiar with licensed software like MATLAB, then the adoption and migration to Scilab will post no challenge at all. The ease of use and assessable by anyone makes Scilab become the software of choice.

SCILAB is an open-source, free software, developed by scientists around the world. It is released as open source under the GPL License and is available for download free of charge. Scilab includes hundreds of mathematical functions and with the high level programming language, it allows access to advanced data structures, 2-D and 3-D graphical functions. It is commonly used as an alternative to the licenses software MATLAB.

Computer Vision and Automation

Digital image processing is the use of computer algorithms to perform image processing on digital images. As a sub-field of digital signal processing, digital image processing has many advantages over analogue image processing; it allows a much wider range of algorithms to be applied to the input data, and can avoid problems such as the build-up of noise and signal distortion during processing. Computer vision deals with how computers can be used for gaining high level understanding from digital images or video with the aim to automate human visual system.

This session shares concepts and techniques for digital image processing and computer vision with Open Source Software (OSS).

Machine Learning and Deep Learning

Artificial Intelligence plays an important role in IR 4.0. Particulary with the data and information collection in daily operation of industrial environments, Machine learning enables predictions to be made based on large amounts of data. This branch of artificial intelligence is built upon pattern recognition and can independently draw knowledge from experience. For this reason,

the technology has found its place in industrial processes.

In this session we will show how we use the Scilab to train a 2 layers CNN with GPU for MNIST dataset, and we would also show a pre-trained model with Python and perform Transfer Learning with Scilab. Finally, we will implement the pre-trained model such as GoogleNET in Scilab for object recognition purposes in the embedded system - Raspberry.

Data Mining and Analysis toward Preventive Maintenance

Data mining, or knowledge discovery, is the computer-assisted process of digging through and analysing enormous sets of data and then extracting the meaning of the data. Data mining tools predict behaviors and future trends, allowing businesses to make proactive, knowledge-driven decisions. Different methods of Visualizing data help us to have better understanding of data. This will give us a big picture of what we are going to do with the data before jumping into it in "blind" and end up with "rubbish in, rubbish out". With the right tools and knowledge in these fields, Predictive maintenance could be implemented to predict the future failure point of a machine component, so that the component can be replaced, based on a plan, just before it fails. Thus, equipment downtime is minimized and the component lifetime is maximized.

This session will share some ideas on the basic concept of statistical analysis of data, study the meaningful relations of the data and representing data with equation, as well as how to perform predictive maintenance for a simple example.

Internet of Things (IoT)

The Internet of Things (IoT) is a vision that leads to a smart world with ubiquitous computing and networking, where computers can be embedded everywhere and programmes to act with or without human intervention.

This session introduces how OSS could be used in various subdomains of the IoT, from being part of the "things", to the data analysis and visualization. The participant would have the chance to access the sensors set up in our facilities, and also getting their own data submitted to the cloud service such as Ubidots and retrieved the data for analysis, both using Scilab as the main interface applications.

SPEAKER BIODATA

Mr. Tan Chin Luh gained his knowledge in renowned science and engineering from his experience in these fields for more than 18 years. He is passionate in developing solutions and applications with open-source software and hardware, and believing in open-source software and hardware would be the dominance of science and engineering domains in the near future. Upon graduating from Universiti Teknologi Malaysia with First Class Honor Degree in Electrical Engineering, Chin Luh has worked with a few organizations including TechSource Systems and i-Math with the involvement in making technical decisions and business development. During the same time, Chin Luh pursued his Master Degree in Computer and Communication Engineering from Universiti Putra Malaysia.

He then founded Trity Technologies together with other partners and actively involved in the product development and consultation for the customers. He has accumulated more than 18 years of experience in his technical and development of high level software application development, as well as real-time embedded control, data acquisition system, image processing, computer vision, machine learning and artificial intelligent solutions. Trity Technologies was then acquired by ByteSource Innovation and rebrand under the name of Bytecode Sdn Bhd and Chin Luh is holding the position of Chief consultant in the company. Currently, Chin Luh is also appointed as an Adjunct Lecturer at Universiti Petronas Malaysia and co-founded Certi Systems and in which he is currently managing the technical operations of the company.

Mr. Joshua Teoh graduates with a Bachelor's Degree in Electrical & Computer Systems Engineering at Monash University, Bandar Sunway with a 1st class honours in 2013. During his undergraduate studies, he had undergone his internship at Trity Technologies where he was exposed to SCILAB, an open source computational and technical software. This is when he is involved in the development of Scilab modules. Upon graduation, he joined Trity Technologies as an application engineer. Here, he continues the development work on SCILAB. He is also one of the instructors for the SCILAB courses on Numerical Computation and Visualization with Scilab, Scilab for Internet of Things, Scilab GUI and Java Interaction Mechanism with Scilab. His latest training is on A Practical Guide to Big Data Analytics with Pig Latin, Hive and Scilab. Currently Joshua hold the position of Technical Consultant in Bytecode Sdn Bhd.

Ir. Yasser Asrul Ahmad
Chairman of Information and Communications Technology Special Interest Group (ICTSIG), IEM
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