ICT Virtual Organization of ASEAN Institutes and NICT
ASEAN IVO Forum 2016
Call for Presentations

Submission and Registration Form

Please enter the relevant information in the fields below, giving an appropriate explanation when necessary. You may add supplemental pages and supporting data. If necessary, you may be asked to provide additional documents.

I. Title—Title of presentation:

Air Quality Monitoring

II. Author(s)—Full name (First name family name):
(If you are already planning a project, please include the names of all team members)

Ahmad, Robiah
Mohd Noor, Norliza
Harun, Ahmad Nizar
Mat, Ibrahim
Mohamed, Norliza
Ahmad, Norulhusna

III. Organization(s):
(If you are already planning a project, please include the institutions of all team members)

- UTM Razak School of Engineering and Advanced Technology,
  Universiti Teknologi Malaysia
  Kuala Lumpur Campus

- MIMOS Berhad

IV. Topic selection:
(Select one from the topics listed in "Call for Presentations")

Environmental Monitoring

IV. Abstract:
(Describe the purpose, background, objectives, content, plans for connected projects, expected results/outcomes, etc.)

Haze or air pollution is one of serious global problems for the the entire people in the world. According to World Health Organization (WHO), air pollutions kills around 7 million people which accounting for one in eight deaths worldwide. The main causes

of death were stroke and heart disease, followed by chronic obstructive disease (COPD), lung cancer and respiratory infections among children [1]. The situation is even bad in Asia- Pasific region which has a population of over 4.2 billion with high population density. Besides health effects, based on one study [2], India's wheat and rise crop yields have dropped significantly that has linked to rising levels of two air pollutants namely black carbon from rural cooking stoves and ground-level ozone formed from vehicle exhusts, industrial emissions, and chemical solvents between 1980 and 2010.

Long term exposure to haze episodes could potentially make the population less healthy over time. Based on a study by Betha et al. [3], the air above Singapore during a smoke haze episode contained arsenic, chromium, cadmium and other carcinogenic elements. They estimated that normal urban levels of PM2.5 pollution would   cause about 12 out of every million Singaporean to develop cancer over a life time.

Besides these effect of haze reported, yet there is still no coordinated international effort to analyze haze in interdisciplinary way most probably partly due to the unpredictable nature of haze.   There are several reasons due to this. Firstly, yhe weather in Southeast Asia region is highly variable which makes it tricky to predict when haze will appear or where it could spread. Secondly, the general public does not view haze as a serious health treat. Another reason is due to political reasons. Countries in southeast Asia have little control over what blows across their border and the Association of Southest Asian Nations (ASEAN) lacks the legal authority to force its members to act against their own interest, unlike other association i.e. the European Union.

In moving towards the development of smart cities, there is a need to have a way in measuring the air pollution and necessary action need to be done to avoid unhealthy impact to people especially in urban areas whom are more susceptible to air population. In Malaysia, haze often occurs when concentration of dust and smoke particles accumulate in relatively dry air [4]. A real-time system for collecting haze data is very important to provide the latest haze information to the public.

This proposal propose a monitoring system to monitor all important air quality parameters, analyze and provide proper and appropriate alert for public awareness and action. Air quality parameters among others are PM10, PM2.5, Volatile Organic Compound (VOC), and Carbon Dioxide (CO_2). The objectives of the project are to produce more accurate real-time haze information system using data from a bigger coverage area to represent a particular location. These data plus other data collected from different methods (such as citywide sensor network, high-tech camera or gathering data literally into hands of the citizens as well as GPS devices

embedded inhalers to collect data on where and when people with asthma are particularly affected [5, 6]) will be used to develop Haze hazardous Index (HHI).

The project will start with reviews on current haze patterns in Malaysia. Secondly, a thorough literature on the existing haze monitoring system will be done. Based on these studies, HHI monitoring system will be developed. The HHI monitoring system will be used to alert and give early warning and notice for public to take precautions especially people with serious effect to asthma or people with problem in their respiratory system.

Measures of air quality have existed for decades and remain a valuable and widely used standard for signaling potentially hazardous levels of pollution to local officials and residents. The development of more advanced sensors, analytics and communication tools, is allowing the cities to make their residents more aware, engage residents in reducing pollutants and address the health outcomes of poor air quality. By distributing the data-collection network throughout the city or in the hands of their residents, it is hope that cities can develop smarter and timelier responses to pollutants to help ensure cleaner air for all residents

Reference:

1. The air pollution that's choking Asia, CNN January 30, 2015
2. Jennifer Burney and V. Ramanathan. Recent climate and air pollution impacts on Indian agriculture. Proceedings of National Academy of Sciences of the United States of America. Vol. 11. No. 46. 16319-16324. Doi: 10.1073/pnas.1317275111
3. Raghu Betha, Sailesh N. Beherat and Rajasekhar Balasubramaniam. 2013 Southeast Asian Smoke Haze: Fractionation of Particulate-Bound Elements and Associated Health Risk. Environmental Science and Technology. 2014. 48(8). Pp 4327 – 4335
4. What causes South East Asia's Haze? BBC News Asia. 26 October 2015. http://www.bbc.com/news/world-asia-34265922
5. Monitoring Air Quality and the Impacts of Pollution. Data-Smart City Sollution. http://datasmart.ash.harvard.edu/news/article/monitoring-air-quality-and-the-impacts-of-pollution-679
6. Air Louville. Data accessed 15 October 2016.   https://www.airlouisville.com
7.

V. Speaker information:

Full name：Assoc. Prof Dr. Robiah Ahmad

Institute： UTM Razak School of Engineering and Advanced Technology, Universiti Teknologi Malaysia

Address： Level 7, Menara Razak, UTM Kuala Lumpur Campus, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur

Telephone：+60197277723 (Mobile), +60321805132

E-mail: robiahahmad@utm.my , dr.robiah.ahmad@gmail.com

VI. Support for speaker—circle or underline any that you wish to request:

- Round trip fare at discount economy class

- Accommodation