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Research, Innovation, Commercialisation and Entrepreneurship

WILD IDEAS : Are We STILL Relevant?

Heart-to-Heart Talk on Research & Innovation in UTeM

Mechanical Engineering Research Day 2017 (MERD'17)

UTeM Reappointed as Authorised Competency Training Centre by SEDA Malaysia

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POTENTIAL PRODUCTS TO BE COMMERCIALISED • UTeM RESEARCHER'S ACHIEVEMENT
RESEARCH ARTICLES • RESEARCH ACTIVITIES •

Editor's Note

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Assalammualaikum wrt and Hi everyone,

Welcome to our first edition of RICE for 2017. Thanks to those who have contributed to this edition. Your contributions are essential to the success of this bulletin. Congratulations to all those who have received awards since the last edition of the bulletin. As the family members of UTEM, we all share and benefit from your achievements, and we hope to hear more good news along these lines. One of the more exciting announcements in this bulletin is the news regarding the 100% winning achievements by all researchers participated in ITEX 2017 recently. Further, in the research highlight section of this edition, we have included a list of interesting articles by a few researchers. We would like to document more research discoveries in the next edition, so please send us your interesting research findings or experience in the next few months for the inclusion in the next bulletin. We are looking forward to expand the scope of the RICE bulletin to make it more interesting and beneficial for the readers; hence, we would love to hear from you, and we publish selected emails at the end of each edition.

Assoc. Prof. Dr. Massila Kamalrudin

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WILD IDEAS: Are We STILL Relevant?

The advancement of technology, especially the rapid growth of connectivity and IoT usage has led to paradigm shift in research and innovation. The overwhelm usage IoT has triggered the alarm whether we, as researchers are STILL or NOT relevant to the needs of the industry and society. In this era of connectivity, we are no longer alone as we can connect with anyone and anything at anytime and anywhere. For example, communication does not only happen between human and human, but also between sensors and human as well as machine and machine (M2M). An obvious example is that the refrigerator can now communicate with the owner of a house, and perhaps, in the nearest future, the machines in the lab can also speak to the researcher on how it is utilised.

Therefore, the current culture of research in a university has to change. Each of the labs, groups and especially, the COEs have to work together and they no longer have to work in silo to perform any task. Further, the growth of the artificial intelligent capability also requires us as researchers to upgrade our knowledge and skills, especially in managing our research. We need to be better than the machine, especially in making decision. The worry of our relevancy will occur if we as researchers are poor in making wise and accurate decision in comparison to the machine. Hence, we have to start asking ourselves this question: “Are We Still Relevant? Further, we need to change our mind set and adapt ourselves consistent with the growth of the technology, in order for us stay relevant within the context of the revolution.

Prof. Datuk Ir. Dr. Mohd Jailani Mohd Nor
DVC Research and Innovation UTeM

Heart-to-Heart Talk on Research & Innovation in UTeM

On 1st June 2017, DVC (RnI) Y Bhg. Datuk Prof. Ir. Dr Mohd Jailani bin Mohd Noor conducted a special event, the Heart-to-Heart Talk on Research & Innovation at Dewan Canselor, UTeM. The purpose of the programme was to motivate the young and senior lecturers in UTeM to strategise their research and publication. In this event, YBhg. Datuk has used his motivational skills in NLP to break their mental block in writing and publishing. There was also a sharing session of real experience from few young lecturers on how they overcome their personal constraints in writing.

During the session, he has managed to instill the needs for togetherness in building a better UTeM through publication. Towards the end of the program, the audience was given a chance to share their real problems and issues related to writing and publishing. Few feedbacks were collected from the audience as per below:

"dares to make a difference"

"something different from the usual programme"

"Prof Jai has demonstrated to us that we can overcome our fear and problem as long as we believe we can do it"

MERD'17 Secretariat in front of UTeM's Library at the Main Campus

Mechanical Engineering Research Day 2017 (MERD'17)

Professor Datuk Dr. Shahrin gave his speech during the closing and award presentation ceremony

One of researchers presented her research to the Vice Chancellor, FKM Dean, and CARe

Mechanical Engineering Research Day (MERD) is an annual affair organised by the Faculty of Mechanical Engineering (FKM) in association with the Centre for Advanced Research on Energy (CARe), Universiti Teknikal Malaysia Melaka (UTeM). Initiated in 2011 as "Hari Penyelidikan FKM", this one-day poster seminar was then established as MERD in 2015 and has become a yearly event. MERD'17 was successfully held on 30 March 2017 at UTeM's Library in Durian Tunggal main campus with its theme 'Idea, Inspire, and Innovate'. Soaring upwards to national level this year, MERD'17 was also participated by researchers from other countries, including Singapore, Indonesia, Japan, South Korea, Iraq, UAE, Saudi Arabia, Australia, United kingdom, New Zealand, and Russia. Featuring the Centre of Technopreneurship Development (C-TeD) as a new co-organiser for this year, MERD'17 has introduced "engineering management and education" as a new research track in addition to the existing tracks, which are automotive and aeronautics, plant and maintenance, structure and materials, thermal and fluids, vibration and control, and other related fields. Out of more than 400 submissions that have been received, only 218 extended abstracts have been accepted for MERD'17. Based on the poster exhibition, the most outstanding paper has been selected to receive the "Outstanding Poster Award" and 20 best posters have been selected to receive the "Best Poster Award". The closing and award presentation ceremony was officiated by UTeM's Vice Chancellor Professor Datuk Dr. Shahrin Bin Sahib accompanied by FKM Dean, Assc. Prof. Dr Noreffendy Bin Tamaldin and CARe Manager, Professor Dr. Ghazali Bin Omar.

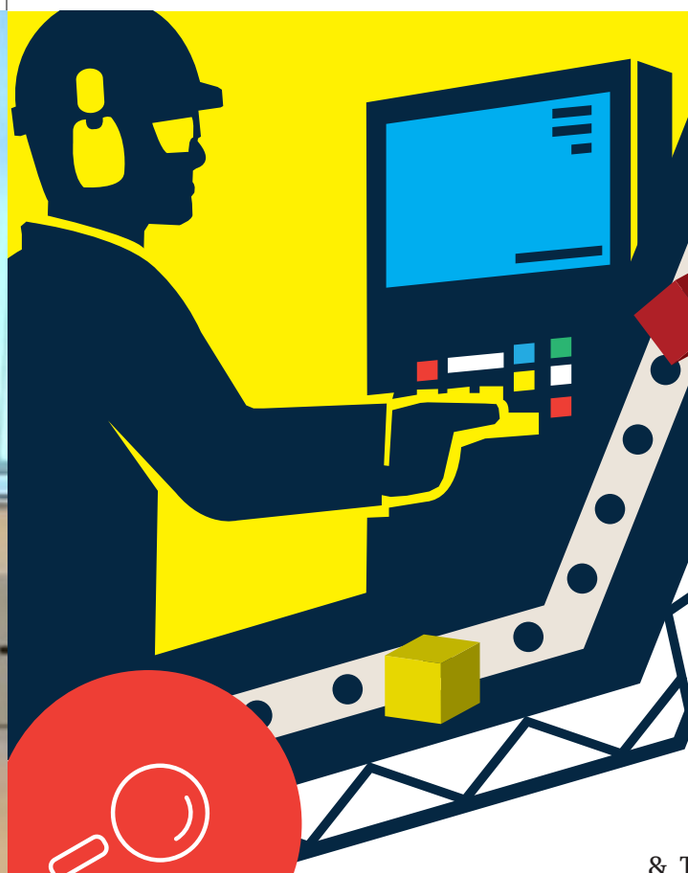
UTeM Reappointed as Authorised Competency Training Centre by SEDA Malaysia

UTeM Training Team with SEDA Delegates

UTeM has been officially reappointed by SEDA Malaysia as the competency training provider for the "SEDA Malaysia Grid-Connected Photovoltaic System Course for Wireman and Chargeman". This new appointment, which is effective until 2 July 2019, is a continuation of the first appointment that began from 15 June 2015 and ended on 14 June 2017. Throughout this appointment, UTeM has successfully conducted six competency training sessions. The 5-day course, conducted at the Research Laboratory of Solar PV System and Smart Grid, Faculty of Electrical Engineering has attracted applicants from all over Malaysia, with participants from both the government agencies and industry technical personnel.

Prior to this reappointment, SEDA Malaysia delegates led by Puan Azah Ahmad, the Director of Renewable Energy Technology, visited UTeM on 31st May 2017 to audit the training centre, facilities, trainers and related documentation. The UTeM training team was led by Associate Professor Dr Gan Chin Kim and assisted by SEDA throughout the whole process. By the end of the auditing process, SEDA officers were satisfied with UTeM's compliance with all the requirements as stated in the Terms of Reference (TOR).

This appointment is indeed a great recognition of UTeM's capability in providing high quality training relevant to the government and industrial needs. It is hoped that this cooperation will provide an avenue for UTeM to directly contribute towards fostering the use of renewable energy in Malaysia.



THE 28th INTERNATIONAL INVENTION, INNOVATION & TECHNOLOGY EXHIBITION (ITEX) 2017

The 28TH INTERNATIONAL INVENTION, INNOVATION & TECHNOLOGY EXHIBITION (ITEX) 2017 organised by the Malaysian Invention and Design Society (MINDS) with the supports from Ministry of Education and Ministry of Science, Technology, and Innovation Malaysia (MOSTI) was held from 11th to 13th May, 2017 at the Kuala Lumpur Convention Centre (KLCC). This exhibtion is a platform to promote research findings, innovation and new invention ideas that contribute significantly towards research and innovation development in UTeM. Among the 23 categories contested are the Electricity / Electronics, Telecommunications, Aerospace and Aviation, Automotive and Transportation, Educational Items, Environmental and Renewable Energy, Household Items, I.C.T and Multimedia, Industrial Design, Manufacturing Process, Machines and Equipment, Materials, Printing and Packaging, Telecommunications and etc. UTeM sent a total of 20 products to be contested and exhibited throughout ITEX 2017. During the exhibition, UTeM won six (6) gold medals and fourteen (14) silver medals with the sucess rate of 100% for the participation. The results are as follows:

NO.	PRODUCT NAME	MAIN RESEARCHER	FACULTY	RESULT
1	Re-VOLT 8.0 Reversed Voltage Topology Single Phase Multilevel Inverter	Dr. Aziah Binti Khamis	FKE	GOLD
2	Reconfigurable and Integrated Microwave Bandpass Filter with Notched Band for Wireless Applications	Dr. Noor Azwan bin Shairi	FKEKK	GOLD
3	Embedded Stiffness Control for Pneumatic	Dr. Khairuddin bin Osman	FKEKK	GOLD
4	Self-Powered Vehicle Collision Notification Via Disc Break Thermal Energy Harvesting	Assoc. Prof. Dr. Kok Swee Leong	FKEKK	GOLD
5	Sistem Penilaian Kebolehbacaan Bahasa Melayu	Dr. Mohd Hafiz bin Zakaria	FTMK	GOLD

6	Trust Crawler	Assoc. Prof. Dr. Massila Kamalrudin	FTMK	GOLD
7	E-IV 3000 High Power Efficiency 3 Phase Cascaded H-Bridge Multilevel Inventer	Dr. Maaspaliza binti Azri	FKE	SILVER
8	ORTHO-DRILL	Dr. Raja Izamshah bin Raja Abdullah	FKP	SILVER
9	Twin Spindle Milling Cutter Adapter for Machining Thin-Wall Aerospace Component	Dr. Raja Izamshah bin Raja Abdullah	FKP	SILVER
10	Smart Wudhu' Device	Dr. Mohd Shahir bin Kasim	FKP	SILVER
11	Shimless Shaft Misalignment Correction Device	Dr. Mohd Shahir bin Kasim	FKP	SILVER
12	NanoEcO-Door Multi-Scale Eco-Composite Automotive Door Panel	Dr. Jeefferie bin Abd Razak	FKP	SILVER
13	Sound Absorption Material Derived from Spent ea Leaves with Natural Rubber Binder	Prof. Dr. Qumrul Ahsan	FKP	SILVER
14	A Simple Thermal Harvesting Device for Low Power Applications	Dr. Norihan bt Abdul Hamid	FKEKK	SILVER
15	Hybrid 3D Printer	Ir. Dr. Mohd Rizal bin Alkahari	FKM	SILVER
16	E-MUET Corpus for Vocabulary Enhancement	Mashanum Osman	FTMK	SILVER
17	The Community-Based Smart Shopping Assistant App (iCust)	Dr. Siti Azirah binti Asmai	FTMK	SILVER
18	Web-based Dynamic Similarity Distance Tools	Dr. Mohd Sanusi bin Azmi	FTMK	SILVER
19	Smart Clothes Drying System	Syahrul Azwan bin Sundi @ Suandi	FTK	SILVER
20	Lead Free KNN Impact Induced Vibration Energy Harvester	Dr. Umar Al-Amani bin Azlan	FTK	SILVER

Congratulations to UTeM's researchers for the achievement and recognition. Hopefully, this achievement can ignite our research and innovation culture and uphold UTeM's name in the international arena.

MALAYSIA TECHNOLOGY EXPO (MTE 2017)

MALAYSIA TECHNOLOGY EXPO (MTE) is the biggest international exhibition organised annually in the area of science and technology in Malaysia. This Expo is fully recognised by MYRA. It is the best medium for the exploration of creativity, business matching and commercialisation of the research and inovation products for the local and global market. MTE is co-organised by the Malaysian Association of Research Scientist (MARS) and PROTEMP Exhibitions Sdn. Bhd. Malaysia Technology Expo (MTE). It also has the full support from the Malaysia Ministry of Education and The Ministry of International Trade and Industry (MITI). There were 500 research and innovation products from local and international participants exhibited their work in the 17th MTE 2017. Among the 42 categories exhibited are Aeronautical & Aerospace, Advance Material, Agricultural, Audio Visual Equipment, Bio-Diagnostics, Bio-Information, Biotechnology, Building & Construction, Computer Engineering, Computer Networking, Computer Science & Programming, Data Management & Storage, Environmental Health, Finance and Human Resource Solution, Fire Science, Food Science, Green Technology, Household Electronics, Information & Communication Technology (ICT) & Information Security, Information Technology, Medicine & Pharmaceutical, Office Appliances, Robotic Technology & Innovation, Supply Chain System & Technology, System & Software Integration, System Automation & Robotics, Technology Engineering and etc. UTeM has contested 12 products and won 1 Special Award, 3 Gold Awards, 2 Silver Awards and 6 Bronze Awards.

NO.	PRODUCT NAME	MAIN RESEARCHER	FACULTY	RESULT	SPECIAL AWARD
1.	Suci-Male Urinal System (S-MUS)	Assoc. Prof. Dr. Hambali bin Arep @ Ariff	FKP	GOLD	CHINESE INNOVATION & INVENTION SOCIETY (TAIWAN)
2.	Self-Powered Machinery Vibration Monitoring Via Internet-of-Things (IoT)	Assoc. Prof. Dr. Kok Swee Leong	FKEKK	GOLD	
3.	Voice-Assisted Wheelchair	Ahmad Fauzan bin Kadmin	FTK	GOLD	
4.	TestMereq2.0: A Total Package tool to Capture and Validate Requirements	Assoc. Prof. Dr. Massila Kamalrudin	FTMK	SILVER	
5.	Ultrasonic and Vacuum Assisted Fuse Deposition Modelling to Improve Parts Strength and Surface Finish	Dr. Shajahan bin Maidin	FKP	SILVER	
6.	New Design and Development of Ankle-Foot Rehabilitation Exerciser (AFRE) System Using Intelligent Pneumatic Actuator (IPA)	Dr. Khairuddin bin Osman	FKEKK	BRONZE	
7.	Low Cost Metal 3D Printing Machine	Ir. Dr. Mohd Rizal bin Alkahari	FKM	BRONZE	
8.	Multiple Entry e-Attendance	Safarudin Gazali Herawan	FKM	BRONZE	
9.	Assymetric HDPE/PANI And CNT Electrodes For Hybrid Pseudocapacitor	Prof. Dr. Qumrul Ahsan	FKP	BRONZE	
10.	NAKULA (Loose Fruits Collector)	Herdy Rusnandi	FTK	BRONZE	
11.	Aplikasi Tashih Mushaf Al-Quran (TasMuQ)	Dr. Mohd Sanusi bin Azmi	FTMK	BRONZE	
12.	Water Cooling Of Photovoltaic Panel	Ahmad Aizan bin Zulkefle	FKE	Merit Award	

It is hoped that the received achievement and recognition can ignite UTeM's research and innovation culture and uphold UTeM's name in the international arena.

Dual direction

blower system to reduce vehicle cabin temperature in idle state

Noor Saffreena Hamdan, Mohd Faiz Mohd Radzi, Amir Abdullah Muhammad Damanhuri
Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka

Malaysia's climate is categorised as an equatorial climate, which is being hot and humid throughout the year. El Nino phenomenon that hit Malaysia in 2016 is the worst in the history of Malaysia. The highest temperature on record is 39 °C at the northern state of Malaysia. When a car parked directly under a scorching sun during this type of season, the cabin inside the car will experience a greenhouse effect leading to higher car cabin temperature up to 70°C, which is not suitable for human being. Various problems will arise due to this high temperature, such as the vulnerability to heat stroke, the existence of benzene gas that can cause cancer due to the reaction of high temperature with the interior compartment, the damage of compartment and etc. The current solution available to reduce car cabin temperature includes making the window tinted and using some portable heat rejection devices available in the market. This project aims to suggest an alternative to reduce car cabin temperature. For this purpose we modify the vehicle's air conditioning blower motor into dual direction powered by solar energy and identify the variation of temperature inside a car when parked under a scorching sun. The normal automotive air conditioning blower motor rotates in a forward direction and the function is to blow the cooled air. However, using the polarity concept, the poles of wiring system for the blower is changed to allow the blower motor to rotate in reversed direction when a car is in a parking condition. It rotates normally when the car is in a drive mode. The blower with reversed direction acts as a vacuum to exhaust the hot air trapped inside the car cabin. The polarity change is applied on double pole double throw (DPDT) switch to allow the blower motor rotates in dual direction, which is forward and backward direction. The connection using DPDT switch is as shown in Figure 1 and Figure 2. The system is connected to a solar panel to prevent the usage of car battery during parking condition. This solar panel acts as a battery for the blower to rotate when a car is parked at an open area.

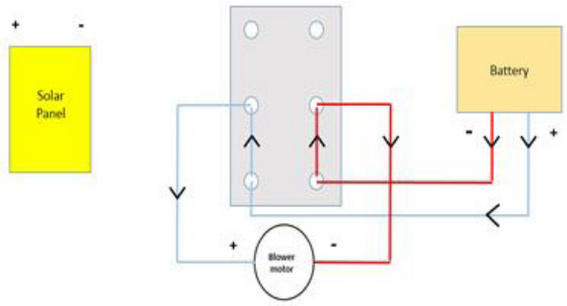


Figure 1: Forward direction circuit with DPDT switch

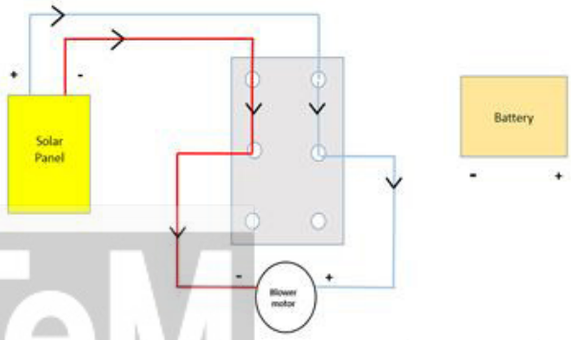


Figure 2: Backward direction circuit with DPDT switch

Figure 3: Connection modified blower with solar panel

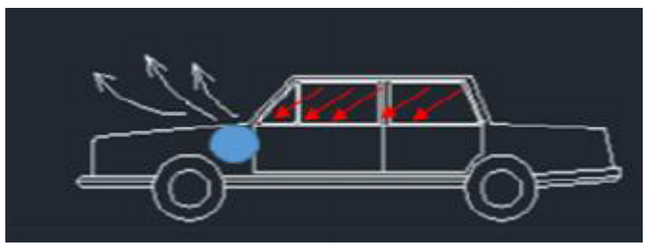


Figure 4: Reversed blower vacuum releases the hot air that trapped inside car cabin.

Multi Methods in Characterising Shear Deformation of Composite Material

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Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka

Mechanical properties, such as shear modulus, G_{12} and shear strength, τs that correspond to the shear behaviour of composite materials are essential for the characterisation and prediction of tool i.e. input in finite element modelling [1,2]. There are several ways of characterising deformation and extracting mechanical properties related to the shear of composite material, which include Iosipescu Testing and Off Axis Shear Testing [1,3].

Iosipescu Shear Test

A material coupon is in the form of a rectangular flat strip with symmetrical, centrally located v-notches and loaded in a mechanical testing machine by a special fixture as per ASTM 5379[1,4]. The specimen is inserted into the fixture with the notch located along the line of action of loading by means of an alignment tool with reference to the fixture. The two halves of the fixture are compressed by a testing machine. The relative displacement between the two fixture halves loads the notched specimen. By placing two strain gauge elements, oriented at ±45° to the loading axis. In the middle of the specimen (away from the notches) and along the loading axis, the shear response of the material is measured. The test is performed on a servo hydraulic with manual grips and a displacement rate of 0.5 mm/min. Load and strain data are taken up to a displacement of about 3.0 mm [2,4].

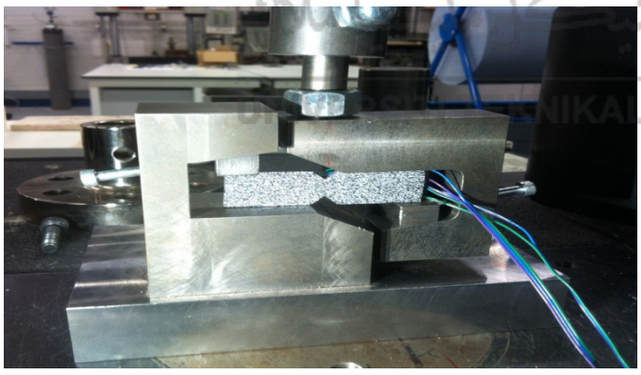

Figure 1: Isopescu shear testing rig as per ASTM D5379

Figure 2: Failed specimen after undergone shear test

To calculate the shear modulus or ultimate strain, the shear strain from the indicated normal strains at +45° and −45° at each required data point is determined.The shear strain is calculated from the strain gage reading by the relationship: $\gamma_i = |\varepsilon_{+45}| + |\varepsilon_{-45}|$

Shear strain ε_{xy} contour of Iosipescu specimen region is taken at the centre in between the notches (upper and lower). The area of shear loading is calculated as; $A = w \times h$, where the cross sectional area for the specimen, A, is in the units of mm2.

Shear Stress/Ultimate Strength- The ultimate strength is calculated and the shear stress at each required data point is determined using;

$$F^u = P^u / A$$
$$\tau_i = P_i / A$$

Off Axis Shear Test

In the off-axis tensile test, a rectangular orthotropic specimen with fibres is oriented at a certain angle, 10 degree with respect to the applied load and subjected to a tensile loading. The angle of the fibres to the longitudinal axis is measured as 10°[1,2]. The test is carried out using Universal Testing Machine with traditional manually tightening grips at a cross head speed of 2 mm/mm. ASTM D3039-76 standard recommends 0/90 composite tabs. Nevertheless, ±45° composites seem to be better because of their lower longitudinal stiffness [4].

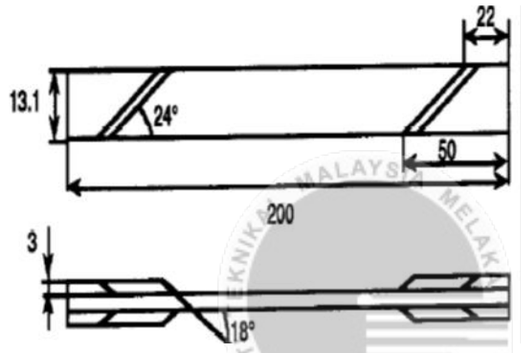

Figure 3: Oblique-tabbed specimens (dimensions in mm)

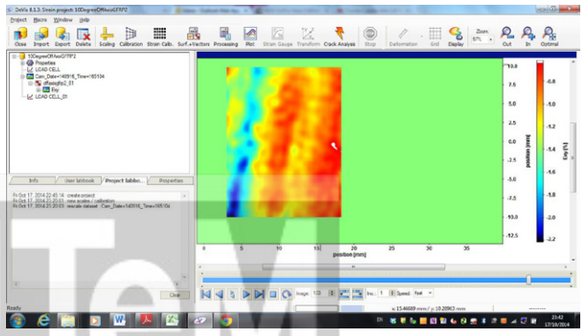

Figure 4: Shear strain contour of 10 degree off axis coupon using Digital Image Correlation Technique

Transformation of stress and strain into principal direction

The equation relating the ply intra laminar shear stress to the structural-axes stress in equation is presented below [1,2]: $\sigma_{12} = 0.171\sigma_{yy}$ resulted in;

$$2\varepsilon_{g3} = \varepsilon_{yy} + \varepsilon_{xx} - \varepsilon_{xy}$$
$$\varepsilon_{xy} = \varepsilon_{yy} + \varepsilon_{xx} - 2\varepsilon_{g3}$$
$$\varepsilon_{l12} = (\varepsilon_{xx} - \varepsilon_{yy})(0.342) + \varepsilon_{xy}(0.9396)$$
$$\varepsilon_{l12} = (\varepsilon_{g2} - \varepsilon_{g1})(0.342) + (0.9396)(\varepsilon_{g1} + \varepsilon_{g2} - 2\varepsilon_{g3})$$
$$\varepsilon_{l12} = 1.2816\varepsilon_{g2} + 0.5976\varepsilon_{g1} - 1.8792\varepsilon_{g3}$$

References

ASTM International, (2011). *Standard Test Method for Shear Properties of Composite Materials by the V-Notched Beam Method*. Annual Book of ASTM Standards, pp.1–13.

Christos C. Chamis and John H. Sinclair, 10° off axis tensile test for intralaminar shear characterization of fiber composite, Report No. NASA TND-8215, April 1976

Daiyan, H. et al., (2012). *Shear Testing of Polypropylene Materials Analysed by Digital Image Correlation and Numerical Simulations*. Experimental Mechanics, 52(9), pp.1355–1369.

Qin, L. et al., (2012). *Full-field analysis of shear test on 3D orthogonal woven C/C composites*. Composites Part A: Applied Science and Manufacturing, 43(2), pp.310–316.

THE RIP CURRENT & WHY IT IS SO DANGEROUS?

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A rip current is a specific kind of water current that can be found near beaches. It is a strong, localised, and rather narrow current of water. It is the strongest near the surface of water, and it moves directly away from the shore, cutting through the lines of breaking waves as shown in Figure 1. A rip current forms because the breaking waves push the water towards the land. Water that has been pushed up near the beach flows together (as feeder currents), and this water finds a place where it can flow back out to the sea. The water then flows out at a right angle to the beach in a tight current called the "neck" of the rip, where the flow is the most rapid. When the water in the rip current reaches outside of the lines of breaking waves, the flow loses its power, and dissipates in what is known as the "head" of the rip. Rip currents can be hazardous to people who are in the water as it may lead to drowning. Swimmers who are caught in a rip and who do not understand what is going on, may not have the necessary water skills, may panic, or may exhaust themselves by trying to swim directly against the flow of water. Rip currents can occur at any beach where there are breaking waves: on oceans, seas, and large lakes. The location of rip currents can be unpredictable. While some tend to reoccur in the same place, others can appear and disappear suddenly at various locations near the beach.

Rip currents are a potential source of danger for people who are in shallow water with breaking waves in seas, oceans and lakes. Rip currents typically flow at 0.5 metres per second (1–2 feet per second), but they can be as fast as 2.5 metres per second (8 feet per second), which is faster than any human can swim [1]. However, most rip currents are fairly narrow, and even the widest rip currents are not very wide; swimmers can easily exit the rip by swimming just a few strokes at a right angle to the flow, parallel to the beach. Swimmers who are unaware of this fact may exhaust themselves trying unsuccessfully to swim against the flow. In a rip current, death by drowning occurs when a person has limited water skills, or panics, or persists in trying to swim to the shore against a strong rip current, thus eventually becomes exhausted.

The following are some characteristics that a person can use to visually identify a rip before entering the water [2-3]:

- There is a noticeable break in the pattern of the waves: the water often looks flat where the rip is, in contrast to the lines of breaking waves on either side of the rip.
- The surface of the rip often looks foamy, because the water is churned up.
- Different colour: the rip usually differs in colour from the surrounding water; it is often cloudier or muddier, and so, depending on the angle of the sun, the rip may show as darker as or lighter than the surrounding water.
- It is sometimes possible to see the foam or floating debris on the surface of the rip is moving out, away from the shore. In contrast, in the areas of breaking waves, floating objects are being pushed towards the shore.

These characteristics are helpful in learning to recognise and understand the nature of rip currents so that a person can recognise the presence of rips before entering the water. Rip currents have a characteristic appearance, and this means that with practice, and using careful observation, lifeguards, beach goers, and water users can learn to notice and identify rips, thus water users can generally avoid them.

References

Rip Current Characteristics College of Earth, Ocean, and Environment, University of Delaware. Retrieved 16 January 2017.

Rip Currents Safety, US National Weather Service. Retrieved 16 January 2017.

National Oceanic and Atmospheric Administration, "NOAA Reminds Swimmers That Rip Currents Can Be a Threat", Rip Current Awareness Week, June 1–7, 2008, June 2, 2008.

Figure 1: The rip current

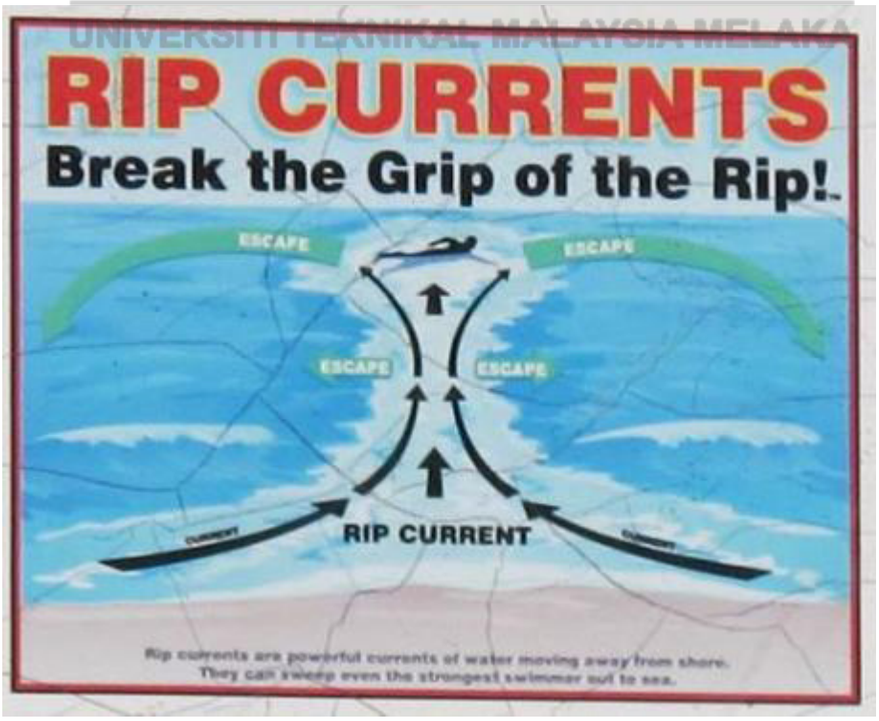

Figure 2: How to escape from rip current

What You Should Know About Industry 4.0?

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[c] Faculty of Manufacturing Engineering, Universiti Malaysia Pahang

The aims of this article is to introduce Industry 4.0 or the fourth industrial revolution. The term 'Industry 4.0' is from a project of the high technology strategy for German goverment, which promotes the computerisation of manufacturing [1]. The term was revived in 2011 and the working group was named as 'Industry 4.0' or also known as "smart factory". There are four pillars in the Industry 4.0, which includes Automation, Cyber-Physical Production Systems (CPPS) or Advanced Manufacturing, Cloud Computing and Internet of Things (IoT). Moving beyond its roots, Industry 4.0 and the Industrial Internet are meeting a global collaboration towards the digital transformation of manufacturing and other industries. Because of this, they also define Industry 4.0 as digital transformation of manufacturing, as shown in Figure 1.

Figure 1: Industry 4.0 – The digital Transformation

- Cyber security
- Augmented Reality
- Big Data
- Autonomous Robots
- Additive Manufacturing
- Simulation
- System Integration
- Cloud Computer
- Internet of Things (IoT)

Despite its visionary aspect, 'Industry 4.0' is a real phenomenon that is transforming manufacturing and other sectors into connected and digital manufacturing (and more) with additional benefits and a range of technological evolutions and possibilities to move beyond the sheer operation dimension towards the so-called fourth industrial revolution [2] [5]. Figure 2 shows the changes from the Industry 4.0 to the fourth Industrial Revolution.

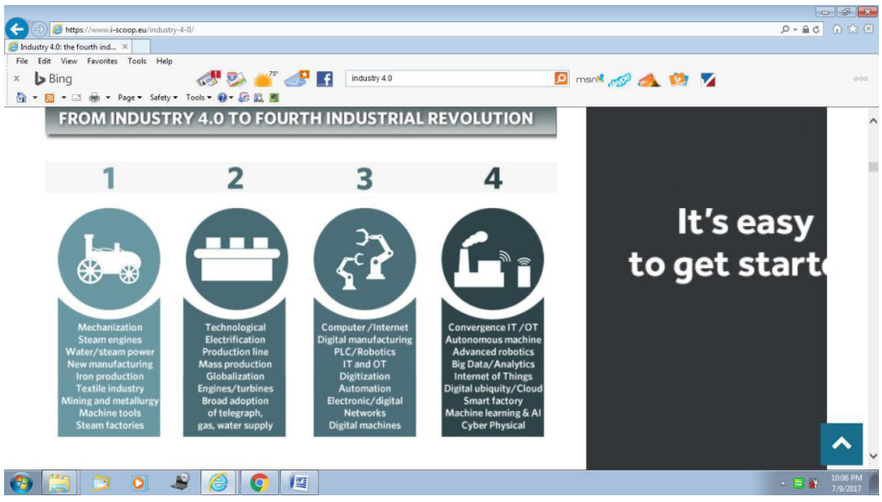


Figure 2: From Industry 4.0 to fourth Industrial Revolution.

The fourth industrial revolution is characterised as the movement from 'just' the Internet and the client-server model to ubiquitous mobility, the bridging of digital and physical environments *(in manufacturing, it is referred to as Cyber Physical Systems)*, the convergence of IT and OT, and all the previously mentioned technologies *(Internet of Things, Big Data, cloud, etc.)* with additional accelerators, such as the advanced robotics and AI/cognitive, which enable the Industry 4.0 with automation and optimization in entirely new ways that lead to ample opportunities to innovate and truly fully automate and bring the industry to the next level [5]. In Malaysia, The Ministry of International Trade and Industry (MITI) said the Industry 4.0 is critical to boost the industrial and economic growth and for Malaysia's economy to reach RM2 trillion target within the next eight years, as announced recently by Prime Minister of Malaysia. Now, manufacturers in Malaysia are encouraged to automate and embrace the fourth industrial revolution or industry 4.0 in an effort to transform Malaysia's manufacturing landscape by helping to reduce reliance on manual labour and keep the exports competitive. Together with the government, the private sector is expected to be the real engine of growth in the fourth industrial revolution [4]. Nevertheless, the greatest challenges are how Industry 4.0 facilitates and enhances:

i) productivity through optimisation and automation of the process for a better working conditions and sustainability, and
ii) quality of products: real-time monitoring, IoT-enabled quality improvement and robots.

Further, it involves the challenges to realise the ability of the tool and devices, machineries, sensors, and people to connect and communicate with each other via the Internet of Things (IoT) or the Internet of People (IoP)[3] [6] to:

- become a higher business continuity through advanced maintenance and monitoring possibilities;
- provide a real-time data for a real-time supply chain in a real-time economy;
- pursue personalisation and customisation for the 'new' consumer; and
- develop innovative capabilities and new revenue models.

Industry 4.0 also facilitates:

- Information transparency:

  The ability of information systems to create a virtual copy of the physical world by enriching digital plant models with sensor data. This requires the aggregation of raw sensor data to higher-value context information.

- Technical assistance:

  The capability of assistance systems to support humans by aggregating and visualizing information comprehensibly for making informed decisions and solving urgent problems on short notice. It also includes the ability of cyber physical systems to physically support humans by conducting a range of tasks that are unpleasant, too exhausting, or unsafe for their human co-workers.

- Decentralized decisions:

  The ability of cyber physical systems to make decisions on their own and to perform their tasks as autonomously as possible. Only in the case of exceptions, interferences, or conflicting goals, are tasks delegated to a higher level.

Lastly, Industry 4.0 provides a new era in business, science and technology. However, the changes are still the biggest challenges to the conventional manufacturing companies in Malaysia. It also contains numerous opportunities that are able to rapidly create new sources of growth and at the same time extinguish conventional ones.

References:

MBF-Internetredaktion(2016-01-21). "Zukunftsprojekt Industrie 4.0 - BMBF". Bmbf.de. Retrieved 2016-11-30.

Heiner Lasi, Hans-Georg Kemper, Peter Fettke, Thomas Feld, Michael Hoffmann: Industry 4.0. In: Business & Information Systems Engineering 4 (6), pp. 239-242.

Markus Liffler; Andreas Tschiesner (2013-01-06). "The Internet of Things and the future of manufacturing | McKinsey & Company". Mckinsey.com. Retrieved 2016-11-30.

Industrial Revolution 4.0 in Malaysia ?. Retrieved on 2017.7.15 from http://www.myforesight.my.

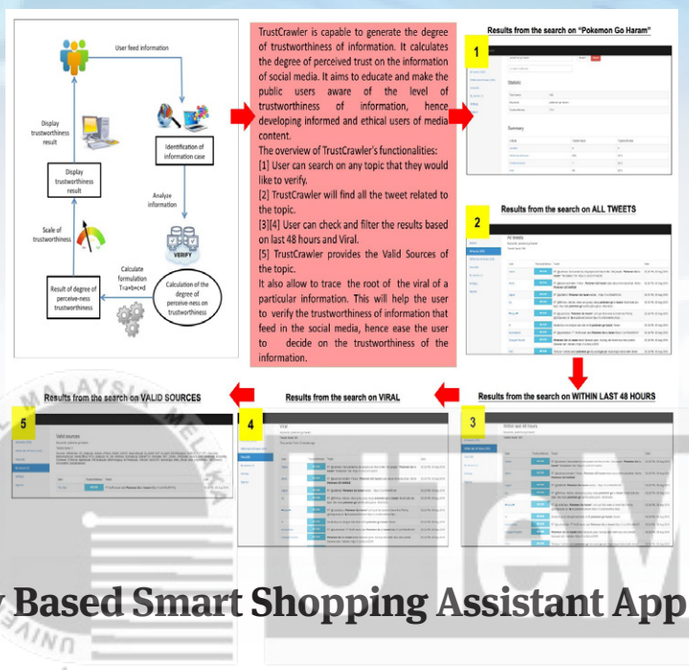
Industry 4.0: The fourth industrial revolution – guide to Industrie 4.0. Retrieved on 2017.7.10 from http://www. i- scoope.eu/ industry 4.0.

what-everyone-must-know-about-industry-4.0. Retrieved on 2017.7.10 from http://www.forbes.com/sites.

TRUSTCRAWLER: SAY NO TO UNRELIABLE INFORMATON!

Assoc.Prof.Dr Massila Kamalrudin and Assoc. Prof. Dr Safiah Sidek

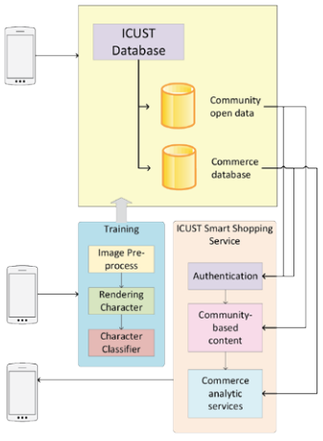
Given the fluidity and excessive information available online, issues relating to the trustworthiness of information have become a concern among the users and authorities. Therefore, there is a need to develop a mechanism that helps users to verify the trustworthiness of information that feeds in the social media so that they can decide whether to trust or to ignore the information. TrustCrawler is capable in generating the degree of trustworthiness of information as well as identifying the trait of viral information. In this respect, TrustCrawler aims to educate and make public users aware of the level of trustworthiness of information, hence developing informed and ethical users of media content.



The Community Based Smart Shopping Assistant App-iCUST

Dr. Siti Azirah Asmai

The increasing living expenses with unstable household income make every single cent matters, and a proper plan to spend wisely is needed. The Smart Shopping Assistant App aims to help users to choose the shopping mall located within the surrounding area of the user that offers the product to be purchased at the cheapest price. Using crowdsourcing data, the system provides information related to the price of the product that the customer intends to purchase at several shopping malls based on the distance of the shopping mall from the location of the customer. This system can assist users to make the right decision to purchase the cheapest and the nearest available product. By using this app, users can reduce their daily expenditure and save their time going to the nearest shopping mall. This app applies an Image Processing technique, which is OCR for detecting the price of consumers products and fast data acquisition.



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