IEEE INDONESIA SECTION

No. 08 | December 2017

Newsletter

We welcome all the readers for the 8th edition of our newsletter. This newsletter is from us to us and hopefully it is useful for all Indonesian IEEE members. We hope that the article can inspire you and the changes also the additions that are made in the newsletters will be liked by all of you.

Welcome!

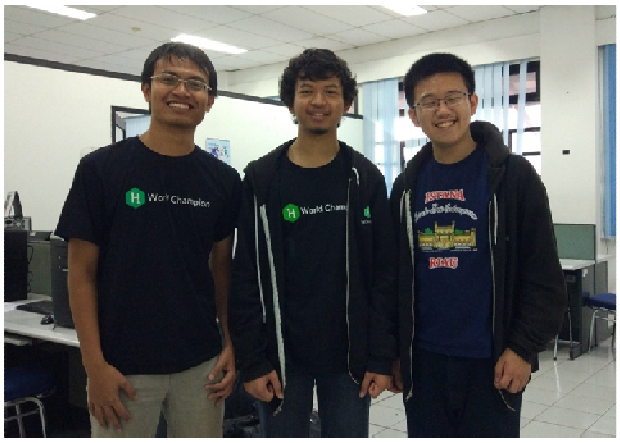
Activities

IEEE SB ITB
A Team Called Ainge ST Got 4th Place in IEEExtreme 11.0

ITB got 4th place in IEEEXtreme 11.0. IEEEXtreme is an international 24-Hour programming competition held by IEEE. With a team consisted of 3 people, they beat more than 3000 teams from around the world. Making Indonesia the top country from South East Asia and the second from IEEE Region 10.

IEEEXtreme 11.0 was held on October 14th, 2017. The participants are strictly IEEE Student members, but it did not make it any smaller. The total participant is 8311 students, divided into 3358 teams from 662 schools out of 70 countries. This is the eleventh year IEEEXtreme held and has been grown much bigger from the first IEEEXtreme.

In IEEEXtreme, the participants are given a set of problem with different difficulty levels, easy, moderate, difficult, advanced, and extreme. What unique about this competition arethe participants can compete from anywhere because the submission is done online and it's a non-stop programming competition for 24 hours. For 24 hours straight, the participants are solving programming problems, takes a lot of endurance. Determination, strategies, team works, and time management are the key into winning IEEEXtreme.



Luqman A. Siswanto, Wiwit Rifa'I, and Alfonsus Raditya Arsadjaja

ITB sent out five teams, FortunaRedux, GaJadiAda, AingeST, FilosofiKoding, and JauharNFriend. Consisted of Computer Science/Informatics students and one Electrical Engineering Student. Each team did their best and as the result one team, AingeST were in the top ten and ranked 4th on the leaderboard. AingeST consisted of Luqman A. Siswanto, Wiwit Rifa'i, and Alfonsus Raditya Arsadjaja, all from Computer Science/Informatics. Such a splendid effort and a great result, big applause for all teams from ITB.

Official Website

http://ieee.id

IEEE Indonesia Section

Activities

IEEE Indonesia Young Professionals Meet-up

IEEE Indonesia Young Professionals presents "Tutorial on IoT" and "Panel Discussion on Industry 4.0: Challenges and Opportunities for Youth Employment" This event is held inline with "The 20th International Symposium on Wireless Personal Multimedia Communications" Royal Ambarrukmo Hotel, Yogyakarta, Indonesia on **Dec 17, 2017.**

Speakers:

- Satriyo Dharmanto
  Founder & CEO, Multikom Indonesia
- Ery Punta Hendraswara
  Managing Director, Telkom Indigo
- Endra Joelianto, PhD
  Chapter Coordinator, IEEE Indonesia Section

Session I: 13.00-15.00 || Tutorial on IoT

"A Brief Update on IoT Implementation in Indonesia, Technology, Regulation and Business Perspectives"

In this session there will be a comprehensive sharing and discussion about a brief update on IoT implementation, especially in Indonesia cases, from the perspective of Technology development, Regulation issues and Business model, as well as identifying opportunities accordingly.

Session II: 15.30-17.30 || Panel Discussion on Industry 4.0

"Industry 4.0: Challenges and Opportunities for Youth Employment"

This panel will discuss about industrial transformation associated with the economical aim and opportunity to make differences in global competitiveness. Youth would know about the next generation of industry and what needs to be prepared. Also, how wireless telecommunication gets in to the value-chain of industry 4.0 and how equipment, sensors, people, and applications will be interacted will be elucidated.

Activities

IEEE Indonesia Section marked the end of 2017 with TISP Workshop

IEEE offers a wide range of learning and career enhancement opportunities within the engineering sciences, research, and other technology areas. The goal of these programs is to ensure the growth of skill and knowledge among professionals and to foster individual commitment to continuing education among IEEE members, the engineering and scientific community, and the general public.

The Teacher In-Service Program (TISP) provides a forum for IEEE volunteers to demonstrate the application of science, technology, engineering and math (STEM) concepts by sharing their real-world experiences with local pre-university educators.

IEEE offers training workshops for its volunteers on how to provide in-service programs to local pre-university educators. TISP functions essentially as a professional development workshop aimed at helping teachers bring exciting hands-on engineering lessons into their classrooms. Once trained, IEEE volunteers can connect with pre-university schools in their local communities to deliver the hands-on program

The program's goals are to:

- Empower IEEE volunteers to collaborate with their local pre-university community
- Promote applied inquiry-based learning
- Enhance the level of technical literacy of pre-university educators
- Encourage pre-university students to pursue technical careers, including engineering
- Increase the general level of technical literacy of pre-university students throughout their educational careers.

Through TISP, IEEE volunteers help support engineering education and the development of future engineering students by:

- Increasing the level of technological literacy in local school districts
- Contributing to the establishment of pre-engineering programs
- Facilitating enhancements in school science and technology curricula
- Developing collaborative relationships with educators
- Exposing more female and minority students to technology-related professions.

Only three out of ten of most chosen study programs on university entrance examination in Indonesia are STEM-rooted study programs namely Medicine, Information Technology, and Civil Engineering (Tempo, April 2017). Based on that fact, IEEE Indonesia Section held TISP Volunteer Training Workshop on Saturday, **December 23rd, 2017** in Jakarta, Indonesia. The event took place at Faculty of Informatics and Communication Technology, National University with 22 participants attending the workshop including IEEE members and pre-university teachers. The workshop was sponsored by IEEE Indonesia Section, Faculty of Informatics and Communication Technology National University, IEEE Education Society Indonesia Chapter and ITB Alumnae Association-Chevron.

TISP workshop was started with opening remarks

by IEEE Indonesia Section Chair, Prof. Dr. Fitri Yuli Zulkifli, S.T., M.Sc., IPM., continued with IEEE's Pre-University Programs and TISP overview by Sohaib Qamar Sheikh, Chair, IEEE Pre-University Education Coordinating Committee (PECC). The main part of the workshop was led by Mr. Sheiks as well. The participants were divided into groups of two people and each group designed and builds a working windmill out of everyday products and learn about anemometer and site testing. The windmills must be able to sustain the wind generated by a hairdryer at medium speed at 30 cm away and rotate, lifting a small object upward. The workshop was ended by evaluation of the effectiveness of the windmills and reflection of what the participants learned by doing such hands-on and exciting activity.

There will be more in 2018 including Bandung, Pekanbaru and Balikpapan. The TISP workshops are plan to be held in major cities of Indonesia

Activities

Distinguished Lecture Program (DLP) of IEEE IS in STIKOM BALI: "File Compression to support IoT in Industry 4.0"

IEEE Indonesia is growing quite nice, as of Dec 2017, it has about 1772 members and 23 Student branches. One of the IEEE Indonesia Section (IEEE IS) programs in 2017 is Distinguished Lecture Program (DLP), a general lecture program with a full professor who is also an IEEE Senior Member (SM) as the resource person. The aim of this program is to share knowledge and to promote the IEEE across Indonesia.

Currently, the program is held to reach the vast Indonesian area and is directed primarily to the regions of Indonesia as one of the equalization efforts of knowledge that IEEE IS can do for the Indonesian community. On this program, the resource person will share their research works to the public audience and a presentation to promote the IEEE especially IEEE IS.

On 29 December 2017, the DLP-IEEE was hosted in STIKOM Bali with Prof. Dr. Teddy Mantoro, SMIEEE as the resource person to share his research works. STIKOM Bali was selected because the campus is in Bali, as this is a tourist destination and also, currently STIKOM Bali is one of the best Higher Education (Sekolah Tinggi) in computer science area. STIKOM Bali was established in 2002, currently has a total number of students around 6000 and has around 4000 alumnae. STIKOM Bali has 3 study programs, i.e.: Computer Systems (BSc/S1), Information Management (BSc/S1) and Information Systems (3 years diploma/D3). All study programs have B accreditation.

The IEEE promotion was delivered by starting with the introduction on IEEE, which has already in the field for more than 130 years (since 1884) and 423,000+ members, 39 Technical societies in 160 countries in the world. IEEE has about 1800 annual conferences and has collected about 3,500,000+ technical documents. IEEE has 10 re-

gions and region 10 is the region of Asia and Pasific, which IEEE IS is resided. The affinity in the technical group are as the following: a. Consultants Network, b. Life Members, Women in Engineering, and Young Professionals.

During the IEEE promotion, the member benefits of IEEE were also explained, i.e. Keeping technically current, Career resources and recognition, Professional networking, Continuing education, Discounts, Humanitarian programs, Global benefits finder. Each lecturers can use their IEEE memberships for a grade point for community service, for the campus level (university), it can also be used to increase the port-folio of the campus for assessment from BAN (National Accreditation Body). It is also possible for a higher education to running a seminar/ conference where the papers can be indexed by Scopus. It is also possible to apply for member elevation, to contribute in national level or even in the international level.

The aim of IEEE IS's activities are including, a. enhancing national visibility of IEEE Indonesia Section and distinguished lecture program from Indonesia to Indonesia. One of the interesting activities is IEEE conference which include:

- Hold a Workshop Conference Management (at least twice a year)
- Collaborate with Higher education to assist their conferences will be in IEEEXplore
- Guide the conference organizers so that their conferences reach the IEEE standard (standard and ethic)
- Bringing IEEE International conference from overseas to Indonesia (such as TENCON etc.)

The second agenda of the DLP is delivering the lecture on "File Compression to support IoT in Industry 4.0". Prof. Mantoro discussed that textual, image and video information has grown tremendously generated from mobile user to digital libraries and archival text, image and video data from many internet sources. Many programs for data compression have been developed. However, mostly are only efficient to compress small files, but inefficient, not even applicable, for compressing very large files, especially on mobile devices. This is because the algorithm is too heavy to process and the design specification is to read small files that are repeated.

In addition, large file sizes when transferred will require longer transfer times, larger space and higher costs, as file transfer rates are affected by internet network speed and file size.

Prof. Mantoro explained how the file compression can be considered as a possible best approach in reducing storage space efficiently and accelerate transmission speed in intelligence environment which implement Internet of Things (IoT), such as multi-users 3D visualization and navigation in small mobile application devices, in Industry revolusion 4.0, especially in the area of human-machine ineraction such as touch interface and augmented reality application.

During the DLP, more than 40 people attended, most of them are lecturers, which actively participate in the DLP and only 7 of them have become IEEE members.

In the end of the DLP, some of the participants were interested to dig more on text and image compression and on how to become a member of IEEE and the benefits for them. Some of them asked if their papers will have better chances to be accepted by a journal or a conference if they were IEEE member.

Science

Image Processing in Agriculture

Iwan Setyawan
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Abstract
Image processing has been implemented in various applications. Once the domain of the ultra high-tech, image processing applications are now entering the consumer electronics market. Applications ranging from telecommunication to entertainment are now commonly found in smartphones, for example. Agricultural research and production are also moving towards "smart farming", including the use of image processing. This short article discuss some image processing applications used in agriculture. This is still an active research area in which much work still has to be done.

Introduction
Agriculture is currently still the main method by which we can feed the world. Until the day when Star Trek's food replicators are perfected and made common enough in the home, humans still need to cultivate crops to get food. Cultivating crops means dealing with various issues. One of the main issues is how to maintain a healthy crop by applying the correct amount and type of fertilizers. Another issue is how to identify the type and number of pests in order to apply the correct amount of pesticides. Estimation of yield is also an important issue particularly for large scale farming.

Addressing the previous issues in the traditional way usually means either extensive labor, extensive expertise, or both. Take, for example, the process of weeding a field of vegetable crops. In order to be able to perform this task, we will need a lot of people to cover the field. The larger the field, the more people are needed. Of course, we cannot simply let anybody do the job. If the laborer is not skilled enough, he or she might mistakenly take out a crop plant that we want to protect. Another example is in determining the Nitrogen intake of a plant based on the color of its leaves. While there exists guidances (in the form of printed leaf pictures) we still need to have someone with enough expertise and experience to be able to accurately classify the colors.

While the need for agricultural products is increasing, the same cannot be said about the number of skilled people working in farms. Labor-intensive work is also increasingly expensive, particularly in developed countries. It is therefore preferable to introduce automation into agriculture, sometimes referred to as "smart farming". Image processing can play an important role here, since a lot of farming tasks (e.g., recognition of weed plants) are essentially visual. In the following, we will discuss some of the existing applications of image processing in agriculture.

Image Processing in Agriculture
One of the applications of image processing in agriculture is in the use of drones. The use of drones, instead of a manned aerial vehicle, is much cheaper and safer. An example of the use of drones in agriculture is in performing yield estimation [1]. In this application, a drone is equipped with multi-spectral cameras (for example, a visible-light RGB camera and a Near Infra Red camera). The drone flies above the field and takes pictures using the onboard cameras. The multi-spectral images can then be analyzed to separate the flowers in the trees from the background. By counting the density of pixels classified as "flowers" in the captured images, the farmer can then estimate yield (i.e., flowers that will later develop into fruits).

When talking about automation, one usually comes to the conclusion that robots are being used. Robots are indeed being introduced into modern farming, and image processing (or machine vision) can also play an important role. One example is in robot navigation. It should be obvious that when one deploys a robot in the field, it is desirable to have the robot able to navigate properly, i.e. not moving

such that it will destroy the crop. While GPS is closely related to navigation, using GPS to solve this problem might not yield the best result due to the relatively low spatial resolution of GPS. Here, it is much more desirable to have a robot that can "see" its way around. For fields in which rows of plants are separated by soil pathways, a simple image processing application using cross-correlation can be used to trace a track along these paths [2]. A relatively cheap camera can be attached to the robot and by computing cross-correlation between rows of picture captured by the camera and a sample data of the pathway a track can be computed for the robot to follow. The cross-correlation computation can be restricted to only the middle part of the captured image since the robot is not expected to follow an extremely tight curve (see Fig. 1).

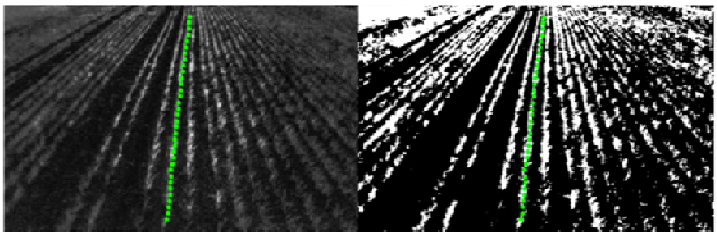

Figure 1. Tracing a path through the field [2]

Another example of the use of robot is to perform automated weeding. Weeding a large field of crop is labor-intensive and the labor condition is unpleasant. A weeding robot will need a more sophisticated camera setup since it will be required to be able to differentiate between a weed plant and a crop plant. One way to do this is by simultaneously using laser and multi-spectral camera [3]. Plants (weed and crop) are separated from the soil by analyzing the captured multi-spectral image. The laser is used to scan lines perpendicular to the robot's direction of movement. The different characteristics of crop leaves and weed leaves will give a different "flicker" characteristics of the reflected laser lines. These differences can also be captured by the camera and then used to differentiate between weed and crop. Identified weed will then be destroyed. The concept for this automatic weeding robot is presented in Figure 2.

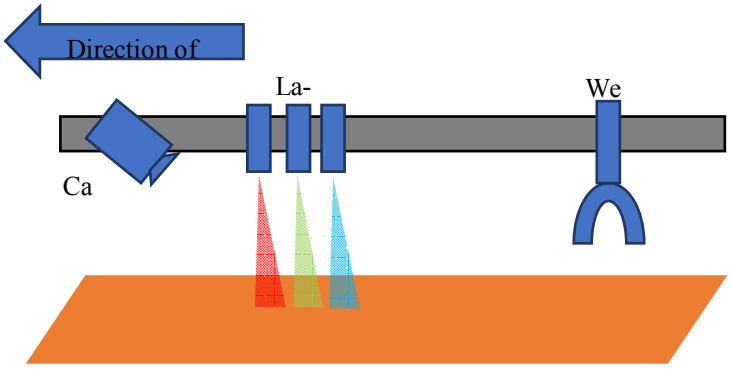

Figure 2. Automatic weeding robot concept [3]

The proliferation of mobile devices (smartphones, tablets) is very high. It can be assumed that a farmer, even in developing countries, owns a mobile device. These mobile devices have enough computing power to run simple image processing applications that is useful in farming. For example, a mobile app can be written to take pictures of leaves and compare the color of the leaves to a predetermined reference colors [4]. These comparison can show whether the plants are getting enough supply of Nitrogen, and advise the farmer how much fertilizer (if any) is needed.

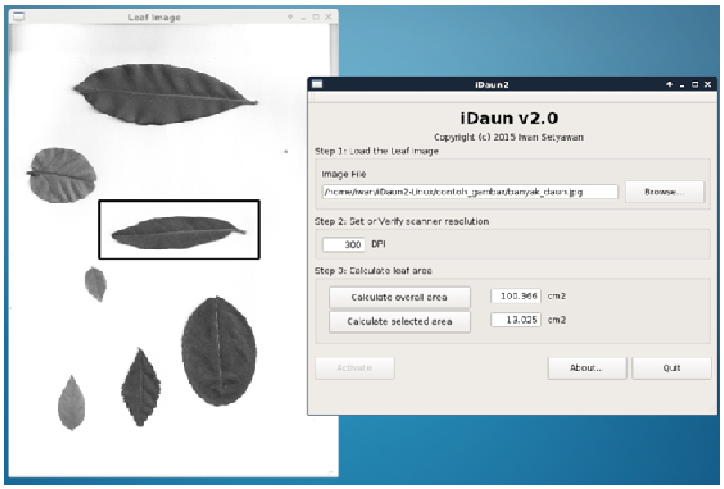

Figure 3. iDaun, a simple app to measure leaf area

Even a simple image processing app for the PC is useful in increasing the efficiency of agricultural research. For example, the area of a plant's leaves is a useful indicator of its health and growth. Manual measurement of the leaf area requires a lot of time and skill, and is prone to errors. The author, upon request by the Faculty of Agriculture in Satya Wacana, has developed a simple app to measure leaf area using a PC (see Figure 3). Leaves are scanned and the user

can then compute the area easily with high accuracy. This app is available for Windows, Linux and mac OS. This app is still being actively developed. For example, by using pattern recognition, it is possible to improve the app to not only measure leaf area but also to recognize known leaf diseases. Finally, since the app does not need a lot of computing power, a version for mobile devices is also being considered (although accuracy will be much more of an issue).

Conclusion

Image processing in agriculture has a promising prospect. This technology can help in implementing automation in agriculture which in turn can help increase efficiency and productivity. This is also a challenging field of research, since currently there are still cases in which the performance of the image processing-based systems, while already satisfactory, is still below the performance of a human expert. It is therefore safe to say that there are still a lot of research opportunities in this field.

References

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2. V. Dworak, et. al., "Precise Navigation of Small Agricultural Robots in Sensitive Areas with a Smart Plant Camera", Journal of Imaging, Vol. 1, No. 1, 2015
3. W. Strothmann, et.al, "Plant classification with In-Field -Labeling for crop/weed discrimination using spectral features and 3D surface features from a multi-wavelength laser line profile system", Computers and Electronics in Agriculture 134 (2017), pp 79 – 93, 2017
4. K. R. Prilianti, et. al., "Automatic leaf color level determination for need-based fertilizer using fuzzy logic on mobile application: A model for soybean leaves", Proc. 6th Int. Conf. Information Technology and Electrical Engineering (ICITEE 2014), pp. 1-6, 2014

Conference

Conference on Broadband Communications, Wireless Sensors, and Powering

BCWSP 2017

21-23 November 2017
at Universitas Mercu Buana, Jakarta.

The advances of broadband communication in the last twenty five years result not only in coverage of the services but especially in the variety and the amount of the transmitted data in time unit. The increasing capacity of the wireless communications has opened new technological applications, which have eminent impact to economics, such as e-commerce, and to social networking, which in turn cause several considerable implications globally. The Internet of Things becomes viral. The sensor technologies together with secure and reliable connections, especially wireless connections, make many daily activities more efficient or even possible.

It was the aim of the BCWSP 2017, to bring academic scientists, research scholars and practitioners to exchange and share their experiences and research results on all

aspects of Broadband Communications, Wireless Sensors, and Powering. It also provided a premier interdisciplinary platform for researchers, educators and practitioners to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in these fields.

The conference was opened by the Minister of Communication and Informatics, Mr. Rudiantara, the vice rector of UMB, Dr. Purwanto SK, and President of IEEE Indonesia Section Prof. Dr. Fitri Yuli Zulkifli. BCWSP 2017 is proud to have four distinguished keynote speakers, Prof. Thomas Eibert from Technical University of Munich Germany, he talked about flexible antenna measurements and field transformations in arbitrary environments, whereas Prof. Arokiaswami Alphones from Nanyang Technological University Singapore gave a talk on Technologies in Wireless Power Transfer. Prof. Yifan Chen from Waikato University New Zeeland presented his research on biologically inspired ICT and ICT inspired biomedicine. The fourth keynote speaker, Dr. Wahju Sediono from International Islamic University Malaysia, talked on FMCW radars.

IEEE
INDONESIA SECTION

Editor Corner

The 8th edition of the IEEE Indonesia Section 2017 newsletter includes activities which have been conducted in November and December 2017. We have many articles and information that is interesting. Hope you enjoy this newsletter edition!

Happy reading!
Casi Setianingsih & Hugeng,
Editor - IEEE Indonesia Newsletter

Official Website

http://ieee.id

IEEE Indonesia Section

We are waiting for the participation of Chapters and Student Branch in Indonesia to share the information of completed and ongoing activities and the participation of Chapters in Indonesia to share the regarding technical articles. For members IEEE who want to share information and articles please email to :

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