ICCE Showcase Student Reports

Each of the following three prize-winning students was asked to provide a trip report about his or her journey to the ICCE Showcase. These provide different and interesting insights to the ICCE 2014 conference, the Consumer Electronics Show (CES), and Las Vegas itself.

Read on to view ICCE 2014 through the eyes of the younger generation.

RANA HESHAM AND ABDELMONEM AHMED: OUR ICCE/CES 2014 EXPERIENCE

On a normal Monday morning, as I was checking my e-mail in my office, I found an e-mail from Dr. Narisa Chu of the United States. In the e-mail was an invitation to attend the International Conference for CE (ICCE) in Las Vegas. Two months before receiving that e-mail, my team and I received the Best Paper Award for a paper we submitted in ICCE-Berlin. As I learned later, ICCE conferences are held in many big cities across the globe, including Berlin, Taipei, Tokyo, and Shenzhen, and the oldest and the biggest of them is held in Las Vegas. After going through the paperwork needed for the U.S. Visa application, I finally booked my airline tickets and boarded a plane heading to the place where the biggest CES is held every year in a city nicknamed "Sin City," which is not too far from the Grand Canyon, one of the seven wonders of the world. So, it was a trip full of excitements, in my humble opinion.

It was my first time flying to the United States. I am originally from Egypt, but I have been living in Germany for about four and a half years. I earned my master's degree in electrical engineering from the University of Stuttgart, where I am continuing to pursue my Ph.D. degree at the Institute of Telecommunications.

ARRIVING IN LAS VEGAS

On the first day of the conference, I finally met Dr. Chu in person, along with the other award winners from ICCE-Taiwan 2013 and ICCE 2013, Dini Nuzulia Rahmah and Donghun (Dave) Kim, respectively. After an interesting keynote by the former mayor of Las Vegas, Oscar Goodman, the grand ICCE sessions started.

Our research team at the University of Stuttgart, in cooperation with the R&D Labs of Sony Stuttgart, focuses on designing receiver algorithms for mobile broadcasting systems. Since the theme of the conference was next-generation mobility, I found the keynote speeches and the invited sessions to be very interesting (relevant to my Ph.D. research interest). Being delivered by high-powered representatives of the CE sector, I found the talks to be very useful and stimulating.

Although some were outside my field of research, I found them to be very informative, even as a CE user. For example, the very first keynote speech delivered by Gildas Sorin, CEO of Novaled, was about the next-generation displays, namely, the organic light-emitting diode (OLED) technology, a product I had seen for the first time in IFA-Berlin 2013. Sorin demonstrated the magnitude of the applications this technology can allow once it becomes mature and affordable for the user. The flexibility of this technology can greatly enhance the user experience. Sorin also outlined the challenges faced when developing these products, not forgetting to send an optimistic tone that, like many other technologies, such hurdles can always be overcome by engineers.

SOME TALKS I LIKED

Similar to Germany, where a growing interest is observed in the field of renewable energy, such topics were also popular on ICCE's keynotes, presentations, and posters. Security concerns were presented, and recommendations for better control and secure implementations of smart grids were proposed.

Another very interesting keynote I was glad to attend was that of Dr. Johannes Clauss, from the technical University of Munich, titled "Mobile Devices for Better Health." It was very interesting to learn how the tremendous development in the CE sector can also be extended to enhance the health-care system. Dr. Clauss presented many possible opportunities, many of which already exist in products in the market, where patients can make use of CE products to monitor and report their health to a doctor. As Dr. Clauss mentioned, this can significantly enhance the efficiency of the health-care system for the elderly, especially with the average age of human life increasing in Europe, the United States, and across the world. Dr. Clauss also pointed out the special challenges found when developing new products in the medical field, where a product has to go through many verification tests before finding its way to the market.

Throughout the conference, I enjoyed listening to many presentations delivered by research students from all over the world. It was very rewarding to learn about the similar research questions shared by fellow researchers in many international universities and industry sectors and to get a chance to meet them in person. In my opinion, one of the strong aspects I found in this conference

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FIGURE 1. A smartwatch with a design suitable for a feminine taste.

FIGURE 2. Different options for smartwatches offered by the company Burg.

was the networking link it can provide an attendee to researchers from academia and industry representatives from different countries.

SPECIAL WORKSHOPS AT ICCE

In addition, the conference program also included two very interesting workshops. The first was "How to Get Your Research Published," chaired by Dr. Peter Corcoran, the editor-in-chief of *IEEE Consumer Electronics Magazine*. In the first part of the session, Dr. Corcoran gave a presentation that included some tips on how to survive the review process. The second part of the session was a Q&A, where, at the beginning, a list of frequently asked questions were mentioned and answered by three professors on three different continents, Dr. Nasser Kehtarnavaz from the University of Texas at Dallas, Dr. Johan Lukien from TUE Netherlands, and Dr. Weng-Chung Kao from National Taiwan Normal University. It was very interesting to learn how different universities manage their research styles differently. It was also very informative to learn more about the viewpoints of the professors, their expectations, and the different ways research is funded. I learned that this was the first time that such a session had been arranged in the ICCE, but I found it to be very well moderated and informative. At the end, the audience was also allowed to come forward with their own questions.

The second workshop was the Graduates of the Last Decade (now known as IEEE Young Professionals) event—this time, it was also a celebration of the 20th anniversary of IEEE Women in Engineering. The workshop, "Plan for a Successful Career," was presented by Joseph Decuir. Decuir enjoyed a very interesting career path himself, and he shared some of its highlights with us. The presentation provided guidelines on how a young researcher can plan his or her career in the fast-developing field of information technology. The theme of the course fit very well to many attendants of the conference, where many, including myself, are master's or Ph.D. students faced by the eternal question of "What's next?" The presentation provided some key elements that an engineer should always keep in mind to guarantee a successful career path. Overall, I found these two workshops very rewarding, and I recommend them to anyone attending this conference.

THE CES AND IFA TRADE SHOWS

A unique aspect of the ICCE is that it runs in the same venue as the annual CES, which is held in Las Vegas, thus giving the attendants a chance to attend the world's largest CES. Three months before my visit to the ICCE, I also attended the CES in Berlin, IFA–Berlin 2013, which also ran in parallel to ICCE-Berlin. While I invested more time going through IFA-Berlin, about a day and a half, I only had about a 2-h, rapid tour of CES, which obviously was not enough. Nevertheless, I managed to notice very interesting similarities between the two shows and, more interestingly, a very fast evolution of many products in the span of fewer than four months, which is just evidence to the extremely fast development pace governing this field. For example, while I could see only one or two companies in the IFA presenting smartwatches, there were numerous companies in the ICCE in Las Vegas showing this new product in all shapes, colors, and different ways to customize them to users' preferences (Figures 1 and 2).

A huge emphasis was placed on how to make everything better interconnected to each other and easily controllable by a smartphone, also called "the Internet of Things (IoT)." For example, there is a smart toothbrush that can record statistics on how often one is brushing his or her teeth, determines whether there are considerable health threats, and sounds an alarm to the user when needed. It can also possibly notify a mother regarding the health of her children.

In addition, many of the products shown were designed to enhance the experience of the smartphone user. As someone who owns a smartphone, I found it to be very useful. For example, there was a demonstration of a special coating for smartphones to make them water resistant. Another company demonstrated a special display that makes a smartphone shock resistant. Finally, from the products I could see, the biggest hurdle of smartphones is the battery issue. There were companies proposing products allowing for flexible charging using the technology of wireless power transfer (Figures 3–4).

One of my favorite demonstrations was that of Parrot AR.Drone 2.0, where four drones were dancing to the masterpiece of Domencio Modugno's "Volare" (Figure 5).

Similar to the smartwatches example, I found many more companies in the

FIGURE 3. Wireless charging technology from power7technology.

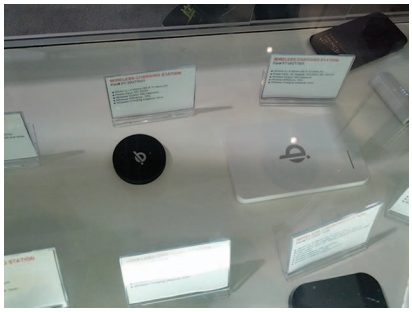

FIGURE 4. A wireless charging station.

FIGURE 5. Four drones dancing to the masterpiece of Domencio Modugno's "Volare."

CES showing their 3-D printers than in IFA 2013. Three-dimensional printing happens to be a very interesting technology that lends itself to many applications (Figure 6).

The same goes for companies advertising their smart home technology, a direction that was also present at IFA-2013. The demonstrations included a smart doorbell that can recognize guests once they sign in using their smartphones, thermostats that can provide feedback to the user about the temperature inside the house and control it, and even a smart bulb that can be controlled from an application.

One thing that IFA and CES definitely shared is the glamorous booths set up by companies such as Sony, Samsung, and LG. Each had its own unique way of attracting the attention of the visitors through their special shows. Either

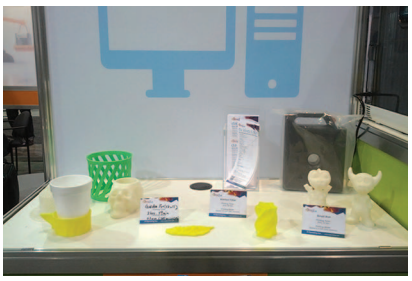

FIGURE 6. Different products of 3-D printing.

FIGURE 7. Rana Ahmed along with the Galaxy 11 football team taken in Samsung's booth.

through displaying how the new Xperia Z1S can be used to control a PS4 or by having a photo taken with the Galaxy 11 football team (Figure 7) in Samsung's booth set to save planet Earth, there was a wide range of shared products among the three companies, such as the 4K and the OLED TV.

CONCLUDING THOUGHTS—LEAVING LAS VEGAS

On the last day of the conference was the special session chaired by Dr. Chu in which Donghun (Dave) Kim, Dini Nuzulia Rahmah, and I gave our presentations. It was clear that we three came from different research backgrounds; however, it was very informative for me to listen to well-delivered state-of-the-art research material in the different fields of human–machine interactive and image processing.

In addition to the very useful personal and professional experience I managed to receive from the ICCE/CES in Las Vegas, I took two extra days after the conference to explore the city. I also managed to use one day to visit the Grand Canyon. It was about a 5-h drive from Las Vegas, but it was definitely worth it.

In the end, I have to say that I owe a debt of gratitude to Ben Eitel from Sony Stuttgart for his great support and work, which enabled us to get the Best Paper award in ICCE-Berlin. I want to warmly thank the IEEE Consumer Electronics (CE) Society for the kind invitation. I especially thank Dr. Chu for her great help in organizing my visit. She managed to provide me with all of the paperwork needed for my U.S. Visa application in a timely manner and was also so generous as to give me many tips before coming to the United States and also during the conference. It was indeed a pleasure to meet so many representatives of different sectors and to enjoy many interesting conversations (Figure 8).

DINI NUZULIA RAHMAH: AN INVITATION FROM THE IEEE CE SOCIETY

It began with the invitation letter from the IEEE CE Society, which I received by e-mail from Dr. Narisa Chu, one of the board members of the CE Society. It was an invitation to present our recent work in

FIGURE 8. From left: Stuart Lipoff (CE Society, vice president of publications), Narisa Chu (IEEE CE Society Board of Governors), Donghun Kim (first winner Best Paper Award ICCE 2013), Rana Ahmed (first winner Best Paper Award ICCE Berlin 2013), Dini Nuzulia Rahmah (first winner Best Paper Award ISCE 2013), and Wen-Chung Kao (general co-chair of ISCE 2013).

a special session of the International Conference on CE (ICCE) 2014. Last year, our research won the first-place Best Paper Award in the International Symposium on CE (ISCE) 2013 held in Hsinchu, Taiwan. I was happy and excited because this would be my second time to present our work in front of many researchers in the same field. Not only that, but I would have a chance to obtain a lot of knowledge and deep information from experts and professionals in a broader field that is related to my work.

The conference was being held in Las Vegas, Nevada. I was really amazed because this would be my first time visiting the United States. I presented my work by myself since the invitation was just for the student, not for my advisor.

THE PREPARATION FOR LAS VEGAS

When I heard that one of my friends failed to get a U.S. Visa, I doubted that I could get my Visa on time. The preparation time was limited, and I also needed to finish my thesis to graduate this semester. But, thankfully, I was able to finish all of the preparation on time. I got my Visa two days after being interviewed by the immigration agency.

After I obtained my Visa, I booked my hotel and flight to the United States. I booked the same hotel with one of the other participants who would also attend ICCE 2014. Her name is Rana Salem, the winner of Best Paper Award in ICCE-Berlin last year. We booked the Stratosphere Hotel and Towers (Figure 9) on the strip because this hotel was located near the Las Vegas Convention Center (LVCC), the venue for ICCE 2014 (Figure 10).

I also prepared my presentation and practice speech because I didn't think that my English was good enough. After all of the preparation was done, I was ready to go to Las Vegas to attend my first international conference.

FIGURE 9. The Stratosphere Hotel, casino, and tower.

FIGURE 10. The Las Vegas Convention Center.

INTERESTING SESSIONS AT ICCE 2014

The ICCE is an annual conference to showcase and educate users and developers with CE technology. This conference was held for the 32nd time as ICCE, and the overall conference was first established 50 years ago. There are also conferences in Berlin, Japan, China, and Taiwan. The conference is run and supported by the IEEE CE Society.

ICCE is the flagship conference of IEEE CE Society. This year, ICCE was focused on next-generation mobility. The development of smartphones and tablets during the next few years were the main issues in this year's ICCE. Almost 500 research papers from more than 30 countries were submitted and evaluated by the experts and reviewers in their fields.

As a prelude, the goals that I set before attending the ICCE comprised obtaining current knowledge on the next generation of mobile technology, updating my view of recent advanced electronics devices, and sharing my research with the world so that people can also gain some valuable information from my recent work.

My participation met all of the preceding goals in addition to providing the opportunity to discuss the latest technology and the development of mobile devices with many participants and professionals at ICCE 2014. I would like to share the details of the sessions I attended during my four days at ICCE 2014.

ICCE 2014—DAY BY DAY—DAY 1

SENSOR-BASED CONSUMER APPLICATIONS

Session date and time: Friday, 10 January 2014, 10:20 a.m.–11:40 a.m.

Session chair: Thomas Coughlin (Coughlin Associates, United States).

Session summary: The session focused on combining sensors with the applicable device. Samsung presented accelerators in a smartphone combining with a digital TV. The movement from the smartphone could interact directly with the digital TV. Another speaker from Korea invented the piano tutorial system with a depth camera. The summary from this session was that we could combine the device and software in such a way to gain the better idea of how some devices could work well with some applications.

My major takeaways: I learned a brief and clear idea of how things could be made and combined together. I was intrigued by the piano that could recognize the depth of the keys touched by using the depth camera. The advantage appeared in that piano players could know whether they played the right or wrong tunes. In my image processing field, I also learned about the depth camera and mapping the depth of some circumstances. I was impressed by the idea of combining the depth camera with the piano in real time so that a performer could play better without a real tutor.

CAMERA TECHNOLOGIES I

Session date and time: Friday, 10 January 2014, 12:00 p.m.–1:20 p.m.

Session chair: Christian Hentschel (Brandenburg University of Technology Cottbus, Germany).

Session summary: The session mainly discussed how to make a camera perform better and remove the noise in the images caused by shaking or disturbance. Most of the recent research also focused on removing the noise from a blurry image

by using preprocessing methods or adding a device in the camera.

My major takeaways: I learned a new method to remove noise caused by a camera shaking or object movement in the scene. I also learned a new method for a color management system in the commercial digital camera; particularly, in some cameras, the color was not constant, so the resultant photograph was not good. Researchers from the United Kingdom presented their work by using machine-learning techniques to keep the constancy of the consumer's camera.

CLOUD APPLICATIONS IN CONSUMER ELECTRONICS

Session date and time: Friday, 10 January 2014, 2:40 p.m–4:20 p.m.

Session chair: Scott L. Linfoot (United Kingdom).

Session summary: The development of cloud computing was discussed in this session. Recently, cloud computing technology has been developing rapidly. Some researchers presented their work of cloud computing helping users in e-books, media service, smartphones, tablets, and television.

My major takeaways: This field is a new topic for me. As cloud computing is becoming one of the important fields in digital technologies, I updated my knowledge about cloud computing from this session.

CAMERA TECHNOLOGIES II

Session date and time: Friday, 10 January 2014, 5:00 p.m.–6:20 p.m.

Session chair: Peter Corcoran (National University of Ireland, Galway, Ireland).

Session summary: This session discussed the development of the infrared signal and image sensors. The advantage of using a signal and sensor is that both technologies can improve the processing method.

My major takeaways: In my research, I was focusing on the improvement of some method without adding any devices. I learned about a new sensor and signal technologies that could relate to my field, as a lot of people were using the combined technology in their devices.

ICCE 2014 DAY 2

INVITED SESSION: HEALTH/MEDICAL APPLICATIONS I

Session date and time: Saturday, 11 January 2014, 10:00 a.m.–11:20 a.m.

Session chair: Yao Shieh (Chang Gung University, Taiwan, and University of California Irvine).

Session summary: In this session, the topics presented included a physical rehabilitation system using Kinect to help people with movement disorders, a novel oral health-care system, medical image processing using super-resolution technology, and a novel medical record system. Combining electronics devices with a high-tech system would create medical applications benefiting health care. Many researchers in electrical/electronic engineering or computer sciences were involved in medical applications.

My major takeaways: This session really got me excited because my B.S. degree final project was related to health-care systems. I used human retina signal processing to detect diabetes in a patient based on the dynamic-range enhancement and super-resolution algorithms for medical image processing. In this session, I learned and gained more knowledge about an application that can be developed in the medical field.

IMAGE QUALITY ENHANCEMENT I

Session date and time: Saturday, 11 January 2014, 11:40 a.m.–1:20 p.m.

Session chair: Christian Hentschel (Brandenburg University of Technology Cottbus, Germany).

Session summary: This session included the discussion of red- and flash-eye defects detection in still image photography, a novel blind image restoration, a novel method for the interpolation of high-definition images, image color correction, and correction of the overexposed region in digital color image. Methods and algorithms were presented for the digital image to have a higher quality result.

My major takeaways: This session was related to my current study, digital image processing. During picture taking, some region could be overexposed while other regions could be darker. I was interested in a color correction image presented by researchers from Korea University about a novel method using a Gaussian structure following with minimization of a new energy functional.

IMAGE QUALITY ENHANCEMENT II

Session date and time: Saturday, 11 January 2014, 2:40 p.m–4:20 p.m.

Session chair: Erwin Bellers (Sigma Designs, United States).

Session summary: Film grain noise superimposition, image restoration, image super resolution, removal of a ghost or noise pseudo-multiframe, and multiscale sharpening filter were discussed in this session. Although the topic is not new in image processing, a novel method and algorithm was developed to obtain a better performance and result.

My major takeaways: In this session, the presenters discussed the same idea as in the previous session. I gained more in-depth information and knowledge about the algorithm and method for image enhancement. This is no longer a new topic, but the researchers continued with the enhancement of their methods.

INVITED SESSION: HEALTH/MEDICAL APPLICATIONS II

Session date and time: Saturday, 11 January 2014, 5:00 p.m.–6:20 p.m.

Session chair: Yao Shieh (Chang Gung University and University of California Irvine, Taiwan).

Session summary: The development of technology in health care was discussed in this session. As in the previous session, most of the applications attempted to solve the health-care problem and help the paramedic obtain more efficient and effective pretreatments for some sicknesses.

My major takeaways: I gained more knowledge and information about medical applications that could be integrated with image processing. In my opinion, behavior prediction of smart home users represented the most interesting research. This application could provide a lot of advantages, especially for caregivers to monitor elderly people. The developments of health-care applications could improve health care. This session broadened my mind toward combining image processing with health-care technology.

ICCE 2014 DAY 3

MOTION ESTIMATION

Session date and time: Sunday, 12 January 2014, 10:00 a.m.–11:20 a.m.

Session chair: Dietmar Hepper (Technicolor, Germany).

Session summary: This session contained significant discussion about motion estimation in object detection in real-time video sequences.

My major takeaways: Although I was not expert in this field, I obtained a lot of information about motion estimation. After attending this session, I could conduct a brief explanation of how motion estimation could work with object detection in video frames.

OBJECT DETECTION AND TRACKING

Session date and time: Sunday, 12 January 2014, 11:40 a.m.–1:20 p.m.

Session chair: Narciso García (Universidad Politécnica de Madrid, Spain).

Session summary: This session focused on sharing an algorithm and method on object detection and tracking. Multiclass moving target detection using Gaussian mixture part, object recognition, vehicle recognition obstacle detection for visually impaired persons, and an automated real-time surveillance camera were presented.

My major takeaways: This topic was related to my master's thesis; it broadened my concept and idea about the methodology of object detection and tracking. So, this session was the most important for my recent research and my thesis. The main point for object detection was actually on the preprocessing techniques, how to learn the right object so that the tracker could detect overtime.

3-D VIDEO

Session date and time: Sunday, 12 January 2014, 2:40 p.m.–4:20 p.m.

Session chair: Dietmar Hepper (Technicolor, Germany).

Session summary: This session was almost the same as the previous session on object detection and tracking. They differed on the video. Here, the researchers used 3-D video instead of 2-D video. They presented their recent works including quality control of conditional replenishment algorithm for hybrid 3-D TV, real-time system for object detection, 3-D model-based multicamera, the effect of high frame rates on 3-D video, and perceptual distortion modeling for side-by-side 3-D video.

My major takeaways: Although this field was quite new for me, I took interest in the study of the effect of 3-D video with increased frame rates on the viewer's quality of experience. From the user study, they would prefer the higher frame rates, which became intuitive to me.

HARDWARE ARCHITECTURES II

Session date and time: Sunday, 12 January 2014, 5:00 p.m.–6:20 p.m.

Session chair: Carsten Gremzow (University of Wuppertal, Germany).

Session summary: The session focused on hardware application architecture on devices, video surveillance, and compressed videos including seeded region growing on multicore system, CAVLC codewords substitution for H.264/AVC video data hiding, and JTS-based static branch prediction.

My major takeaways: My field is image processing, but I also think it is important to know the hardware architecture if I someday merge and integrate my work with some devices. I learned about the hardware architectures from this session.

ICCE 2014 DAY 4

SPECIAL SESSION: INTERNATIONAL BEST PAPER SHOWCASE

Session date and time: Monday, 13 January 2014, 10:00 a.m.–11:20 a.m.

Session chair: Narisa Chu.

Session summary: This is a new special session in ICCE 2014. This session aimed to show the research of best paper winners in 2013 (Figure 11). The speakers were invited from the winners of ICCE 2013, ICCE-Berlin 2013, and ISCE 2013. With different majors and different topics, the speakers shared their research work that won the best paper awards last year.

My major takeaways: In this session, I presented my previous research about creating a focus–defocus scene in the image by using a shallow depth of field without any expensive device, such as a DSLR camera. The target of the algorithm was to create the focus–defocus effect on a synthesized image from an all-focused image. Prior research concentrated on refocusing and defocusing rather than using the focused image as an input image. Given a scene, the area is divided into some depth. As human eyes possess a perspective depth map, we allow the user to choose which area would be blurred and which area would remain sharp and focused.

In this session, I could talk without any difficulties about our recent work. I was also happy to gain knowledge from Dave Kim, the winner of the Best Paper Award at ICCE 2013, and Rana Salem, the winner of the Best Paper Award at ICCE-Berlin 2013.

VIDEO QUALITY AND PERFORMANCE ENHANCEMENT

Session date and time: Monday, 13 January 2014, 11:40 a.m.–1:20 p.m.

Session chair: Erwin Bellers (Sigma Designs, United States).

Session summary: This session discussed the method and algorithm to enhance video quality and performance. An efficient recording method, an effective image color balancing scheme, a postprocessing algorithm to reduce blocking artifacts, video enhancement using super-resolution, and spatiotemporal denoising were presented.

My major takeaways: Actually, my recent work was related to video but not focused on enhancement. By attending this session, I came up with a novel idea to combine my recent work about object video tracking and video enhancement to obtain a better quality result and performance of the video.

FIGURE 11. Special session: International Best Paper Showcase 2013.

FIGURE 12. Some eye-catching products at CES 2014.

CONSUMER ELECTRONICS SHOW (CES) 2014

Besides ICCE 2014, the annual biggest electronics show in the world, CES, was held in the same venue as ICCE, the LVCC. I was very lucky to attend the show on the last day of CES 2014. Although I was no expert in this field, I felt so amazed by the show. All of the vendors and professionals from around the world gathered at this event to show off their latest products. I saw a lot of different product categories including the latest mobile devices, electronics, high-tech gadgets, and high-tech vehicles.

The organizers aim to show the industry's latest developments and discoveries through this international event. Thousands of consumer products launched and showcased across more than 15 product categories. More than 36,000 international visitors and 14,327 presidents, CEOs, and owners gathered together in this event to share and show their latest products and technology (Figure 12). The best and biggest companies also attended this great event. I hope I can attend this event again to update and gain more knowledge on the latest high-tech products in the consumer technology industries.

DONGHUN KIM: PRESENTING MY RESEARCH AT ICCE 2013

MY RESEARCH

The theme of ICCE 2013 was human–device interaction. My research is about the interaction by a natural pointing gesture. This pointing gesture is a useful tool for devices or machines to recognize the human intention for the interaction. For that purpose, we proposed the useful technology for smart TVs. Also, this technology can be applied to the video walls that were shown in CES this year.

The need for remote posture activation-related technologies is growing. Human posture and hand pose estimation

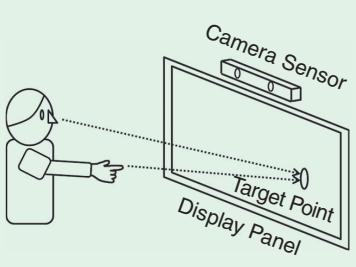

FIGURE 13. The target pointing system.

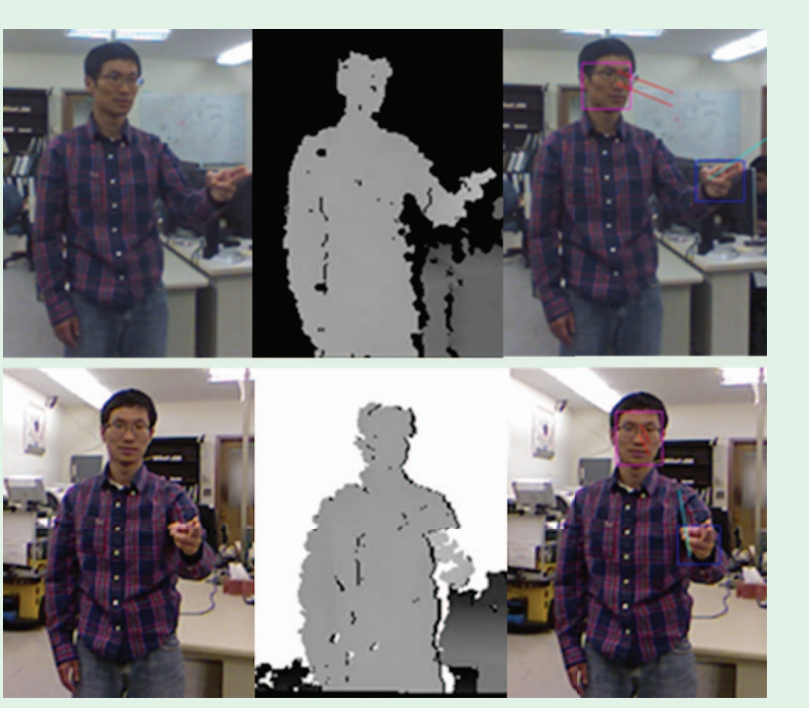

FIGURE 14. The pointing results of both a hand and a face from RGBD data.

methods have been applied to many devices in the consumer market. However, the conventional methods provide only limited control signals to devices; only some predefined posture can be recognized. If an interactive system uses a human pointing estimation in addition to human gestures, it will give great freedom to operate a device control. It may enable control pad or machine interaction without a mouse. As shown in Figure 13, a robust method for target pointing estimation using 3-D face and hand poses is proposed. A target pointing estimate with a single modality, such as a hand or a face, may not be reliable because of visual perception error and human mobility error. To alleviate these errors, both hand and face pointing estimates are fused in a soft switching sense.

To acquire the input data of a hand and a face, an RGBD sensor, a recently emerging sensor with an RGB color and a depth, is chosen for this paper. This sensing device is helpful for the more robust pointing estimate as well as the more accurate estimate. Figure 14 illustrates the result of hand and face poses that are estimated from both an RGB image and a depth image. Additionally, the pointing results of hand and face poses in a different stance are shown in Figure 15. The estimated target points on a display panel are evaluated as shown in Figure 16 and Table 1.

As a result, for estimating the pointing target on a display, the combined method of hand and face poses is more accurate than the estimates that use target pointing with a single hand and a single face.

CES AND ICCE

Since the first day of the ICCE overlapped with CES, I had a good chance to experience some new trends in my research field. In my opinion, the technology and knowledge is more meaningful when engineering output reaches out to present real consumer products such as on the CES floor. In that sense, CES followed by ICCE presents a great benefit for the evaluation of the practicality of current research. It could substantially point out future research directions targeting real-world applications.

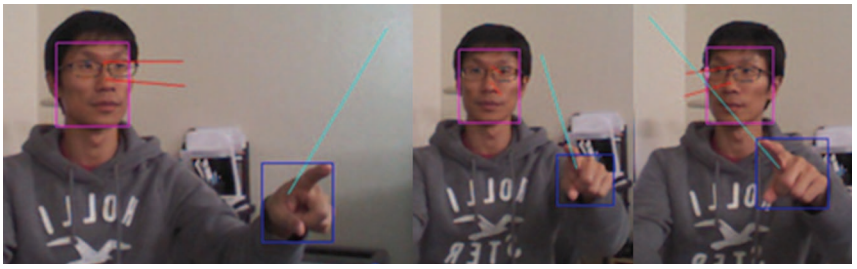

FIGURE 15. Examples of the seated stance.

Table 1. The average of the estimated point errors and standard deviations.

	Error[a]	Error std.[a]
Hand	9.69	7.04
Face	10.02	4.90
Combined	6.89	3.23

[a] Unit: cm

At CES, I was very excited about many novel concepts of wearable devices. Wearable devices could be directly related to the human–device interface, which could enhance new concepts of interaction. Although there were few brand-new innovative concepts, some predefined wearable concepts were realized by many products such as the smartwatch and an immersive device for virtual reality or games. Their performance was impressive to motivate me to attend the next CES.

BEST STUDENT PAPER AWARD IN 2013

I remembered the time when I received a message about the Best Student Paper Award. In the early morning, my coauthor at Purdue University made several calls to me. When I took the call with barely opened eyes, he told me with an urgent voice to read my e-mail immediately. I saw the title "Important News for ICCE 2013." There was an attached file with the following message only: "Please find the attached letter from the ICCE 2013 organizing committee." When I opened the file of title, "Best Student Paper 2013," I was wide-eyed with excitement.

With this special award, I attended the ICCE 2013 and gave a successful presentation. I had an interview with IEEE CE Society TV before receiving the award. Then, the presentation of the award was made at the Best Papers Luncheon. When my name was called, I went to the podium to receive the plaque, and that was a very honorable moment, especially as a student.

INTERNATIONAL BEST PAPER SHOWCASE IN 2014

As a special session, ICCE 2014 held the International Best Paper Showcase for the first time. I was thinking of the purpose of this showcase. One of the goals might be sharing the technologies

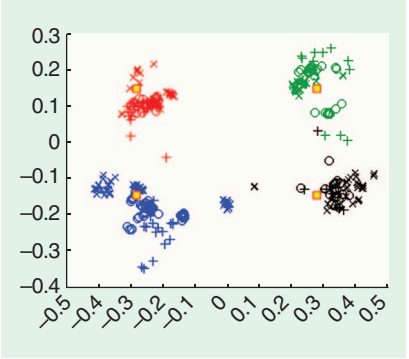

FIGURE 16. The estimated target points on a display panel: the ground truth (square), hand pointing result (x), face pointing result (+), and hand–face combined result (o).

awarded as the Best Student Papers around the world for the entire year. Another goal could be to follow up with the improved research of the awarded topic after a year. During the showcase, I formed good professional relationships by talking about research with other winners. This showcase provides an opportunity to discuss the future direction of promising technologies with experts in various fields, the so-called cross-pollination, multidisciplinary research potential. Even though the showcase was assigned on the last day of the conference, both presenters and the audience still shared plenty of useful feedback. I believe that this special event would not only encourage the awarded researchers but also stimulate the attendees of the conference. Furthermore, I am convinced that this kind of communication would lead to better and more creative technology in the CE Society.

> Human posture and hand pose estimation methods have been applied to many devices in the consumer market.

—Narisa Chu,
IEEE CE Society,
Chair, Best Student Paper Showcase

—Rana Hesham and Abdelmonem Ahmed, delegates to ICCE-Berlin 2013

—Dini Nuzulia Rahmah, representing ISCE 2013—Taiwan

—Donghun Kim, delegate to ICCE 2013

Revelations from the Young Consumer Survey

Since May 2013, the IEEE Consumer Electronics (CE) Society Future Directions Committee has sponsored and helped recruit participants in a survey of young consumers (high school and college age) in the United States and other parts of the world. As of 13 December 2013, there were 146 participants. Most of the survey participants were informed about the survey by members of the CE Society Future Directions Committees or through contacts made at IEEE CE Society conferences in 2013.

This article will give some results and an interpretation of the survey results. The survey remains open, and additional young consumers can participate at http://www.surveymonkey.com/s/ZSRKFQK.

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SURVEY RESULTS

First, let us look at the participants in the survey. In Figure 1, you can see the distribution of responses when asked what their field of study is or expected career.

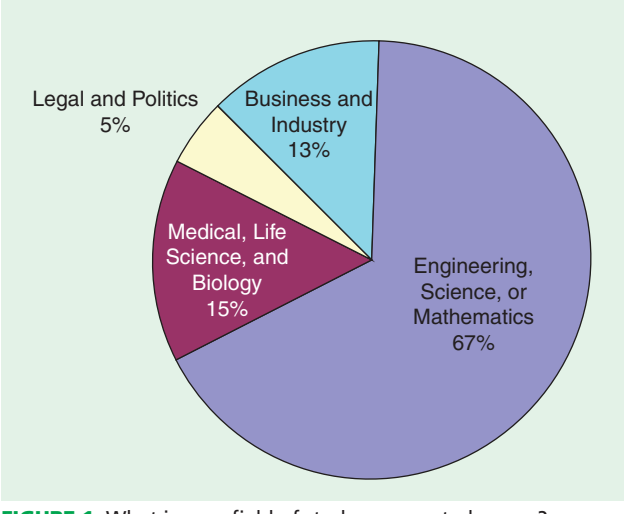

FIGURE 1. What is your field of study or expected career?

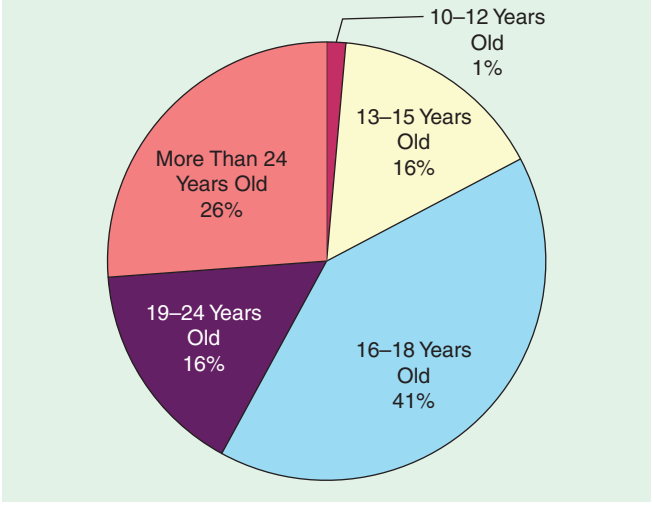

FIGURE 2. How old are you?