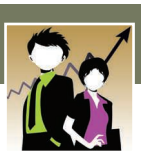

by Marek Jasinski, Haitham Abu-Rub, Kinga Wytrychiewicz, Daniel Pankowski, Shady S. Refaat, Hong Li, Oguz Alkul, Sertac Bayhan, and Shivali Malhotra

Power Industrial Electronics and Informatics for Humans

For three years, I have had the impression that high tech should be much more integrated with societal life. The last four months have confirmed this 100%. In some ways, high tech is well utilized, as in the case of telecommunication, information processing, and image analysis. These basic ideas are mature; however, new technology should be better utilized, such as in big data analyses. Most people in our society understand why almost every single person needs a computer and a smartphone, and they currently understand the need and opportunities of owning fully electric smart cars, smart wireless biomedical devices, smart home appliances, and so forth.

However, there are also some other paths of daily life that are not yet so clear. This is the role and opportunity for industrial electronics and informatics (IE&I), which is widely based on our silent friend, power electronics. There is a feeling that technology is starting to be more mature and applied everywhere in our life, although considerable efforts and discoveries are still needed. Electrical drives (applied in vehicles, robots, industry, home, and hospital appliances) are starting to be used almost everywhere, and thanks to Elon Musk's Tesla [1] and Cyberdyne, we have been reminded that e-mobility is widely used and will be very important for current and future generations [2]:

> This is our "Challenge to Shape the Future." … A bright future can be built by utilizing leading edge innovative technology. …To achieve this vision, Cyberdyne proposes a "Techno-Peer Support," which is mutually supported by both humans and technology.

There are various discussions about smart grids and smart cities, but not many of them focus on the power supplies, energy storage, energy conversion, management, and conservation until the moment when the power is shut down for extended period or during a blackout within a large region. Or how about during our travels, when the battery in our smartphone or laptop has just died and the plug adapter is missing? We usually do not care too much about power security when a device works. People from highly developed countries usually do not think about long-term and widespread energy interruptions and do not remember that there are many world regions where electricity is still almost unknown. This is analogous with our health: "My good and noble health/Thou matter'st more then wealth/None know'th thy worth until/Thou fad'st, and we fall ill" [17]. In December 2019, when problems with the Coronavirus (COVID-19) started in Asia, worldwide society did not react quickly. All of us thought that this was the next "brand new flu" and would disappear in a few weeks—up until the moment when the problem reached Europe, America, and everywhere.

Surely, many things could be done better in terms of fast technology utilization and development. Proper technological development and utilization could help our societies be better prepared for sudden worldwide challenges and disasters. This is highlighted by Bill Gates during his TED talk [21].

We are doing much in the fields of industrial electronics, informatics, power electronics, biotechnology, robotics, big data, smart grids, smart cities, the Internet of Things, renewable energy, and power quality. To be honest, it is difficult to list them all. In situations like the COVID-19 outbreak, worldwide society can see that people are the same everywhere. We are optimistic, and we are doing our best to provide a better life for our society. The question is, can we do this faster and better? Can we avoid such pandemic scenarios in the future (now that we don't know how it will end)? How could we transfer outcomes from robotics to hospitals as efficiently as we do in industry?

Thanks to God, scientists, and businesspeople such as Robert (Bob) Melancton Metcalfe (Ethernet) [20] and Sir Tim Berners-Lee [22], we have the Internet; thanks to Steve Jobs and Wozniak [23], [24], or Nolan Bushnell (ATARI) [25] and many others, we have PCs and software, including games. We check most of our queries through Google (Larry Page) [26] and Wikipedia (Jimmy Wales) [27]. Thanks to them, school and university research can be conducted without stopping—up to the moment we don't have electric energy. We hope that this energy will be processed as quickly and easy as the information.

The Internet of Energy (Enernet) [3] idea should be implemented as soon

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as possible. To develop it promptly, academia, industry, and government sustainability should always work during such a critical pandemic time. The IEEE Industrial Electronics Society (IES) shall do its best to keep engineering work as productive as possible. The goal is to obtain sustainable development for academia, industry, and nations. High technology should be encouraged by social and health-care sectors to be assimilated very quickly.

Fortunately, our flagship conference, the IEEE International Conference on Industrial Technology (ICIT2020), took place in Argentina at the end of February [28]. Maria Ines Valla and Victor J. Lifchitz did an excellent job and organized the IES Professionals and Students (YPS) event with support from Dmitri Vinnikov, Yousef Ibrahim, Hani Vahedi, Marek Turzynski, Aleksander Malinowski, Sertac Bayhan, Christian Rojas, Hong Li, Adam Milczarek, and Marek Jasinski [29], [30]. It is unfortunate that similar events cannot be conducted because of COVID-19. We hope that together we can overcome the pandemic and that conferences with personal contacts will be soon allowed again. Personal contacts are mandatory in science; they not only give us a wider scientific view, but they teach us about culture and mutual understanding.

A good example is the research in Qatar, which the government constantly supports. Thanks to excellent cooperation between academia, industry, and government, this small country has significantly developed and attracted top scientists and experts from around the world. The Qatar government supported the creation of the Qatar Foundation for Education, Science, and Community development. The Qatar Foundation initiated the Qatar National Research Fund (QNRF) for the funding of various research. Different funds are given to academia and industry sectors, to school students, families, organizing conferences and workshops, and many other aspects. Electric energy with smart grid areas are among their top priorities and they are always generous in supporting IES events and the YPS activities of the IES. Those activities were mainly organized under Texas A&M University at Qatar (TAMUQ), which is part of the Education City under the Qatar Foundation. Extensive industrial and informatics electronics research is being supported at TAMUQ.

Despite its very small size, the electrical and computer engineering program at TAMUQ was ranked 68th worldwide in the area of electrical and electronic engineering, according to a recent issue of *U.S. News & World Report* [5]. This was made possible with the impressive research generously supported by Qatar. Over 90% of research funds in the electrical engineering program come from QNRF. This country supports its society, science, industry, health care, and athletics. It may be a desert (with gas and oil under it), but now this desert is changing to an oasis of sustainability.

SYP at ICIT2020 in Buenos Aires, Argentina

A number of activities at ICIT2020 featured SYP attendees. The IES-Student and Young Professionals Travel Paper Assistance (IES-SYPA) recipients presented their interdisciplinary projects.

- Nicolás Barreto, Universidad de la República, Uruguay, "Research Platform for Cattle Virtual Fences"
- Eduardo Matias Robador, CNEA/Instituto Balseiro, Argentina, "Mechanical Design of an Underwater Robot to Inspect Closed Environments"
- Jitendra Kumar Goyal, Indian Institute of Technology, "Experimental Design of Robust Decentralized PI Controller for TRMS through Polytopic Modeling"
- Shabnam Ruzbehi, University of Erlangen, Germany, "Two-level Topology Optimization of an Electromagnetic Actuator Based on Genetic Algorithm and Neighborhood Method"
- Wenhua Ling, RMIT University, Australia, "A Motif-based Classification Algorithm for Identifying Solar Panel Installations"
- Bita Arabsalmanabadi, École De Technologie Supérieure, Canada, "Analytical Design Study of Spiral Circular Coils for Efficient Magnetic Resonant Coupling Power Transmission in EV Chargers."

Videos of these presentations are available at the IEEE IES Channel [31].

A Sustainable Development Goals Workshop was conducted. This event aimed to encourage SYPs to propose new companies (product, technology, service businesses, or social entrepreneurship) based on the 17 United Nations Sustainable Development Goals [32], [33]. The workshop started with a brief presentation about the goals and then a group-based challenge. The UN Sustainable Development Goals are:

1) end poverty in all its forms everywhere
2) zero hunger
3) ensure healthy lives and promote well-being for all at all ages
4) quality education
5) gender equality
6) ensure access to water and sanitation for all
7) ensure access to affordable, reliable, sustainable and modern energy
8) promote inclusive and sustainable economic growth, employment, and decent work for all
9) build resilient infrastructure, promote sustainable industrialization and foster innovation
10) reduce inequality within and among countries
11) make cities inclusive, safe, resilient, and sustainable
12) ensure sustainable consumption and production patterns
13) take urgent action to combat climate change and its impacts
14) conserve and sustainably use the oceans, seas, and marine resources
15) sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss
16) promote just, peaceful, and inclusive societies
17) revitalize the global partnership for sustainable development.

In the context of the latest COVID-19 outbreak, it is evident that goal number 17 should be placed at the top position, not at the end.

Several invited outstanding young speakers also presented the hottest topics from academia and industry [34]:

- Ing. Brenda Rossi, Allegro Microsystems, Argentina, "Semiconductors Design: Towards a Safer and More Sustainable Future"
- Agustina Thibaud, Mirai 3 D, Argentina, "Disruptive Trends for Healthcare Applications"
- Ing. Mariano Ratto, Adivo Associates, Argentina, "When Engineering Meets Life Sciences. How We Use Biology for Human Development"
- Ing. Victor Lifchitz, ICIT YPS Activities Chair, Argentina, "IES/YP Volunteering Opportunities."

After the scientific activity, the hospitable local General Chairperson hosted the all-important social interactions during the SYP Party and Welcome Reception.

It is evident that all scientists see the need to be together, cooperate, and use engineering outcomes for human development, safety, and protection for improving health conditions. This idea is even more urgent than it was just three weeks ago. As we are writing this article (18 March) the World Health Organization announced in its Situation Report 58 that there are 191,127 confirmed cases of COVID-19 versus 109,577 confirmed cases from 9 March, and it seems that this is only the start of the pandemic [35] (3,224,079 cases on 30 April). No matter how it ends, all people must learn from it and act in a more unified and sustainable way in the future. Everything depends on us. Our activity has an impact on others, and others influence us.

Academia, Industry, and Government Sustainability

Academia, industry, health care, and governments should start cooperating closely; the Earth has the potential to overcome this disaster. People would like to help each other, but technical constraints are limiting us. China is an expressway introducing the newest technology in the fight against COVID-19 [4], [6]. Italy and other countries need significant help now. Robotics would help with treatment in such kind of pandemic. We must act fast and remember that all the newest technology works if it has good quality and a continuous electrical power supply. Therefore, sustainable, distributed energy storage devices such as charger stations are necessary and critical.

Scientists could work at home like Isaac Newton in 1665. Without professors, student Isaac spent more than a year away from university, but he did not give up and spent his time learning and researching in his bedroom and garden laboratories. That time became known as a "year of wonders." He wrote his early papers about calculus, optics, and the theory of gravity during that time [18], [19].

We can go to our roots and look to Egypt and China, where thousands of years ego engineering led society; however, in that time, a human was not in the center of gravity. Nowadays, it is clear that humanity is the main subject, and we shall go through the technology adventure only if we protect ourselves. It seems that due to access to electricity, and thanks to it, information and automatization is now a priority of most societies. If we could provide equal access to electricity and the Internet in New York and in In Ekker, Algeria, the world's population will be safe. Medicine, industry, academia, and governments would feel comfortable and allow to people grow in the place where they were born. To achieve this, we should act according to the rule "hand-in-hand: healthy planet and healthy economy" and it would be only made possible with alternative energy sources like photovoltaics (PVs) [7].

The biggest PV power plant in the world is in Egypt. But the question is, can this plant be a backup in case of blackout? Is there large energy storage? Let's see the state of the art. PVs have shown extreme growth worldwide; Egypt possess one of the highest solar insolation levels in the world due to its hot desert climate. Recently, it has installed a significant amount of solar power capacity in its power grid to supplement existing power generation sources. This is driven by a high population increase, a huge increase in energy demand, and a supply shortage [8]. The Ministry of Electricity and Renewable Energy in Egypt announced the target of supplying 20% of generating electricity from renewable sources by 2022 [9].

However, solar energy provides only 1% of total generated electricity [10]. Egypt has installed one of the largest solar power plants in the Middle East, namely, Benban Solar Park, with a capacity of 1.8 GW. It was designed to serve 1 million homes [11] and is located east of Benban, Aswan Governorate. Figure 1 shows the location of the different PV plants in Egypt. In addition, Table 1 shows the major PV power plants, their capacity, and the average direct solar radiation in kWh/m^2/day in their locations. The total capacity of installed PV systems is about 2.167 GW.

Egypt is also installing a 2,400-MW pumped-storage hydroelectric plant in Attaqa, to be completed in 2022 [12]. The units are due to operate during the high electrical demand period, when the stored water is released from an upper to a lower reservoir with a 28-m height difference [13]. During the low-demand periods, the upper reservoir is reversed through using the turbines as pumps and the generators as motors.

It can be seen that this is not enough; just as the sun does not recognize borders, viruses do not recognize borders, and nor should renewable energy development recognize the borders among countries. Countries that produce oil and/or gas have sufficient income to switch on renewables. However, they have to cooperate and think like one body by planning huge projects and introducing them in a huge scale around and in the Middle East. The transition to renewables will be not rapid. It will be a long-term process, and for many years, oil and gas will be crucial. However, it is mandatory to start developing now—not alone, but together. Why should we not set up pipes with gas and oil to Europe (on one side) and water (on the other side) to Iran, Iraq, Qatar, Saudi Arabia, Egypt, Palestine, Israel,

and so forth? We hope that Gulf countries will start common energy policies to have a strong electrical energy grid connected with Europe and Asia, including Russia. In parallel, every single person should have their own PC, smartphone, laptop, and, most importantly, a personal power electronics converter and drive with energy storage.

The development of technology in every field of life is already a fact. The personal device for processing information—the PC and all its varieties, such as smartphones or tablets—surprises no one. Automation and robotics are already at the beginning of their heyday, and it can be said that one day, robots will not only produce vehicles but also drive them. Such advanced technology is also beginning to enter other basic areas of life, such as agriculture, education, medicine, and rehabilitation. Modern technologies such as the Internet of Things, Enernet, Industry 4.0, smart grids, artificial intelligence, and so forth are dynamically developing; however, there is a technological gap visible, especially in third-world or underdeveloped countries. Namely, there is no personal device that converts and stores energy and has the ability to propel an electric machine (EM). The EM is, after all, the engine of development of our civilization. Such a device should be adapted to many tasks from the basic, such as acquiring and storing energy from renewable sources, from its transformation into a usable form through compatibility with the concept of the Internet, and ending with artificial intelligence and the human–machine system.

The development of a series of personal power electronic converters with drive and energy storage will allow its use in many places and areas of life. Thanks to the personal power electronics converter, it will be possible to supply electricity to the neediest in third-world countries, as well as to use it in exoskeletons or for the rehabilitation of people in posttraumatic coma.

The personal power electronics converter can be compared to our body's digestive system. Thanks to it, we can acquire, process, and store energy. If necessary, thanks to advanced data collection and control methods, we will drive an EM that, depending on the needs, can pump water from a deep

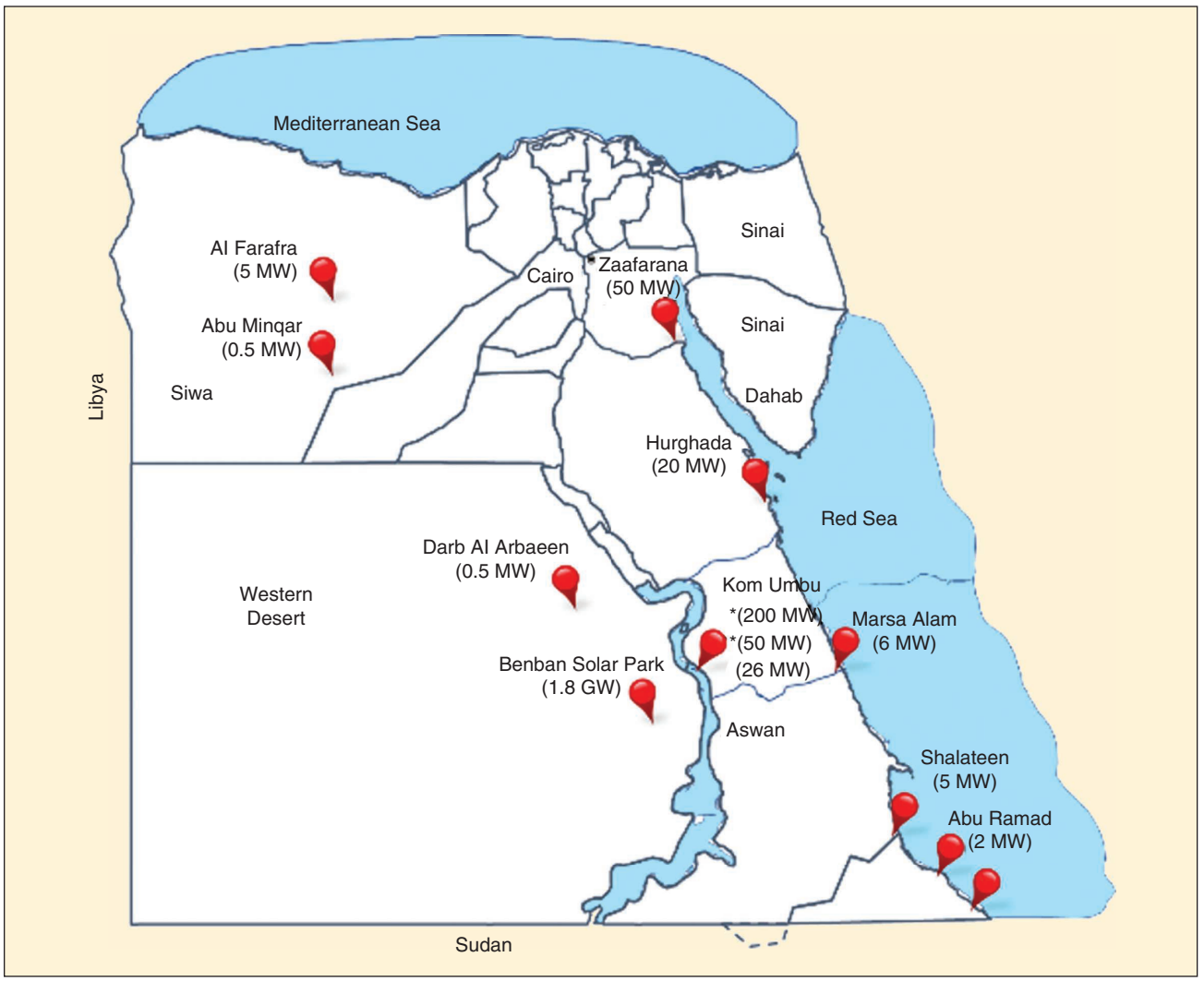

FIGURE 1 – The locations of PV power plants in Egypt. *The two projects are under construction, with a combined capacity of 300 MW.

well during drought in Africa, control the arm of an exoskeleton supporting a limb during rehabilitation, prevent pressure ulcers, or assist people with infectious diseases such as COVID-19. However, to obtain such a high of level of flexibility, we have to develop and work hard in the near future. The role of ancillary services offered by distributed renewable energy sources is a wide subject, and we do not know most of them yet.

Physical, Mental, Spiritual, and High-Tech Sustainability

All of us are focused on our families, our jobs, and professional growth. But we should not forget that we can only process as efficiently as our mental condition allows. Therefore, "Managing our mental health and psychosocial wellbeing during this time is as important as managing our physical health. We are most likely to know how to de-stress and we should not be hesitant in keeping ourselves psychologically well. This is not a sprint; it's a marathon" [39]–[44].

In the situation that we have now, when man coexists with technology, we must not overlook the human factor. As recipients of this technology, our beliefs, mental state, or psychosocial resources have a great impact on whether even the most technologically advanced solutions will be implemented in an appropriate manner. Currently, the development of technology can be seen in all spheres of our lives. These technologies include, among others, transport and communication, but also health.

The bases for the active participation of people in the process of treating diseases, preventing them, controlling their mental and physical health, and strengthening their potential are knowledge, understanding, skills, and the willingness to use them. In times when the inclusion of technology in medicine or psychology is very common, these aspects that seem essential for effective treatment become even more important.

The human psyche plays a huge role in those diseases that are referred to as *somatic*. The psychological functioning or psychological characteristics of a person is associated with how strong a stressor a disease is [45], how the person copes with it [46], and even whether the patient complies with medical recommendations and how often the patient has relapses [47]. Such a holistic approach to the problem of an ill person implies a broader and more comprehensive approach to this subject, because it assumes that they shape the picture of the disease according to their own experiences, resources, beliefs, and knowledge, thus giving it individual meaning.

Medicine intersects not only with psychology but also with technology. They develop together and side by side; therefore, their sustainable development is crucial from the point of view of the effectiveness of treatments. New technologies are used to monitor treatment and control disorders such as overweight and obesity [48], diabetes [49], chronic lower-back pain [50], addiction [51], and other mental disorders (for example, virtual reality therapies used in the case of agoraphobia [52] or applications used to support or even replace psychotherapy [53]). Besides, technological progress can be observed in all areas of treatment, in particular, in devices used to help patients, such as operations carried out by human-controlled robots (for example, DaVinci [54]).

The development of technology also means the development of communication methods, as well as the possibility of statistical analysis, analyzing big data, and drawing conclusions about the effectiveness of treatment carried out worldwide (not only reduced to one hospital/state), along with international cooperation on the development of new treatment methods, as now in the case of COVID-19. Without technology, we would be powerless in its face.

The development of technology also allows the development of a repertoire of research methods that are more precise and less invasive. Technological progress, such as in in neuroimaging, allows drawing more accurate conclusions about how our brain works; virtual reality allows for experiments in which people find themselves in a given situation—not only imagining it, reading a text, or practicing very complicated tasks [55]. Many devices monitoring the physiological parameters of our body are getting smaller (and also wireless), which allows continuous measurement of changes in the functioning of our body.

Thanks to the dynamic development of technology, it is also possible to reduce both the financial and time costs associated with treatment, which are colossal in most countries.

TABLE 1 – A LIST OF PV PLANTS IN EGYPT.

	NAME	PV PLANT LOCATION (GOVERNORATE)	CAPACITY	KWH/M^2/DAY
1	Benban Solar Park	Aswan	1.8 GW	8.8–9
2	Darb Al Arbaeen	New Valley	0.5 MW	8.3–8.5
3	Mersa Alarm	Red Sea	6 MW	8.3–8.5
4	Shalateen	Red Sea	5 MW	8.8–9
5	Abu-Ramad	Red Sea	2 MW	8.8–9
6	Halayeb	Red Sea	2 MW	8.8–9
7	Al Farafra	New Valley	5 MW	7.3–7.7
8	Abu-Minqar	New Valley	0.5 MW	7.3–7.7
9	Hurghada	Red Sea	20 MW	8.3–8.5
10	Zaafarana*	Red Sea	50 MW	7.3–7.7
11	Kom Umbu*	Aswan	276 MW	8.5–8.8

*The two projects are under construction, with a combined capacity of 300 MW.

This is achievable thanks to the possibility of transferring such services as medical visits, issuing prescriptions, exemptions, or other procedures, to a platform or an instant messenger. This has tremendous benefits, especially at a time like now—a pandemic—in which gathering people in one place is particularly dangerous. In the future, perhaps such solutions will be used on a large scale and become the norm.

New technologies, however, can also be a source of anxiety and stress because people cannot understand them and apply them to everyday life and because they almost change from day to day. The effectiveness of technology-based interventions may, therefore, be much lower. For example, people may be afraid of new methods of neuroimaging or experimental treatment and consequently do not get involved in the treatment process or even avoid it. Accordingly, the need to go out to these people, encouraging them to use new technologies and available methods by informing them about how they work, seems justified. What's more, logical explanations for the operation of new technologies can arouse admiration and curiosity, which is probably the most effective way of giving them new meaning and overcoming fear.

Already in the 1990s, research was conducted on the fear of a new technology (the computer) that was just beginning to gain popularity at that time. One study [56] showed that increasing the experience with computers leads to a reduction of anxiety associated with them. Yet for some people participating in the study, despite the experience, anxiety persisted, which may indicate that other psychological variables play a role in its reduction or maintenance, such as perceived self-efficacy and beliefs about technology, as well as earlier experiences.

There may be a natural fear of the unknown arising from the beliefs about technologies such as the belief that new technologies are dangerous or that artificial intelligence is a threat to humanity. Beliefs can result from various sources, for example, the press, television, opinions prevailing in the community, and sometimes the person themselves without reliance on any sources to generate them. These beliefs determine how new information is received and processed; some of these are received and assimilated, while others are rejected. This may involve information in an inaccurate manner or not based on reliable evidence. Such a situation can be observed, for example, in the current situation related to COVID-19, when conspiracy theories or unconfirmed techniques of avoiding infection arise.

However, such a dynamic development of technology does not come without "victims." Society is aging, and many older people (depending on where they live) are not even familiar with the basic technological innovations that seem to be quite natural for most young people. Older people may be reluctant to use such methods; they will not implement them in their daily routine because difficulties in using them may generate anxiety, stress, or frustration. It should be remembered that in the case of civilizational diseases, which are the main threat to public health, the primary potential recipients are the elderly [57].

In addition, one can observe a tendency to focus on the effectiveness of a given method in numerous publications. Although it is fully justified, the key aspect also seems to be the identification of factors, variables that may be related to the fact that for a specific group of recipients this intervention is not effective. When we eliminate a factor related to technology, such as availability and characteristics (when we fully improve a given product), human factors such as beliefs and abilities will remain. Refining the technology in this field will improve efficiency by broadening the reach to a wider range of reflectors.

We are all connected by one big global network, which on the one hand, makes contact easier yet, on the other hand, leaves us still far away from each other. Technological progress allows both voice and visual contact everywhere, practically at any time, thanks to various types of messengers. Scenes from recent days and weeks (in the United States, United Kingdom, Japan, Australia, India, Italy, Spain, and Poland), where crowds of people walked on streets and parks despite the danger of infection, show that technological contact is not enough. People are looking for "live" contact with other people. This can also be seen in many research schemes used to test the effectiveness of various forms of therapy.

As a reference group, conversations with a psychologist on topics not related to a given disease/problem are often used—such therapeutic contact is a kind of placebo. It is worth asking what the future will bring. Despite the amazing technological developments, we believe that in hospitals, psychological, and physiotherapy rooms—everywhere where the presence of another person can be a healing factor—people will still be needed.

Another "human" aspect is what we do with technology. In transferring our lives to the network, we also transfer various types of pathological behavior (such as gambling [58] and addiction to social media [59]). Despite the fact that such addictions do not have their markings in the classifications of diseases such as ICD 10 [60] or DSM V [61], they can still affect people's lives. In this context, it is worth noting that because the network allows us to be anonymous, it is often the source of many unimaginable tragedies (such as the death of Professor Rokita [62]). In addition to access to technology, we should also educate on how to use it to develop and help other people.

E-Ways of Contact

There are many systems for human communication, such as TV, laptop, telephone, radio, and so forth. In these communication systems, TV and radio are very old communication methods, but very effective devices to share information between humans. In the last 30 years, many new communication methods have been announced, particularly smartphones and computers. Moreover,

a lot of software has been written for these devices, such as WhatsApp, Telegram, Facebook, Twitter, Instagram, and many other applications. We use them to see the latest news, events, and incoming emails. For this reason, we use our phones every day.

The Internet is an excellent place for news coming to our devices in milliseconds. On Twitter, for example, a billion tweets are submitted by users every day. The number of Twitter users jumped from 1.22 million in 2008 to 73.5 million in 2010 [36]. The number of monthly active Twitter users worldwide was 330 million in 2019 [37]. Even government representatives communicate via tweets.

People get daily news about wars, pandemics, and other warnings from the Internet. For example, the first COVID-19 cases were learned from the Internet and TV [38]. In the beginning, nobody expected that COVID-19 would affect our lives. We watched the news and we learned about it, but almost nobody acted against the pandemic. Soon, we learned that this virus had spread to other countries very quickly. For solving problems related to this pandemic, communication became very important. Information on all incidents is shared very quickly. Moreover, researchers use the information to try to produce new vaccines and treatments. We hope that this situation will be solved using the Internet and communication platforms, but people should not only be texting but implementing trusted information in real life.

IE&I in Rehabilitation and Human Assistance: Technology and Health Care Sustainability

During the outbreak of COVID-19, advanced biomedical equipment has been playing an important part in the diagnosis, treatment, and care of patients. It is noteworthy that power electronic technology is essential in advanced biomedical equipment. An independent, highly reliable, and uninterrupted power supply system is required for extracorporeal membrane oxygenation, for example, whereas a wireless power supply is usually necessary in the in vivo implanted devices. A power switch that is capable of withstanding several thousand volts and conducting hundreds of amperes is needed in the gradient amplifier in the magnetic resonance imaging scanner, while a high-voltage generator is inevitable for computerized tomography. Power supply is necessary from one side, and accurate and safe sensing from the other side. Hepatic feedback is therefore also a crucial point in the helping and rehabilitation of people [14].

IE&I in the Internet of Things and Big Data

IE&I is also applied in the Internet of Things and big data, and we can see its application in fighting COVID-19. This is the real fight. I have just learned from Yousef Ibrahim (via Facebook) that one of his Italian friends has passed away. Indeed, this is a fight for life and death [15], [16].

Conclusion

It is evident that interdisciplinary action is required. The IEEE IES is an interdisciplinary society, so we can play an important role in this pandemic. However, we have to cooperate more closely with other specialists. Moreover, all of us should look toward the following actions:

1) *Understanding and psychological aspect*: Huge changes have to be implemented.
2) *Power supply for people*: Love and peace have to be secured.
3) *Power supply for high tech*: Electrical energy has to be secured.

The scientific and didactic process should be even more efficient in this pandemic time than ever before. We have the Internet, so let's use it for communication, research and learning [63]–[75], and much more. We are still young. Students and Young Professionals will play the most important role ever. It seems that, as always, "an ounce of prevention is worth a pound of cure"; "a stitch in time saves nine"; "better safe than sorry", "mieux vaut prévenir que guérir"; "más vale prevenir que curar"; "meglio prevenire che curare"; and "lepiej zapobiegać niż leczyć." Based on the opinion of both my father and a Chinese friend, this is good advice to calm the situation.

The role of industrial electronics and telecommunication is extremely significant today. Children are at home learning on the Internet. Moreover, many of us had more time during the Lenten season. Just use it for meditations and to better understand the situation. Even two weeks ago, I thought differently than today. Let us hope that we (the people) will find the solution and, after this, be stronger than before as a community. It is a difficult time, but we will see that there is hope. For certain, we will keep up our activities by e-conferences and focus more on publications in magazines, transactions, and so forth, to continue to disseminate our knowledge and exchange experiences without interruption.

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Limiters and Symbols in Block Diagrams. A list of references and an index complete the contents of the book.

The authors have added several new materials and expanded topics for wider analysis and test the impact of wind farms and virtual power plants, power plant inertia, and control strategies on the stability of the power system. The new topics are:

- wide-area monitoring and control systems
- the improvement of power system stability by optimization of control systems parameters
- the impact of renewable energy sources on power system dynamics and stability
- the role of power system stability in planning of power system operation and transmission network expansion
- real regulators of synchronous generators and field tests
- selectivity of power system protections at power swings in a power system
- the criteria for switching operations in transmission networks
- the influence of automatic control of a tap changing step-up transformer on the power capability area of the generating unit
- the mathematical models of power system components such as HVDC links, wind and photovoltaic power plants
- data of sample (benchmark) test systems.

The third edition continues the approach of the previous two releases and primarily emphasizes the understanding of basic physical principles before moving on to more complex models and algorithms. The book contains a large number of diagrams and examples enabling readers to better understand the considered issues.

I recommend this book to students of electrical and energy faculties as well as engineers, practitioners, and researchers interested in modern energy systems.

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ERRATA

In the March 2020 issue of *IEEE Industrial Electronics Magazine*, there was an error in the Society News article "Bijnan Bandyopadhyay Delivers a Distinguished Lecture in Brazil." The fourth paragraph should read:

> In his second lecture (Figure 3), Bandyopadhyay explained that the complete solution of discrete-time SMC could be obtained by using only a multirate output-feedback technique and concluded that the method's results remove the bottleneck to real-world applications.

We apologize for the error.

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In the March 2020 issue of *IEEE Industrial Electronics Magazine*, there was an error in the Society News article "Call for IEEE Industrial Electronics Society Award Nominations." In the article, it was stated that the Society's Early Career Award was "(Previously the J. David Irwin Early Career Award)." The award is still the J. David Irwin Early Career Award. We apologize for the error.

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