Conference on Women in Sensors - Security and Health organized by IEEE Sensors Council Hyderabad Chapter.

The Conference was organized at BVRIT HYDERABAD College of Engineering for Women, from 16-17 November 2022. The event was supported by IEEE BVRITH SB, IEEE SNIST SB, IEEE VNRVJIET SB, and IEEE Vardhaman SB. The event started with a great sense of positivity and oneness. Even though the sensor council is at its budding stage its aura is very impactful since the world is relying on sensor-based technology. The Keynote Speakers from different industries addressed the audience and shared knowledge and rich experience of application of sensor technology in their companies. As a result, many Keynote Sessions have been arranged in accordance with conference scope to discuss the Challenges, Opportunities and Problems of Application of sensor-based technology, in various fields and especially Women in Sensors - Security and Health.

DAY-1:





Welcoming and Opening Ceremony

The first day of conference started with Welcoming and Opening Ceremony, the chief guest Saakshi Dhanekar Dept., of EE, IIT Jodhupur and WiSe Committee Chair addressed to participants with short welcoming speech.



Joydeb Chattopadhyay Retd. Director, DRDO Hyderabad, delivered a wonderful session on "Applications of Wearable Sensors for Continuous health Monitoring". Wearable smart sensors are emerging technology for daily monitoring of vital signs with the reducing discomfort and interference with normal human activities.

Wearable sensors hold a pivotal position in the microelectronics industry due to their role in monitoring physiological movements and signals. Sensors designed and developed using a wide range of fabrication techniques have been integrated with communication modules for transceiving signals. He also highlighted the sensing products that are currently available on the market for a comparative study of their performances. The conjugation of the sensing prototypes with the Internet of Things (IoT) for forming fully functioning sensorized systems is also discussed. Finally, some of the challenges existing within the current wearable systems are also considered, along with possible remedies.



Sarbani Ghosh, Dept., of Chemical Engineering , BITS Pilani , Pilani Campus, Rajasthan has shared her view on "Electronic Structure and Morphology of n-Type Conducting Polymers for GAS Sensor".

Conducting polymers, such as polypyrrole (PPy), polyaniline (Pani), polythiophene (PTh) and their derivatives, have been used as the active layers of gas sensors since early 1980s. In comparison with most of the commercially available sensors, based usually on metal oxides and operated at high temperatures, the sensors made of conducting polymers have many improved characteristics. Furthermore, conducting polymers have good mechanical properties, which allow a facile fabrication of sensors. As a result, more and more attentions have been paid to the sensors fabricated from conducting polymers, and a lot of related articles were published. There are several reviews emphasize different aspects of gas sensors and some others discussed sensing performance of certain conducting polymers but few of them paid special attention to summarizing gas sensors based on different conducting polymers.

Panel Discussion on "Sensors for Everything":

Panellists:

Amit Kumar, Chair, IEEE Sensors Council Hyderabad Chapter.

Anil Roy, VP Technical Operation, IEEE Sensors Council, DAIICT, Gandhinagar.

Sarbani Ghosh, Dept., of Chemical Engineering, BITS Pilani, Pilani Campus, Rajasthan.

Priyanka Sharma, VicePresident, Projects-AI, Samyak and Chairperson, Jt chapter IAS/PES, Gujarat Section.

Rajul Patkar, Founder of SoilSens, IITB Incubate.

The panel discussion was very informative and interactive though few of the panellists were virtually connected and the Internet of Things is a broad-reaching concept traversing virtually every market segment. The IoT space has created a market opportunity valued as high as \$14 trillion by analysts. IoT implies that devices with information become "smart" by adding connectivity and a means to provide or consume information to and/or from other external systems. The silicon and sensor components play a big role in the capabilities and cost of the IoT device. Software that incorporates connectivity to enable "smart" is required. And once a device is "smart", non-trivial security issues need to be addressed. Join us as a diverse panel of experts discuss IoT applications and dissect what puts the "smart" in IoT devices.

Precision agriculture sensors are very efficient in agriculture because they transmit data that helps farmers not only to monitor but also to improve their products and keep abreast of changes in the field and ecosystem. Intelligent agricultural sensors help to easily identify animals, detect heat and monitor their health, thus facilitating the isolation and healing of sick cows by identifying, detecting, and following herds. Using smart sensors in agriculture, farmers can now record their crops and keep an eye on their effectiveness remotely, address crop pests and take swift action to protect their crops from any risk to the environment. A security sensor is a device used to detect events, movements, or changes in its environment. In a standard security system, detection devices are synced with alarm panels and may operate on RF, Z-Wave, Zigbee, or WiFi. They can be used indoors or outdoors, and help create fully-integrated, multi-layered protection.



Priyanka Sharma, Vice President, Projects- AI, Samyak and Chairperson, Jt chapter IAS/PES, Gujarat Section gave an insightful session on "Use of AI in Healthcare". The primary aim of health-related Al applications is to analyze relationships between clinical techniques and patient outcomes. Al programs are applied to practices such as diagnostics, treatment protocol development, drug development, personalized medicine, and patient monitoring and care. What differentiates AI technology from traditional technologies in healthcare is the ability to gather data, process it, and produce a welldefined output to the end-user. AI does this through machine learning algorithms and deep learning. These processes can recognize patterns in behaviour and create their own logic. To gain useful insights and predictions, machine learning models must be trained using extensive amounts of input data. AI algorithms behave differently from humans in two ways: (1) algorithms are literal: once a goal is set, the algorithm learns exclusively from the input data and can only understand what it has been programmed to do, (2) and some deep learning algorithms are black boxes; algorithms can predict with extreme precision, but offer little to no comprehensible explanation to the logic behind its decisions aside from the data and type of algorithm used.

DAY -2:



Rashmi Sahay Dept.of CSE, ICFAI University, Hyderabad has shared her thoughts on "Security Requirements of IoT-Enabled Smart Healthcare System". Healthcare facilities in modern age are key challenge especially in developing countries where remote areas face lack of high-quality hospitals and medical experts. As artificial intelligence has revolutionized various fields of life, health has also benefited from it. The existing architecture of store-and-forward method of conventional telemedicine is facing some problems, some of which are the need for a local health centre with dedicated staff, need for medical equipment to prepare patient reports, time constraint of 24-48 hours in receiving diagnosis and medication details from a medical expert in a main hospital, cost of local health centres, and need for Wi-Fi connection. To make it more efficient a novel and intelligent healthcare system that is based on modern technologies like Internet of things (IoT) and machine learning are introduced.



Khairunnisa Amreen Dept., of EE, BITS Pilani, Hyderabad Campus, Hyderabad has greatly mesmerized with a wonderful session on "Point of Care(POC) Devices for devices for real time health

Monitoring "The increasingly global focus on health care issues continues to underline the importance of point-of-care technologies and their ability to provide cost-effective solutions that address many unmet health care needs. Further, the current crisis in health care costs has critically underscored the need for research and development into highly effective, but low cost means of delivering health care. With a focus on providing clinically actionable information at or near the patient, point-of-care devices provide clinicians with information that is critical to the management of patient care while they are still with the patient. Rapid information results in various advantages for POC testing in different kinds of health care settings. In primary care settings in developed countries, the shortened timeline between testing and availability of results reduces the need for extra office visits or follow-up phone calls to convey testing results and adjust clinical intervention. This strategy can reduce cost and increase access of otherwise underserved populations to medical care. For diseases that are infectious, such as transmitted infections or respiratory diseases, POC testing can facilitate treatment modalities quickly, thus preventing further spread of the infection for better and timely clinical management. In acute care settings, timely access to diagnostic information is most critical for providing an effective medical response. In disaster settings, POC diagnostics can speed triage and enable rapid establishment and delivery of medical services.

While in the developed world, POC testing is primarily designed as an adjunct to central lab testing, not as replacement, POC testing can enable local health care providers to deliver cost-effective care in developing countries or at rural locations with lack of access to central laboratory infrastructure. Further, a growing number of pointof-care technologies enable clinicians to remotely assess/monitor patients who are home bound or unable to meet the clinician in their clinical setting. The main moto is to multiply the effectiveness of physicians by providing better/faster information that enables timely delivery and management of health care.



Priyanka Sihag, Dept., of Management Studies, MNIT Jaipur session on "Sensors for Women-Security and Health" brought so much awareness on the mobile applications and its usage for women safety. The women safety is the prime concern in today's world considering the jump in the number of incidents and crime rates against women, especially in the metro cities where women must stay out for long. Around 85 percent of the women had faced some or the other kind of harassment before moving out of the teenage. As women need to travel late night sometimes, it is important to stay alert and safe. Although the government is taking necessary measures for their safety, still, there are free safety apps for women that can help them to stay safe. Most of the females nowadays carry their smartphone with themselves, so it is necessary to have at least one the belowmentioned personal safety apps installed. Such a safety app for girls can certainly help in some way or the other. Some of those applications include 1. My Safetipin: Personal Safety & Women Safety App 2.Women Safety 3.Shake2Safety - Personal Safety 4.bSafe -Personal Safety App 5.Watch.Me 6.Eyewatch SOS for women 7. iGoSafely -Personal Safety App 8. CitizenCop- Best Security App 9. Family Locator - GPS Tracker 10. Raksha, A Women's Safety App 11.SOS App: Women Safety, Senior Citizen, Ambulance 12. Himmat Plus.

Saikumar Tara Dept., of ECE, BVRIT HYDERABAD College of Engineering for Women & Student Activities Committee (SAC) Chairman, IEEE Hyderabad Section, has created a great awareness on "Importance of Sensors Council Chapter and its initiatives at Student Branches". The IEEE Sensors Council focuses on the theory, design, fabrication, manufacturing, and application of devices for sensing and transducing physical, chemical, and biological phenomena. With an emphasis on the electronics, physics, and reliability aspects of sensors and integrated sensor-actuators, the Council sponsors well-recognized, international conferences, and publications, including:



IEEE Sensors Journal, IEEE Sensors Letters, IEEE Internet of Things Journal, IEEE SENSORS Conference - the Council's flagship annual conference, IEEE International Conference on Intelligent Sensors, Sensors Networks and Information Processing (ISSNIP), IEEE International Symposium on Inertial Sensors and Systems (INERTIAL), IEEE International Conference on Internet of Things, IEEE International Conference on Flexible and Printable Sensors and Systems (FLEPS)

Council-sponsored activities provide participants the opportunity to publish and collaborate on research, network with colleagues, stay current on news and events, develop standards, and participate in educational activities. There are no membership requirements to join; participation in this Technical Council is free

Chithra Lekha, Senior Research Scientist ,the Coordinator, Healthcare Technologies Division, Virginia Tech India, Research Park, Indian Institute of Technology Madras, Chennai has shared her view on "Smart materials for flexible wearable's" Wearable devices seem to have great potential that could result in a revolutionary non-clinical approach to health monitoring and diagnosing disease.With continued innovation and intensive attention to the materials and fabrication technologies, development of these healthcare devices is progressively encouraged. The session gave a concise review of some of the main concepts and approaches related to recent advances and developments in the scope of wearable devices from the perspective of emerging materials. A complementary section of the review linking these advanced materials with wearable device technologies is particularly specified. Some of the strong and weak points in development of each wearable material/device are clearly highlighted and criticized.



Finally the conference was closed with a great pump and show by a valedictory function and vote of thanks.