Workshop Report: Technological Advancements in Digital Healthcare

Organised by,

Digital Healthcare Unit,

Department of Electrical Engineering,

Jamia Millia Islamia, New Delhi

Workshop Report

The workshop on Technological Advancements in Digital Healthcare was held from 01/02/2023 to 07/02/2023. The workshop aimed to provide insights into the latest technological advancements in digital healthcare and their impact on healthcare systems and patient outcomes. The workshop included 19 lectures from renowned experts in the field, covering a wide range of topics related to digital healthcare.

Overview of the Workshop

The workshop started with an opening address by Prof. Munna Khan, Organizing Chair, who highlighted the importance of technological advancements in healthcare and the need for collaboration between healthcare providers, technology developers, and researchers to bring about positive changes in healthcare systems. Followed by Address ofProf. Mini Shaji Thomas (Dean,FoE, JMI), Chief Guest Prof. Ibraheem, DSW, JMI. And finally, the vote of thanks by Dr. Kashif Sherwani, Organizing Secretary

The workshop then proceeded to the first lecture by **Prof. VR Singh** from CSIR-NPL, Delhi, who discussed the technological advancements in nano-sensor systems for healthcare. Prof. Singh explained the various applications of nano-sensors in healthcare, including monitoring vital signs, detecting diseases, and drug delivery.

The following lectures covered a wide range of topics, including research in defence forces, ML-based sleep analysis using EEG signals, electrical activity of the heart, thermal imaging-based techniques for digital health, cardiovascular readjustment, capacitive sensors for non-

contact health parameters measurement, and technological advancements in digital healthcare.

Dr. Ashok Kumar Salhan from DIPAS-DRDO, Delhi discussed the research in defense forces. He talked about the advancements in medical technology for treating battlefield injuries and the use of artificial intelligence and machine learning in analyzing and predicting the outcome of medical treatments.

Prof. Omar Farooq from AMU presented on ML-based sleep analysis using EEG signals. He talked about the use of machine learning algorithms to analyze EEG signals and diagnose sleep disorders.

Prof. Vibhakar Shrimali from G.B. Pant DSEU Okhla-I Campus spoke about the electrical activity of the heart. He discussed the different types of electrical activity that occur in the heart and the use of electrocardiogram (ECG) signals to diagnose heart diseases.

Prof. ZA Jaffery from JMI, Delhi discussed thermal imaging-based techniques for digital health. He talked about the use of thermal imaging to detect and diagnose diseases and the development of new sensors for thermal imaging.

Dr. KK Deepak from AIIMS, Delhi presented on cardiovascular readjustment. He discussed the impact of cardiovascular diseases on the human body and the different techniques used for treating these diseases.

Prof. Tarikul Islam from JMI, Delhi spoke about capacitive sensors for non-contact health parameters measurement. He talked about the use of capacitive sensors for measuring various health parameters such as body temperature, heart rate, and respiratory rate.

Prof. Tapan Gandhi from IIT, Delhi discussed technological advancements in digital healthcare. He talked about the use of artificial intelligence, machine learning, and internet of things (IoT) in digital healthcare and the development of new medical devices.

Dr. MA Ansari from GBU, Noida presented on AI and IoT in biomedical engineering and healthcare applications. He discussed the use of artificial intelligence and IoT in various healthcare applications such as disease diagnosis, drug discovery, and patient monitoring.

Dr. Suman Das from AIIMS, Delhi talked about man mechanical interface in epilepsy. He discussed the use of mechanical devices for controlling seizures in epilepsy patients and the challenges associated with these devices.

Prof. Majid Jamil from JMI, Delhi presented on power system fuzzy logic. He discussed the use of fuzzy logic in power system optimization and control and its application in the development of new medical devices.

Prof. Moinuddin, former director of NIT Jalandhar spoke about M-Health- A changing face of the healthcare system. He talked about the use of mobile devices for delivering healthcare services and the different applications of mobile health technology.

Dr. Mohammad Irfan Qureshi from JMI, New Delhi presented on CRISPR. He discussed the use of CRISPR technology in gene editing and its potential applications in treating genetic diseases.

Prof. Dipali Bansal from G.B. Pant DSEU Okhla-I Campus, New Delhi spoke about brain-computer interface. She talked about the use of brain-computer interfaces for controlling various devices and the challenges associated with this technology.

Prof. Shabana Mehfuzfrom JMI, Delhi discussed the role of cloud computing in healthcare. She explained how cloud computing can help healthcare providers to store, manage, and share large amounts of medical data securely and efficiently. She also discussed the benefits of using cloud-based healthcare systems, including increased accessibility, reduced costs, and improved patient outcomes.

Yusuf Uzzaman Khanfrom AMU, Aligarh presented the latest advancements in electrocardiogram (ECG) and electroencephalogram (EEG) monitoring for healthcare. He discussed how ECG and EEG monitoring can help healthcare providers to diagnose various medical conditions, including heart disease and neurological disorders, and how it can improve patient outcomes.

Prof. Ikbal Ali fromJMI, Delhi discussed the significance of smart grid technologies in healthcare. He explained how smart grid technologies can help healthcare providers to manage energy consumption, reduce costs, and improve the reliability and quality of healthcare services.

Prof. Abid Haleem from JMI, Delhi talked about the applications of additive manufacturing (AM) in healthcare. He explained how AM can be used to create customized medical implants, prosthetics, and devices, and how it can improve patient outcomes and reduce healthcare costs.

Prof. Neelesh Kumar from CSIR-CSIO, Chandigarh discussed the applications of virtual reality (VR) in digital healthcare. He explained how VR can be used to simulate medical procedures, train healthcare providers, and improve patient outcomes. He also discussed the potential benefits of using VR in mental healthcare.

Valedictory Session:

The Closing Ceremony of the Workshop on Technological Advancements in Digital Healthcare was held on the final day of the workshop, starting at 2:30 PM. The event began with the recitation of the Quran, which was followed by the welcome note by the Chair, Prof. Munna Khan, who is the Head of the Department of Electrical Engineering at JMI.

After the welcome note, the Dean of the Faculty of Engineering at JMI, Mini Shaji Thomas, addressed the audience. She highlighted the importance of the workshop and how it has helped in increasing awareness about the latest technological advancements in digital healthcare.

The DST-STUTI PMU Coordinator, Prof. Suhel Parvez, from Jamia Hamdard, New Delhi, then addressed the audience. He talked about the role of DST-STUTI in promoting research and innovation in the field of digital healthcare.

Next, the Guest of Honor, Padam Shree Prof. Sujoy Kumar Guha, from IIT and AIIMS Delhi, addressed the audience. He talked about the importance of interdisciplinary research and how it can lead to breakthroughs in healthcare technology.

The Chief Guest, Prof. R K Sinha, Vice-Chancellor of Gautam Buddha University, Greater Noida, then addressed the audience. He praised the efforts of JMI in organizing the workshop and emphasized the need for collaborative efforts in advancing healthcare technology.

The highlight of the event was the Presidential Address by Padam Shree Prof. Najma Akhtar, Vice-Chancellor of JMI, New Delhi. She talked about the importance of digital healthcare in improving the overall health of society and praised the efforts of the organizers in conducting such an informative workshop.

The distribution of certificates to the participants of the workshop was then carried out This was followed by the vote of thanks by Dr. Kashif Sherwani. The event concluded with a high tea.

In conclusion, the Closing Ceremony of the Workshop on Technological Advancements in Digital Healthcare was a fitting end to the informative and engaging workshop. The event provided a platform for experts in the field to share their knowledge and experiences, which will go a long way in advancing healthcare technology in the future.

Main Themes and Trends

One of the main themes that emerged from the lectures was the increasing use of machine learning and artificial intelligence in healthcare. Many lectures highlighted the potential of AI and ML in analyzing large datasets and developing predictive models for disease diagnosis and treatment.

Another theme that emerged was the importance of non-invasive and non-contact health monitoring technologies. Many lectures discussed the development of sensors and imaging techniques that could monitor vital signs and detect diseases without requiring physical contact with the patient.

The lectures also highlighted the potential of additive manufacturing, virtual reality, and cloud computing in healthcare. These technologies could revolutionize healthcare systems by enabling the development of personalized medical devices, providing remote healthcare services, and improving patient outcomes.

Critical Evaluation of Technologies

While the lectures highlighted the potential benefits of various technologies, they also emphasized the need for careful evaluation and validation of these technologies before their widespread adoption in healthcare systems. Several lectures discussed the challenges of ensuring the safety, accuracy, and reliability of digital healthcare technologies, and the need for regulatory frameworks to address these challenges.

Recommendations for Further Research

Based on the lectures and discussions, several recommendations for further research emerged. These include:

- Conducting more studies to validate the accuracy and reliability of digital healthcare technologies.
- Developing regulatory frameworks that address the challenges of ensuring the safety and effectiveness of digital healthcare technologies.
- Exploring the potential of machine learning and artificial intelligence in personalized medicine.
- Investigating the use of virtual reality and other immersive technologies in healthcare education and training.

Conclusion

In conclusion, the workshop on Technological Advancements in Digital Healthcare provided valuable insights into the latest advancements in digital healthcare and their potential impact on healthcare systems and patient outcomes. While the lectures highlighted the potential benefits of various technologies, they also emphasized the need for careful evaluation and validation of these technologies before their widespread adoption in healthcare systems. The workshop generated several recommendations for further research, which could help address the challenges of implementing digital healthcare technologies and realizing their full potential in improving healthcare systems and patient outcomes.