About IEEE

The Signal Processing Society is a dynamic organization that is the preeminent source of signal processing information and resources to a global community. We do this by: being a one-stop source of signal processing resources; providing a variety of high-quality resources to a variety of users in formats customized to their interests; adapting to a rapidly changing technical community; and being intimately involved in the education of signal processing professionals at all levels.

IEEE Signal Processing Society (SPS) provides dynamic opportunities to collaborate and connect with industry professionals, academics, and students alike working toward the advancement of signal processing and the technology it enables. It includes conferences and events, employment and professional networking opportunities, award eligibility, and top-ranked educational resources that help build rewarding, lifelong careers in the signal processing fields.

Technical Talk Series

Dr. Arnav Bhavsar, Associate professor at the Indian Institute of Technology, Mandi, Himachal Pradesh on 21st July 2021 on the topic of Applications of Deep Learning in Medical Image Analysis.

Prof Dr. Norliza Mohd Noor, Head of Electrophysiology Research Group, Razak Faculty of Technology and Informatics, University Teknologi Malaysia, Kuala Lumpur Campus, Malaysia on 17th July 2021 on the topic of Classification and Management of Lung Disease.
Dr. Supavadee Aramvith, Associate Professor, Multimedia Analytics and Processing Research Unit, Chulalongkorn University, Thailand on 25th August 2021 on the topic of AI-based Video Analytics.

Dr. Alpa Shah, Head- MCA Department Sarvajanik College of Engineering and Technology, Sarvajanik University on 17th July 2021 on the topic of Battling Emotions during COVID 19.

Dr. Rajalaxmi Chouhan, Department of Electrical Engineering, IIT Jodhpur on 18th September 2021 on the topic of An Overview of Technical Writing for research Proposal.

Dr Nirali and her team of six students from Faculty of Computer Engineering of Sarvajanik College of Engineering and Technology worked on Medical Image Translation that used a deep learning framework to translate MRI images from one modality to the other. IEEE SPS Gujarat Section congratulates Dr Nirali Nanavati and the team for winning “First Prize” in the 10th Computer Society of India - In-app International Student Project Awards 2021. We applaud Dr Nirali for sharing her work to our Newsletter to be published and benefit our readers.

Medical imaging is very important to track progress of ongoing illnesses and to create a visual representation of internal organs of the human body. A Computed Tomography (CT) scan normally takes 45 to 60 minutes while a Magnetic Resonance Imaging (MRI) can require 60 to 90 minutes. Sometimes it is possible that two different kinds of imaging modalities (e.g., T1 MRI and T2 MRI scan) provide supplementary information to complete a diagnostic process. So, if we are able to convert a medical image from one modality to another, we can save the time and money required for scans and make the diagnostic process faster and safer.

Our focus was on converting the modalities of MRI scan. The various modalities in MRI are T1, T2, Flair, Proton Density (PD), etc. We have been successful in generating MRI T2 from T1 modality. In T1 modality, tumours are light while in T2 modality, the tumours are bright. In T1 modality, fat tissues are bright while in T2 modality, fat and water are bright. Currently, long acquisition time (AQT) is observed due to series acquisition of multi-modality MR images (especially in T2 weighted images the acquisition time is longer). Due to this prolonged procedure, there are 50% chances of motion artifacts as well. Also, prolonged exposure to MRI has been widely reported to induce Transient sensory effects such as vertigo, nausea, dizziness, metallic taste, and visual phosphenes. Creating a model that could possibly generate other modality can enhance the efficiency of the conventional MRI procedure.

For medical image translation, a modified UNET based architecture which uses a convolutional neural network was proposed which will help them to generate the required brain images (generating T2 images from T1 images to save on the MRI scan time and exposure for the patients). In this project, they have worked on improving the efficiency and accuracy for medical image translation using DICOM (Digital Imaging and Communications in Medicine) brain images which are mostly used in contemporary MRI radiology practices. They have proposed a solution based on a deep neural network to convert T1 modality to T2 modality for DICOM images using our modified UNET architecture. Since the DICOM images were not available online they have sourced them. The proposed network provides a significant and promising T2 image for a given T1 image. The proposed solution is giving promising results in terms of MSE, MAE and PSNR (accuracy metrics). The generated T2 modality has also been validated clinically by a prominent Radiologist.

In Fig. 1, the left side image is the ground truth of the T2 MRI modality and the right side is the image generated by our proposed model. This model can be further extended to other modalities and to other parts of the body as well. Fig. 1 – Ground Truth vis -a - vis the generated T2 modality image. Hence, to conclude this project would help save on resources for the radiologists, cost for the patients, reduce motion artifacts. Hence, making MRI scan time shorter would make them less expensive, enabling more MRI examinations. It would also be beneficial for children as it would reduce the time needed for their MRI.
Our Upcoming Events

1. Data Science Challenge 1.0 (DSC 1.0)
With the goal of turning data into information, and information into insight, Sarvajanik College of Engineering and Technology (SCET), Surat in association with IEEE Signal Processing Society SCET Student Branch Chapter and IEEE SCET Student Branch has organized a National Level Project Competition ‘Data Science Challenge 1.0 (DSC 1.0)’. The event will be held on 28th and 29th January, 2022.

Participants in a team have been given a problem statement based on Data Science and they were required to produce the output based on given performance parameters.

Kindly refer to the link: https://ieeespsgs.org/data-science-challenge/

2. Two Days International Webinar on Women Leading Technology on 13th and 14th December 2021
The IEEE Gujarat Section Sensors Council’s Women in Sensors (WiSe) and the Signal Processing Society Chapter’s Women in Signal Processing (WiSP) in collaboration with IEEE Gujarat Section are pleased to announce an International Webinar (virtually) called Women Leading Technology (WoLT 2021) during 13–14 December 2021.

The objective of the Webinar is to provide a global stage for visionary women entrepreneurs, researchers, and academicians to understand and share their experiences. The Day-1 is completely devoted to successful women entrepreneurs. Day-2 is scheduled with four technical talks of state-of-the-art development in the area of sensors and signals. Besides these some other talks and networking moments are also arranged.

Kindly refer to the link: https://sites.google.com/scet.ac.in/wolt-ieee/home
3. Expert Talk on Challenges and Opportunities in AI
by Dr. Deepak Garg, Dean, International & Corporate Affairs, Bennett University on 20th January 2022, 10.00 am


CONGRATULATIONS!!
for elevation to grade of IEEE Senior member

1. Dr Arpan Desai,
   Technical Activity Chair, IEEE SPS Gujarat Section.

2. Dr Manish Khare,
   Membership Development Chair, IEEE SPS Gujarat Section.