



NEWSLETTER



Vol. II, September 2020

**Industrial Consultancy & Sponsored Research Board
(ICSR)**



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SARDAR VALLABHBHAI NATIONAL INSTITUTE OF TECHNOLOGY
(An Institute of National Importance, Established under NITSER Act by MHRD, Govt. of India)
SURAT-395 007, GUJARAT, INDIA.



Message from the Director.....

I am very happy that the Centre for Industrial Consultancy and Sponsored Research has come out with this Second Issue of the newsletter. The newsletter contains details of the Research Projects and the other related activities carried out in the last six months. Among various activities, a number of innovative works related to COVID-19 have also been carried out. These include developing face shields with 3-D printers, Sterilizer box for articles like mobile phones, etc., remotely operated trolley for serving medicines and other essential items in COVID patients' wards, etc. The content will be useful to the faculty members and the students in other Institutes to interact with the concerned faculty for any collaborative work.

The newsletter also provides a list of some of the consultancy assignments and the progress of Research Park at SVNIT. In the present year, 3 patents have been approved and Prof. Jigisha Parikh of Chemical Engineering Department has been selected as Fellow of the Royal Society of Chemistry. Please join me in congratulating the faculty members for the above achievements.

Please send your feedback/ comments, if any, which will help us to improve the newsletter.

Prof. S R Gandhi
Director



Message from the Dy. Director....

It gives me immense pleasure to see that team of Dean (Research and Consultancy) is in the process of releasing Second News Letter of the Institute. The News Letter contains the details of newly received sponsored Research Projects in last six months from different funding agencies, key findings of ongoing sponsored Research Projects and Research Park at SVNIT; along with Patents granted to the Institute. The Newsletter also contains the challenging consultancy assignments handled at the Institute level.

Last six months were very critical for the whole country, and our Institute faced very challenging tasks to keep the campus safe from Corona-2019 Pandemic. The faculty, staff and students were involved in development of safety tools, masks and sanitizers to make the campus safe against the pandemic. Such tools and masks were also donated to the society, police and hospitals for fighting against the pandemic. The details of such tools and innovative products are included in the current News Letter. The applications of such innovative products and untiring efforts of dedicated Task Force at Institute level kept the campus completely safe, as on date, from the Covid-19 Pandemic.

I would like to complement the dedicated efforts for the whole team for bringing such products for the safety of the Institute campus and society at large against the pandemic. Also, my congratulations to our faculty members and their research groups for fetching high valued research Projects and patents from their innovative research. Last, but not the least, my special complements to the faculty members for their personal achievements and signing MoUs with Industries and field organizations.

Prof. P L Patel
Dy. Director

COVID 19 Related Activities by the Institute

During the challenging times of COVID -19, the Director of the Institute **Dr. Shailesh R Gandhi** encouraged the Faculty/Students/Research scholars of the institute to come forward and contribute in fighting against COVID -19. Students and faculty responded to his call and contributed in significant ways.

Dr. Harshit Dave and **Dr. Shailendra Kumar** from Mechanical Engineering Department came up with a simple and cheap face shield and face mask with the support of their research scholars, Ashish Prajapati, Swapnil Vyavahare, Ravi Teja Karumuri, Rahul Narkhede and Labh Chand Dhakar.

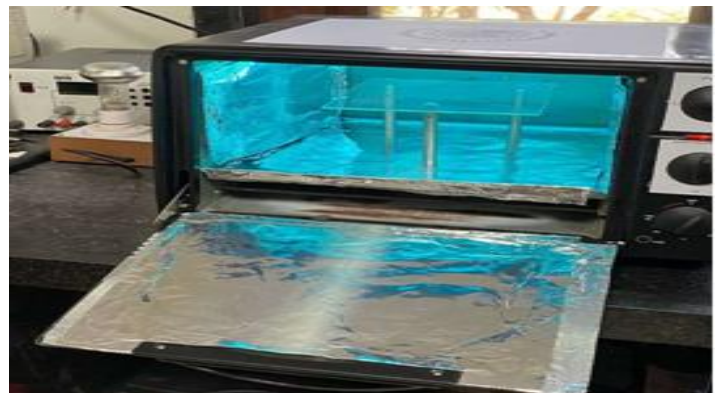


The 3D printer was utilized which is an upcoming manufacturing process which is being widely investigated in Advance Manufacturing Laboratory and Research Lab (Production section) of the department.



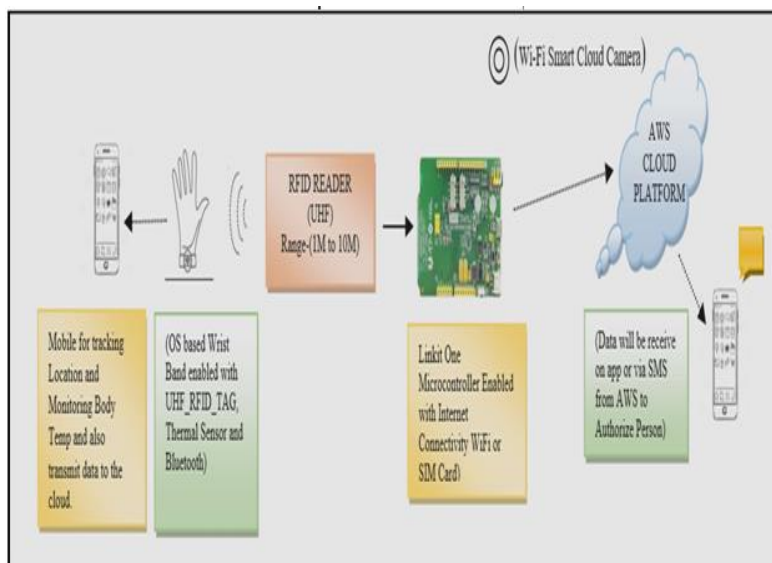
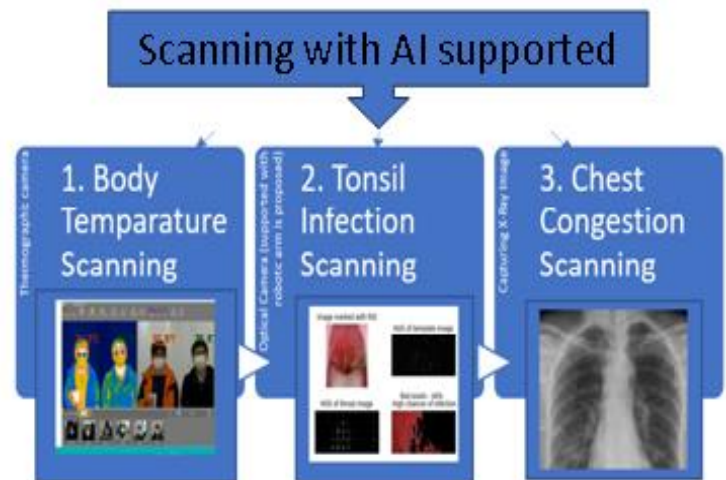
The team used PLA material which is a biocompatible material having negligible impact on environment. Face shield and face mask so fabricated weigh only 15 gram and 70 gram respectively and can be easily worn. Similarly, the team made and distributed ear guards, public toilet tap retrofit, door handle retrofit etc. Around 700 face shields have been distributed amongst front line covid warriors like Surat Municipal Health Care Team, Medical doctors, Local Police Station Staff, Security Staff, Mess Workers etc.

Research Scholar Akshay Jariwala and **Dr. Vipul Kheraj**, Associate Professor of Department of Applied Physics, SVNIT, and his team at Optoelectronic Materials and Devices lab have developed and fabricated a novel sterilizer box to thoroughly sterilize surfaces of mobile phones, vegetables, fruits and groceries before using them to overcome this



problem. The design involves combination of UV- C radiation along with hot-air in an oven, hence named 'yoUVen', to ensure thorough sterilization of various objects, even when the surface is irregular in shape.

Prof. Dr. Upena Dalal and Dr Parima Parikh (MD Pediatrician) concluded based on literature survey that along with the Chest x-ray+AI based scanning system (for lower respiratory system), one need to have tonsillitis examination (upper respiratory system) with the help of thermo graphic camera and optical camera, in order to identify the COVID-19 suspected cases. The AI based Chest X-Ray scanning system with gesture identification is already developed. Now, in continuation for throat infection part, a team of students developed image processing based algorithm to detect the viral infection from the tonsillitis images. There may be bacterial infection with redness and yellow dots, so in order to identify redness and inflammation in tonsils along with its level of infection, **Dr. Kishor Upla**, Asst Prof, ECED, SVNIT developed AI part of it, creating the dataset of 1000+ images. Once the throat infection is identified, medical diagnosis can be done for final conclusion. This reduces the consumption of sample kits. It is planned to develop a robotic arm for touch less capturing of images, hence, communicating with various companies. Thermo graphic and optical cameras suitable for the applications are identified.



Home Quarantine People Tracking and Alert Message Generation System designed (Wristband) by Sarikhada Mansi, Sai Pranav, Sureliya Bansi, Neha Patel, Kanchankumari, Pritesh Kethele, Shubham Pandey under the guidance of **Prof. Dr. Upena D Dalal**. This Project design can be used to monitor the movements of quarantined patients, both at home and at hospitals, and any spikes in their body temperature, it will send an alert to public health officials if patients move outside their quarantine zone. The devices will also have an emergency

button that wearers can use to call for help. The wristband will let health workers know if people they encounter have been to high-risk areas or have been in contact with an infected person, while aiding those delivering essential services such as groceries or medicines. It will capture all the places, an infected person has visited, the routes they took, determine if they

had any foreign travel and identify those who were in their vicinity. It will also tell people if a sick person is nearby. It will also help in creating a geofence, or a virtual perimeter, around areas being monitored, such as common meeting places, public transit or places for religious gatherings. A person leaving or entering the virtual perimeter could be alerted through the wristband.

Mr Seshu Vardhan, research scholar of Applied Chemistry Department under the supervision of **Dr. S K Sahoo** started computer based simulations and docking work using high-speed computing facilities to contribute some results on the mission of quick discovery of drugs for COVID-19. The purpose of computer based simulations work is to search targets from medicinal plant extracts (found in tulsi, neem, citrus etc) and FDA-approved drugs that could have potential use for fight against COVID-19.

Some computational results from his research group indicating that the phytochemicals (chemicals of plant origin) are showing better binding with the proteins related to COVID-19 as compared to hydroxychloroquine claimed to be effective against COVID-19. Therefore, the outcome is a good sign for future research to use traditional Indian medicines as an alternate for long term fight against COVID-19. Some other computational simulations to propose suitable targets for COVID-19 are in the process of development.

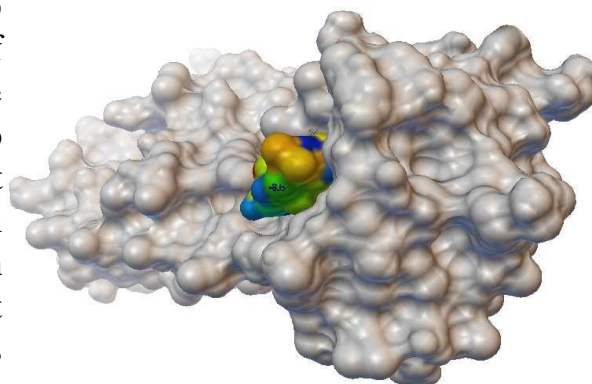


Image of Molecular Docking



Handover of Automated Trolley to Covid Patient Ward to Dr. Vandana Desai, HoD, SMC Hospital by Prof. S A Channiwala

Development of 'Sardar Automated Trolley' for COVID-19 patients: Mr. Parth Shah, research scholar at SVNIT Surat under the guidance of **Prof. S A Channiwala**, CSIR Bhatnagar Fellow and workshop staff Shri Gajendra Panchal along with Mr. Gav Master and Mr. Shivdas developed an automated Trolley for COVID-19 ward. The trolley can be operated using smart phone from remote location. The trolley compartments were treated with anti bacterial and antiviral coating treated with Tulsi Extract. **Dr. Ravi Kant** Workshop in-Charge extended all his support.

The trolley can be operated remotely and can be used to dispatch food packets, medicines to covid patients. It has speaker arrangement for announcement.

Mr. Kalpak Sagar and Nishant Shah, Research Scholars under the guidance of **Dr. Hemant Mehta** and **Shri G J Panchal** fabricated a disinfection tunnel for vehicles visiting the campus. The tunnel is also used to disinfect the ambulance on campus which is also handling the covid patients. Shri G J Panchal, Technician SG I and In-charge Foreman at Workshop played a key role.



For awareness to fight against Corona Virus, UBA students/Faculty and our Chief Medical Officer **Dr. Sanjay Shah** contributed in making 10,000 cloth masks by taking cloth in donation from one of the Surat Textile owners Shri Kamal Pugalia Ji and Dr Paresh Shah (Surgeon and Philanthropist), got them stitched from the women from villages adopted under **Unnat Bharat Abhiyan**. This has made women villages to earn their livelihood in challenging times.

The cotton masks were distributed to campus students, security staff, mess workers, house-keeping staff of campus. In addition to this few masks were distributed to village people.



SVNIT UBA team working with village women of adopted villages making cotton mask during COVID 19

Use of artificial intelligence to detect covid patient: **Dr. J Banerjee** led **ASHINE** incubated students, namely, Nikhil Vyas, Pratyush Gupta, Divya Shah and Kishan Singh and Het Shah developed a software using artificial intelligence and deep learning claiming that the chest X Ray can assist doctors in identification of COVID -19.

Prof. Dr. Atul K Desai is associated with the development of new Covid hospital instead of using stem shell center with PIU officials. As existing building is not designed for such purpose; there was a need of extra power supply to mitigate the requirements. For the high power requirement transformer positioned but it requires platform which can take minimum one-month time to build. Considering the time and space constraint, requirement is satisfied by steel Concrete Composite foundation. The solution was provided at the site and foundation had been developed only in 8 hours.



With the lead role of Workshop Staff Mr. Gajendra Panchal and support from research scholars Mr. Puneet Kumar and Himanshu Prajapati developed a foot operated hand sanitizer that can be operated using foot paddle so as to minimize the risk of transmission. The machine was developed and handed over to Health Center. **Dr. Ravi Kant** Professor In charge Workshop mentored the development of this product.

In-house Hand Sanitizer prepared by Chemical Engineering Department:

Faculties of Chemical Engineering Department **Prof. Dr. Jigisha Parikh, Dr. Meghal A Desai** and **Dr. Sanjay R Patel** initiated the preparation of in-House Sanitizer for the Institute. Research Scholars (Rushikesh, Yash, Vishal, Shama and Shivangi) were guided for the preparation of Sanitizer in BULK quantity as per the standard protocol and in line with the safety precautions. Moreover, the final product delivered was with value addition i.e. addition of typical essential oil having antibacterial and antimicrobial capacity. This essential oil is a research product from the ongoing activities of the mentioned faculty members at the department. Total of 225 litres of in-House Sanitizer was prepared during this pandemic situation and handed over to Health Center Chief Medical Officer **Dr. Sanjay Shah** who in turn arranged to distribute in campus at various places like Administrative/Academic Departments/Sections, students hostel, security staff, faculty quarters, UBA cell etc.



Sanitizer made at Chemical Engineering Department for in-house distribution.

Recently Sanctioned Research Projects

Robot Making Competition "ROBOFEST-GUJARAT"	
Dr. Harshit K Dave Mechanical Engineering Department	Funding Agency: GUJCOST
Study of breakup reactions involving weakly bound projectile nuclei at Coulomb barrier energies	
Dr. Dipika B Patel Applied Physics Department	Funding Agency: SERB
Development of composite thin films with simultaneous different and magnetic properties	
Dr. V N Lad Chemical Engineering Department	Funding Agency: DST
Linear Stability Analysis of Interface Dynamics in Two Phase Jets	
Dr. Jyotirmay Banerjee Mechanical Engineering Department	Funding Agency: SERB
Simulation and Land data assimilation to community land model for improving rice crop dynamics	
Dr. R K Jana Applied Mathematics Department	Funding Agency: ISRO
Synthesis of Artificial Sweeteners and High Value Chemicals from Biorenewable Resources using Noble Metal Aerogel Catalysts	
Prof. Jigisha Parikh Chemical Engineering Department in collaboration with IIT, Delhi	Funding Agency: SERB
Design and Development of Co-Planar Waveguide based Wearable Bio-Sensor for Medical Application	
Dr. Piyush Patel Electronics & Communication Engineering Department	Funding Agency: DBT

Research Activities

Mathematical modelling of thermal dispersion of effluent released into moticher lake at KAPS

Dr. Jyotirmay Banerjee (PI)
Department of Mechanical Engineering
Dr. R A Christian (Co-PI)
Department of Civil Engineering



Funding Agency: Board of Research in Nuclear Science (BRNS)

Project summary

Present work involved modeling, numerical analysis and experimental field measurement for analysing dispersion of thermal effluent released into the water body of Moticher Lake from the operating units of Kakrapar Atomic Power Plant (KAPS). KAPS is a nuclear power plant located on southern bank of Moticher Lake, in the downstream of Kakrapar weir on Tapi River. KAPS currently has a running capacity of 440MW (2×220MW) with a future expansion of 1400MW (2×700MW) in installation at the same premises. Surface discharge method is adopted for an average volume flow rate of 5000 m^3/hr of effluent being released into the Moticher Lake. Taking into consideration the upgradation of existing power generation capacity, the thermal effluent discharged from the blowdown into the same lake could cause notable environment impact. In order to control the temperature gradient in the near vicinity of the blowdown, the lake water temperature distribution near the blowdown was examined using an in-house designed buoy, depth meter and attachment used for inserting the temperature probes shown in Figure. Dispersion of thermal effluent released near the blowdown is analyzed based on measured temperature and reported in this research.



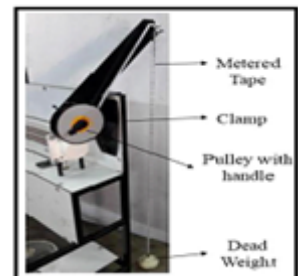
(a)



(b)



(c)



(d)

(a) Blow down pipe with six holes at periphery. (b) Attachment used for inserting the temperature probes near blowdown. (c) In-house designed Buoy in the Moticher Lake. (d) Depth meter.

In addition, the zone of thermal influence is established using numerical analysis and based on field measurement of temperature using Buoy for different seasons of the year. A multiport submerged diffuser is designed and optimized for minimization of the zone of

thermal influence. The performance of the optimized diffuser is tested in a lab scale test facility in the Advanced Fluid Dynamics Laboratory of Mechanical Engineering department.

Study, Design and Simulation of Ionodelay effect based on Ionospheric Models and their correction techniques using Software Defined Radio



Dr. Shweta N Shah (PI)
Electronics & Communication Engineering Department

Funding Agency: SAC, ISRO Ahmedabad

Project Summary

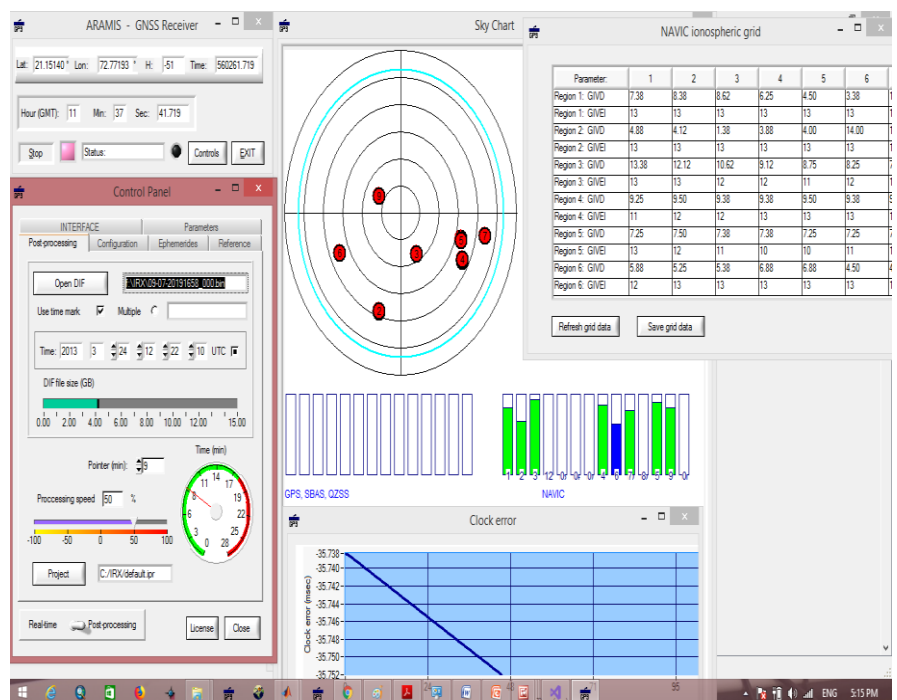
The Indian government has launched a NavIC regional navigation satellite system to provide accurate positioning information for the low-latitude equatorial Indian subcontinent. Navigation should be accurate enough to give precise location. The ionosphere plays an important role as satellite signals have pass through it. Overcoming the effects of the ionosphere is a challenging problem in the NavIC system due to significant irregularities in the low latitude Indian region. The purpose of the project is to observe the effect of the ionosphere on NavIC signals and provide the correction using existing ionospheric delay models (dual frequency, Klobuchar, GIVE, GRAPHIC, etc.) as well as a proposed model on the software-defined radio platform to improve the NavIC positional accuracy.

Innovation

The implementation of proposed ionospheric algorithms on SDR based NavIC receiver improves the performance of the receiver in the local region compared to conventional Klobuchar and regional GIVE model.

Technology Transfer

The MOU for NavIC receiver and its data, between SAC, ISRO, Ahmedabad and SVNIT, Surat has been done from 10/01/2017.



GUI of NavIC L5-Band ARAMIS SDR Receiver

New Product Development

Developed SDR based ionospheric correction model for precise positioning of NavIC receiver.

Investigations on a Novel Stacked Minichannel Heat Sink using Efficient Coolants

Hemantkumar B Mehta (PI)
Mechanical Engineering Department



Funding Agency: SERB, New Delhi

Project Summary

Incessant development of electronic components demands the invention of novel thermal management technique which provides reduced temperature non-uniformity and pressure drop penalty. In view of that, a novel liquid cooled Variable Channel Width Double Layered Minichannel Heat Sink (VW_C DL-MCHS) is proposed in the present study (shown in Fig.1). The results of present numerical and experimental investigations show that, counter flow VW_C DL-MCHS with zero overlap (0%) shows the overall improvement in thermal performance of 8.68 times than the conventional Single Layered (SL)-MCHS and 3.7318 times higher than the conventional double layered (DL)-MCHS using water as well as advanced coolants.

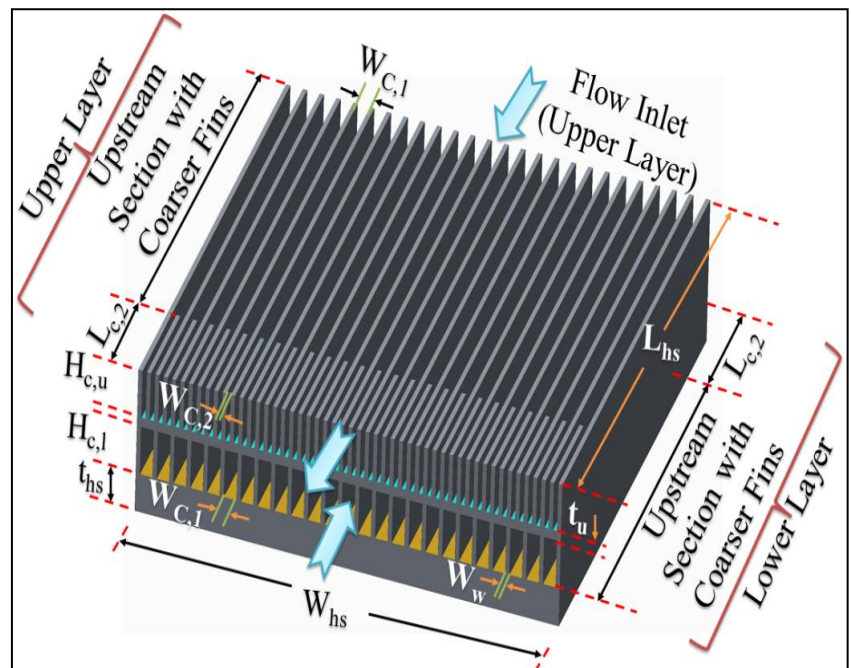
Application Potential:

The present invention is an innovative liquid cooling device for the efficient dissipation of the large amounts of heat from the very small and constrained areas of the high heat flux microelectronic chips and circuits developed for various advanced engineering applications.

Patent

Design Registration:

The present design of a VW_C DL-MCHS is ***granted and published***



Schematic of a VW_C DL-MCHS

in the patent journal No. 28/2019 dated 12th July 2019 for the registration to the controller general of Patent, Designs and Trademarks, Intellectual Property office, Kolkata, India with Application No. 303545 entitled as “Stacked Minichannel Heat Sink”.

Complete Specification:

The complete patent specification entitled “A liquid cooled Variable Channel Width Double Layered Minichannel Heat Sink (VW_C DL-MCHS) with zero overlap” having Application No. 201821021270 is filed at the Indian Patent office, Mumbai, which is published in the patent journal No. 32/2018 dated 10th Aug 2018.

Novel perovskite-based solar cells: Investigation of potential properties using ab-initio approaches

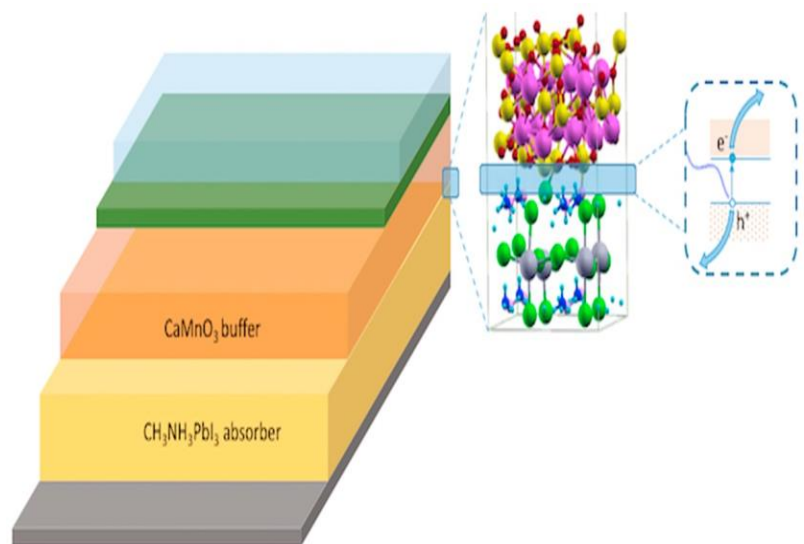
Dr. Yogesh Sonvane (PI)
Applied Physics Department



Funding Agency: SERB, New Delhi

Project Summary

The proposed research work aims to apply theoretical approaches to design perovskite solar cell by tailoring the layer thickness, surface roughness, transparency and electrical properties coupled with appropriate hole transport material (HTM). The graphene-ZnO composite based perovskite solar cells are expected to show a higher efficiency as compared to their conventional TiO₂ counterparts. Our theoretical results suggest that the power conversion efficiency (η) is 28%, which is higher than that of its bulk form and 5% less than the Shockley–Queisser limit (33%), suggesting that 2D CH₃NH₃PbI₃ is a good candidate for the solar cell application.



CaMnO₃-based buffer layer perovskite solar cell (Ref. Nano Energy, 45, 287, 2018)

Development of Novel Cluster Assembled material from Potential Cluster Motifs: A new insight under density Functional Investigation

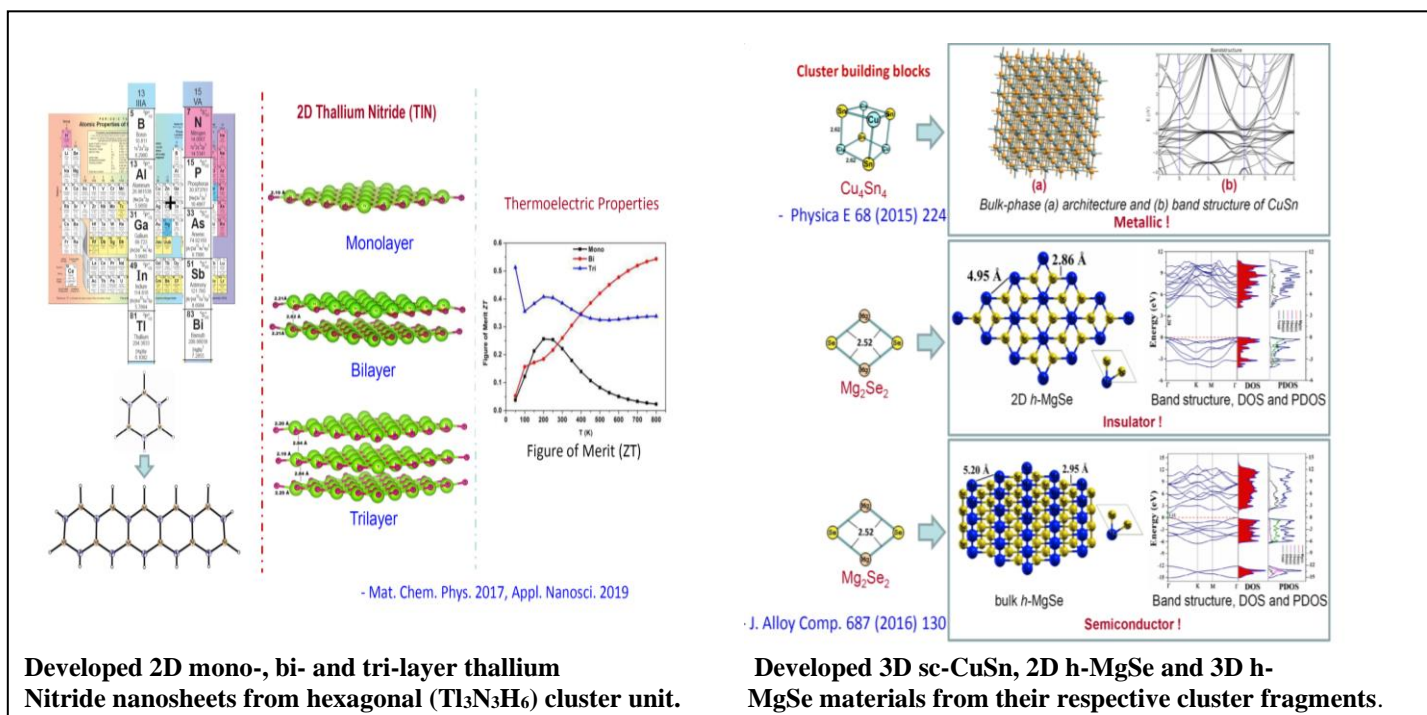
Dr. Debesh R Roy (PI)
Applied Physics Department



Name of Funding Agency: SERB, New Delhi

Project summary

Small atomic clusters are the sub-nanoscale particles are of immense interest for developing novel cluster assembled materials with excellent electronic, chemical, magnetic and optical properties and relevant applications. A number of exceptionally stable with useful properties are developed as units of developing materials which includes Al_4^{2-} (D_{4h}), Be_3^{2-} (D_{3h}), M_4Mg_3 ($M=B, Al, Ga, In, Tl$), Si_3Mg_3 , Si_4Mg_3 , Si_7Mg_3 etc. Several novel 1D, 2D and bulk phase cluster assembled materials are developed under the project, e.g. metallic (h -BeS, sc -CuSn, sc -AgSn etc), semi-metallic (2D mono-, bi- and tri-layered TIN nanosheets), insulator (2D h -MgSe) and semiconductor (3D h -MgSe, 1D B_4Mg_3) etc.



Design of Green Synthetic Approaches for Atomically Precise Nanocluster their specific Interactions: Development of Miniaturised Analytical Method

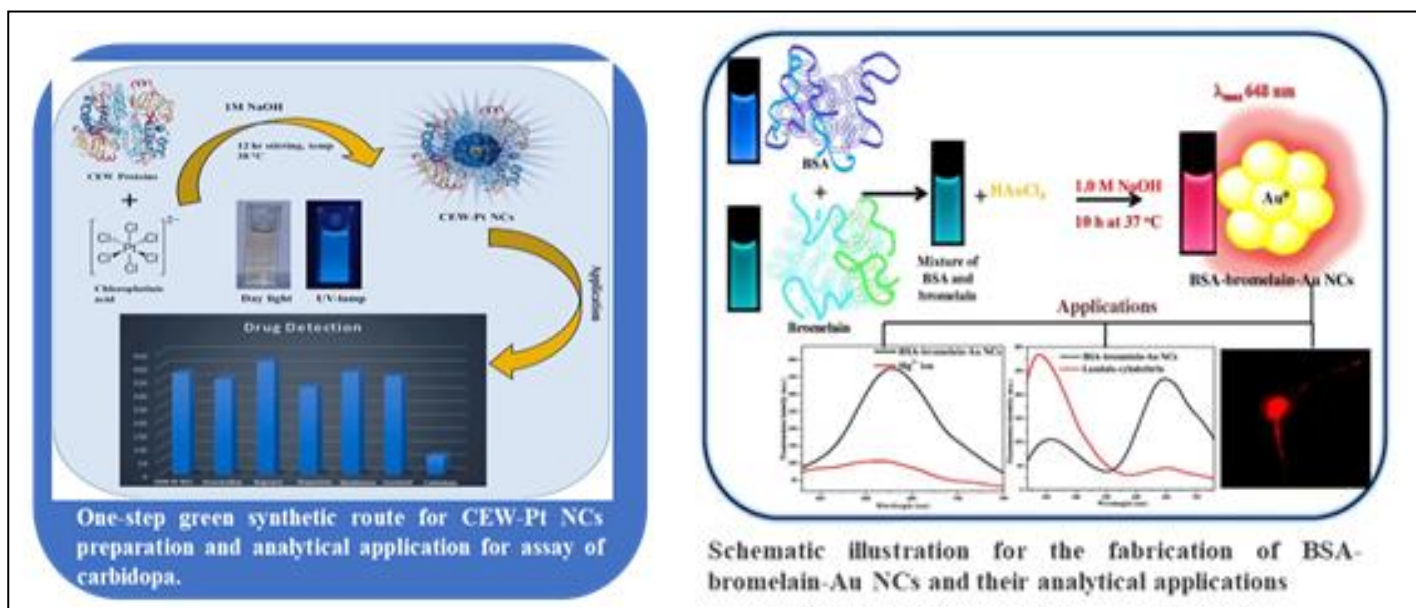


Dr. Suresh Kumar Kailasa (PI)
Applied Chemistry Department
Prof. Z V P Murthy (Co-PI)
Chemical Engineering Department

Funding Agency: SERB, New Delhi

Project summary

The proposed project, deals with the green synthetic approaches for atomically precise nanoclusters for dictating their specific interactions. Development of miniaturized analytical methods for assaying of chemical and biomolecules with reduced sample preparations. This project will be completely focused on the creation of nanoclusters with precisely natural molecular ligands and plant extract to control nanoclusters surface properties, which provides an important toolkit for modulating their interaction with either chemical or biological systems, allowing them to use as probes in analytical method developments for assaying of chemical species.



Young Faculty Research Fellowship (YFRF) of Visvesvaraya PhD Program



Dr. Piyush N Patel (PI)
Electronics Engineering Department

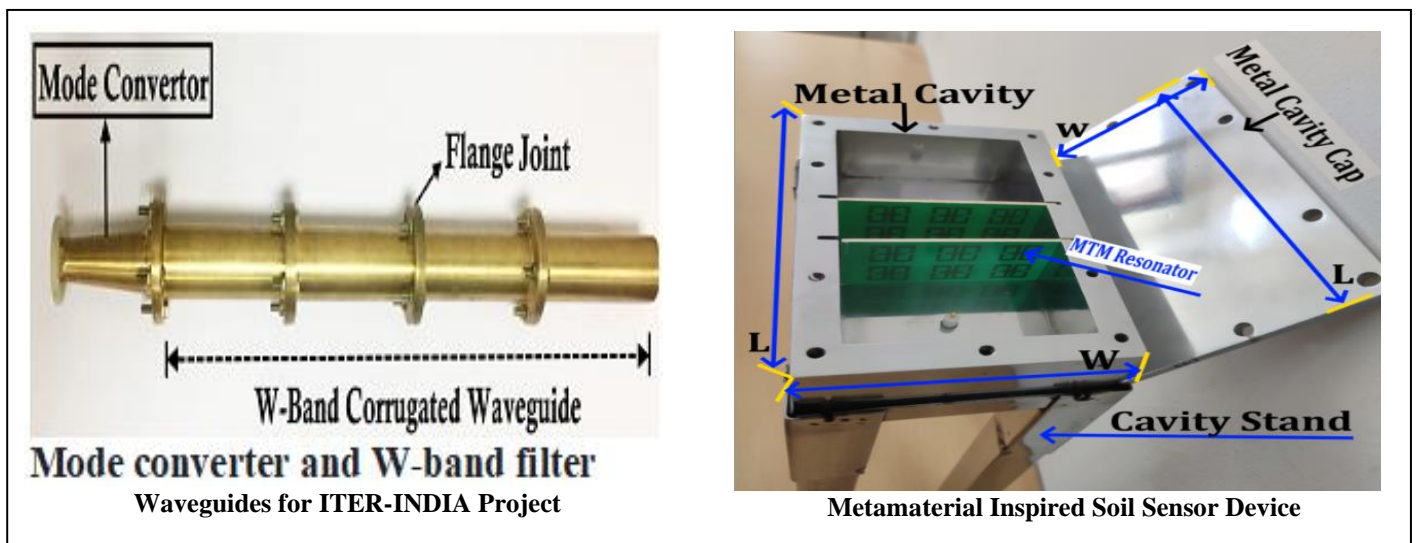
Funding Agency: MeitY, Government of India

Project summary

This project grant is sanctioned to support the research need of young faculty e.g. equipment, manpower and other similar expenses of relevance to support the research work of the 'Young Faculty Research Fellow (YFRF)'.

In this research grant following areas of research are explored:

1. Modeling, Fabrication, and Testing of Electromagnetic Bandgap-Inspired Microwave Devices for Sensor Applications
2. Design, fabrication and characterization of w-band notch filter for wave diagnostic application in ITER-INDIA
3. Realization of ENG Metamaterial-Based Planar Modular Devices for Sensor Applications
4. Design and fabrication of sensors for structural health monitoring.
5. Design and fabrication of E-Textile antenna for WBAN and sensor applications.
6. Design and fabrication of metamaterial inspired devices and their applications for soil sensors.



Mode Converter
Flange Joint
W-Band Corrugated Waveguide
Mode converter and W-band filter
Waveguides for ITER-INDIA Project

Metal Cavity
Metal Cavity Cap
MTM Resonator
Cavity Stand
Metamaterial Inspired Soil Sensor Device

IT Indian Heritage Platform: Enhancing Cultural Resilience in India by Applying Digital Technologies to the Indian Tangible and Intangible Heritage



PI (India)
Dr. Dilip A Patel
Dept of Civil Engineering



Co-PI
Dr. Kumar Neeraj Jha
Dept of Civil Engineering
IIT, Delhi



PI (UK)
Dr. Chika Udejaja



Co-PI
Dr. Claudia Trillo
School of Science Engineering and Environment
University of Salford, Manchester, UK



Co-PI
Dr. Kwasi Gyau Awah

Funding Agency: Indian Council of Historical Research (ICHR), New Delhi.

Project summary

Surat is a major metropolitan area experiencing dramatic migration flows and therefore its cultural identity is challenged by new uses and meanings given to the traditional cultural heritage.

This research allows making available to the wider public through website information including a sample of 10 exemplar heritage buildings. It will be possible for the website users to navigate the buildings through 3D models, including information on constructive techniques and state of conservation. The data on the buildings will be complemented with further information reflecting the less visible but equally important cultural assets,



for example, folklore, traditions, uses and stories associated to the buildings and related environment. These will include: storytelling from the locals, short videos on the relevant traditional events. Although the website and associated dataset is the main outcome of this

research, partner institutions from India and UK will continue working jointly beyond the project through a Centre of Excellence. This will be internet based and will offer support to all those authorities, willing to implement the same approach.

www.it-india-project.com

The near future air cathode Osmotic microbial fuel cell (OMFC) for wastewater treatment, electricity generation and pure water extraction

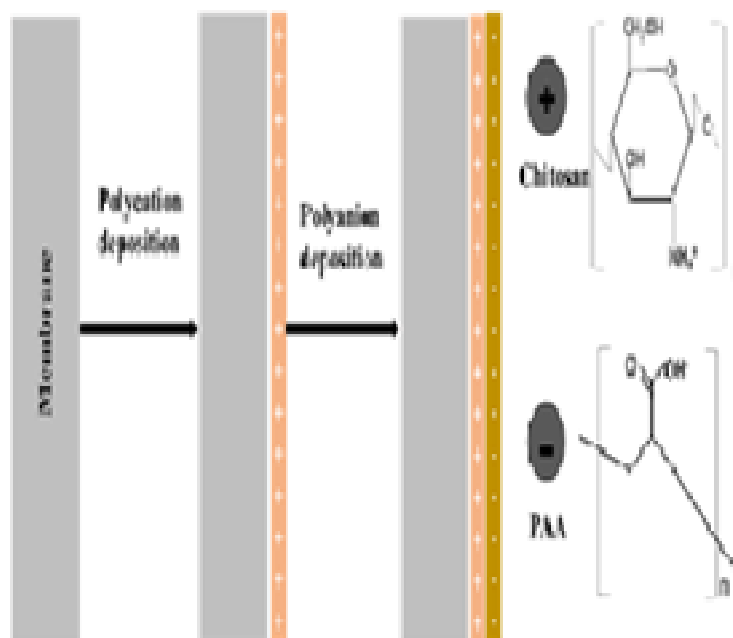
Dr. Alka A Mungray (PI)
Chemical Engineering Department



Funding Agency: SERB, New Delhi.

Project summary

The primary focus of the project was to get a reliable renewable power source, wastewater treatment and pure water form wastewater. Novel technique like air cathode OMFC with hollow fiber FO membrane and Quantum Dots (CQDs) from Tulsi leaves as a draw agent was used in this project. Water flux and reverse solute flux was determined for flat sheet and coated hollow fiber FO membrane in FO and OMFC system. Taguchi and ANOVA was performed for optimizing the operating parameters of Tulsi CQDs as a draw solution such as temperature, flow rate and concentration on coated hollow fiber membrane. OMFC setup with the best operating condition was performed.



Single LbL polyelectrolyte coating

Impact of Climate Change on Water Resources of Sabarmati Basin



Dr. P L Patel (PI- Partnering Institute)
Civil Engineering Department
SVNIT, Surat

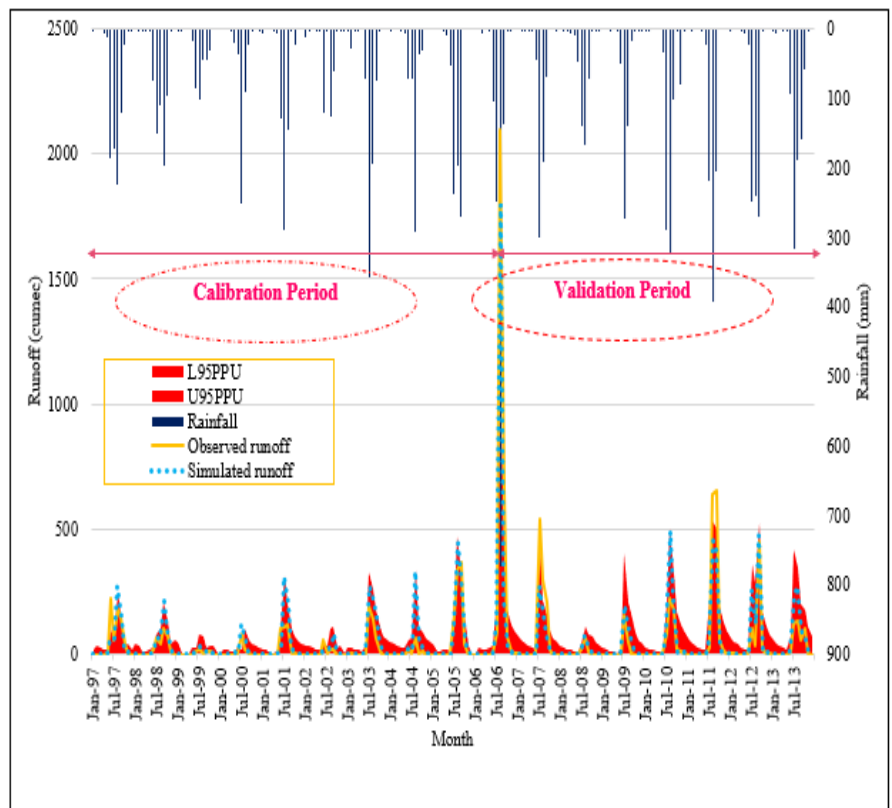
Dr. Vimal Mishra (PI- Lead Institute)
Civil Engineering Department
IIT, Gandhinagar

Funding Agency: Indian National Committee on Climate Change (INCCC), Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti (GoI).

Project Partnering Institute: IIT, Gandhinagar (Lead Institute).

Project Summary

The proposed project includes Collection of long-term hydrological data base of Sabarmati basin, Development of hydrologic modeling framework using HEC-HMS, SWAT and VIC, Development of high resolution downscaled and bias corrected climate and hydrologic scenarios, Detailed assessment of retrospective change and changes that are likely to occur under the projected future climate, Reservoir and irrigation optimization and simulation and Training of graduate and post graduate students.



Simulated and observed inflows into Dharoi Reservoir

Impact of Climate Change on Water Resources of Tapi Basin



Dr. P L Patel (PI -Lead Institute)
Civil Engineering Department
SVNIT, Surat

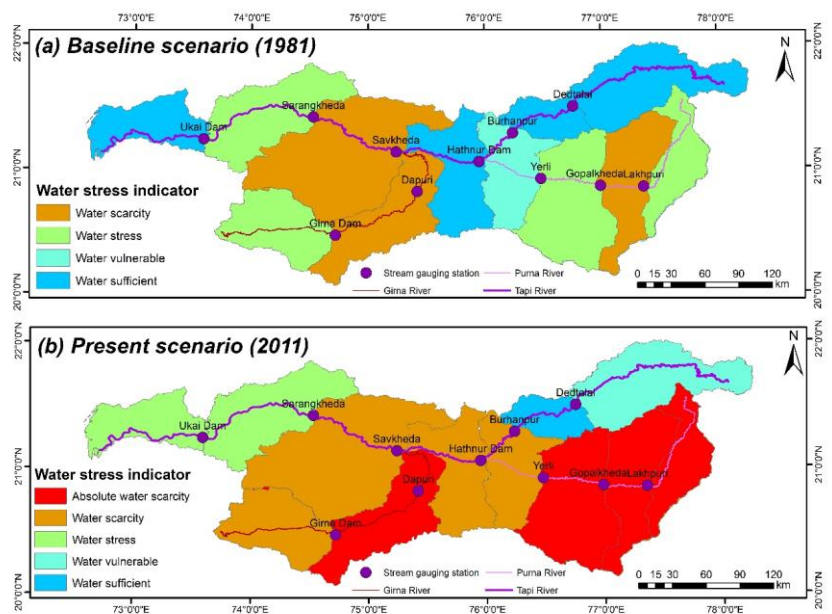
Dr. P V Timbadiya (Co-PI - Lead Institute)
Civil Engineering Department
SVNIT, Surat

Funding Agency: Indian National Committee on Climate Change (INCCC), Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti (GoI).

Project Partnering Institute: MNIT-Jaipur and MANIT-Bhopal (Partnering Institutes).

Project summary

SVNIT-Surat in collaboration with MNIT-Jaipur and MANIT-Bhopal is involved in assessing the impact of climate change on water resources of Tapi basin. The project undertakes development of hydrologic and hydrodynamic models for the baseline scenarios to ascertain basin response to the aggravating climate change conditions across the globe and help governing bodies in deriving/employing better water management practices addressing the catastrophic effects of floods and droughts. The project also focuses on the development of optimal reservoir operation policy/ rule curves for Ukai Reservoir, under the influence of climate change, such that the releases would not cause flood situations in the downstream areas, preferably Surat city.



Temporal evolution of water stress indicator for (a) Baseline scenario (1973-1981) and (b) Present scenario (2002-2011).

Computational Study on Multi-dimensional Stefan Problems in Biological Tissues based on Non-Fourier Heat Transfer Model using Mesh-free Method



Dr. Sushil Kumar (PI)
Applied Mathematics & Humanities Department

Funding Agency: SERB, New Delhi.

Project Summary:

Objectives of the project are: (1) to develop mathematical model for vivo freezing of biological tissues considering: non-ideal, variable thermo-physical properties of tissue, (2) to generalize the mathematical model by considering the porosity, non-equilibrium heat conduction etc., (3) to develop the efficient numerical scheme based on RBF mesh-free method to solve the resulting mathematical model. The algorithm and computer code developed will be made available to other researcher working in the field to solve the different mathematical models of phase change phenomena in other discipline of engineering sciences. Thus, research collaboration will also be developed with other institutes.

Development of Control Algorithms for Shunt and Series Connected Custom Power Devices

Dr. Sabha Raj Arya (PI)
Dr. Rakesh Maurya (Co-PI)
Electrical Engineering Department



Funding Agency: SERB, New Delhi

Project summary

Reducing the time of manual tuning PI controller gains by introducing an Optimization Techniques (OTs) implementation for PI regulator gains tuning in the DVR control algorithm and DSTATCOM control algorithm in three leg and six leg voltage source converter based topologies. Advantages of phase locked loops (PLLs) like extraction of fundamental component, estimation phase angles, and fundamental frequency from the non-ideal supply voltage has been utilized in the control algorithms of DVR and other side Improved response and Advantages in case of adaptive and learning based algorithm with less tuning or constant parameters.

Development of control algorithm in association with optimized PI tuning method for fast dynamic response for compensation of voltage and current based power quality problems.

Study & Implementation of Generative Adversarial Network (GAN) for image super-resolution: Application to image captured using CCTV camera

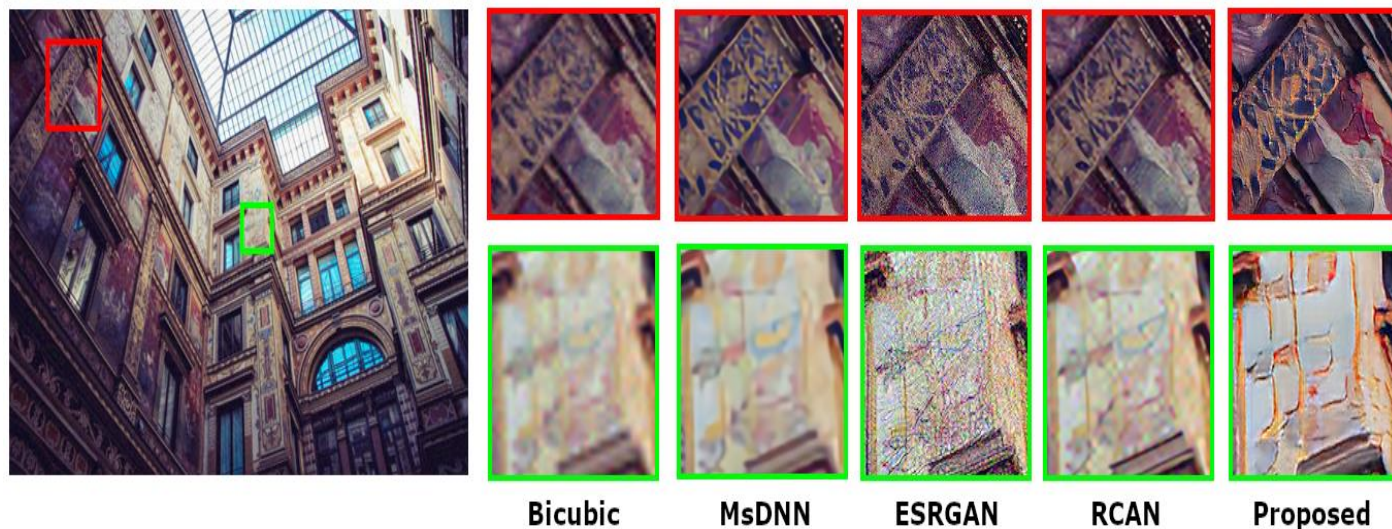
Dr. Kishor P Upla (PI)
Electronics Engineering Department



Funding Agency: SERB, New Delhi.

Project summary

In this project, our aim is to use generative adversarial network for super-resolution task for images acquired from CCTV camera. Because of un-availability of real LR-HR paired data on CCTV, we need to use unsupervised learning approach. In this direction, previous works tried to generate LR image from HR image based on real LR dataset which are later used to train SR network in supervised manner. However, we proposed couple of approaches which directly learn SR from unpaired LR-HR data and achieve comparable performance with state-of-the-art methods.



Visually Comparison of proposed USISResNet method with other SOTA methods on NTIRE-2020 Real world SR challenge Track1 (testing data) for up-scaling x4.

CONSULTANCY

List of Major Clients

- ❖ Ahemdabad Municipal Corporation, Ahemdabad
- ❖ APWD, South Andaman Div, Port Blair
- ❖ BRTS Projects, Surat Municipal Corporation, Surat
- ❖ Civil Division, Dadra & Nagar Haveli, Silvassa
- ❖ Heritage Cell, Surat Municipal Corporation, Surat
- ❖ Hydraulic Department, Surat Municipal Corporation, Surat
- ❖ Irrigation And Water Resource Department, Government Of Uttar Pradesh
- ❖ J P Iscon Pvt Ltd " Iscon House" Ahemdabad
- ❖ Kalthia Bhavnagar Pipli Highway Pvt Ltd, Bhavnagar
- ❖ Kalthia Engineering And Construction Ltd
- ❖ Konstelec Engineering Pvt Ltd, Mumbai
- ❖ Malani Construction Co. Rajkot
- ❖ National Highway Authority Of India, Odisha
- ❖ NTPC Limited, Uttar Pradesh
- ❖ ONGC, Ankleshwar
- ❖ Palsana Enviro Protection Limited, Surat
- ❖ Patel Sethiyahopu-Cholopurm Highway Pvt Ltd
- ❖ PWD, Dadra & Nagar Haveli, Silvassa
- ❖ Rachna-KECL JV, Ankleshwar, Dist-Bharuch
- ❖ Sachin Notified Area Authority, Surat
- ❖ Siddhi Construction, Surat
- ❖ Silvassa Municipal Council, Silvassa
- ❖ Slum Upgradation Department, Surat Municipal Corporation, Surat
- ❖ Space Application Center (ISRO), Department Of Space, Ahmedabad
- ❖ Sterling And Wilson Pvt Ltd, Mumbai
- ❖ Surat Smart City Development Limited
- ❖ Surat Urban Development Authority, Surat
- ❖ Tata Power Solar System

- ❖ Traffic Cell, Surat
- ❖ Translink Infrastructure Consultants Pvt Ltd
- ❖ UJVN Limited (A Government Of Uttarakhand Enterprise)
- ❖ Urban Ring Development Corporation Limited , Suda Bhavan, Surat
- ❖ Ver Project Sub Division, Vyara
- ❖ Vijay M Mistry Construction Pvt Ltd, Ahmedabad

Consultancy Services during 2019-20

337 Assignments

Amount: Rs. 12.88 Crore

ASHINE – Research Park

A Research Park has been set up at SVNIT, Surat to coordinate institutional activities related to innovation, incubation, entrepreneurship and industrial interaction. Under the Research Park, SVNIT Surat in association with the Department of Science and Technology (DST), Government of India, has established a NIDHI-TBI (Technology Business Incubator) named ASHINE (Association for Harnessing Innovation and Entrepreneurship). ASHINE which is a section 8 (not-for-profit) company aims to promote entrepreneurial activity on SVNIT campus and commercialization of R&D efforts across all disciplines of Engineering and Technology including Energy, Environment and Manufacturing. It also extensively undertakes pre-incubation activities for students under the SSIP policy of the Government of Gujarat.

ASHINE is aimed at serving the following main objectives:

1. To promote and support entrepreneurship and innovation and allied concept across SVNIT, Surat; other institutes of National Importance as well as other technical institutes
2. To implement and handle operations and management of startup and innovation incubators
3. To develop, frame and implement policies to support start ups
4. To extend state of the art laboratories and other world class incubation and pre incubation facilities to start ups, entrepreneurs and innovators
5. To support IPR awareness and registration activities

SVNIT Surat in association with the Department of Science and Technology (DST), Government of India, has established a NIDHI-TBI (Technology Business Incubator) named ASHINE (Association for Harnessing Innovation and Entrepreneurship). ASHINE which is a section 8 (not-for-profit) company aims to promote entrepreneurial activity on SVNIT campus and commercialization of R&D efforts across all disciplines of Engineering and Technology including Energy, Environment and Manufacturing. It also extensively undertakes pre-incubation activities for students under the SSIP policy of the Government of Gujarat. It also envisions developing incubation activities in other sectors in the coming years with support from various government/semi-government and private entities.

PROTOTYPES SHOWCASE

Development of Ball
On Plate Balancing
System



Development of
Nonlinear Control
system for Autonomy
Of Quad-Rotor



Alkali activated concrete
using steatite powder



Implementation of
Impedance-source
Inverter (ZSI)



Plant Leaves based Waste
Water Treatment



E- Writer using ARM
processor



Low-Cost Cleaning
Solution of Solar PV
Panel



Development of Various
Products from Water
Hyacinth



Real-Time Sign
Language Recognition
System using Machine Learning



Solar Thermal-
Parabolic Trough with
Active tracking



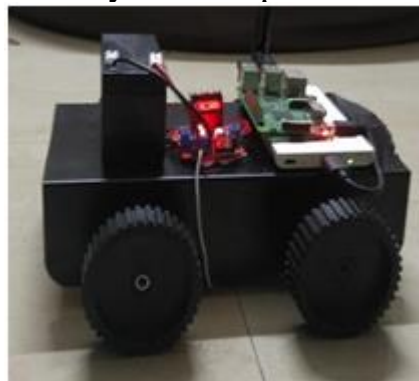
Vertical Axis Hydraulic
Turbine



Design and
Fabrication of Rice
Crop Cutter



ROS based Robotic
System for precision



Electric Tricycle for a
physically handicapped Person



http://www.svnit.ac.in/Data/Notice/ashine_newsletter/ASHINE%20NEWSLETTER-Vol%2001%20Issue%2001%20Mar-2020.pdf

http://www.svnit.ac.in/Data/Notice/ashine_newsletter/ASHINE%20NEWSLETTER-Vol%2002%20Issue%2001%20June-2020.pdf

UNNAT BHARAT ABHIYAN

Unnat Bharat Abhiyan (UBA) is national program launched by Ministry of Human Resource Development (MHRD), Government of India and IIT Delhi is servicing as National Coordinating Institute for coordinating the UBA activities in entire India. Regional Coordinating Institute SVNIT Surat have been working on UBA since December, 2016. Unnat Bharat Abhiyan has aimed for sustainable development of rural India by leveraging knowledge institutions. The village development process includes village surveys, problem identifications, finding sustainable and affordable solutions by research & innovations and implementation & maintenance of solutions. UBA is a program in which district administrations, Gram panchayat, higher education institutions, NGOs, private & public companies working together for development of villages.

VISION

Transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an Inclusive India.

MISSION

To enable higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth.

AIM

To create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India.

UBA TEAM

Dr. K D Yadav (UBA Regional Coordinator)
Dr. Manish K Rathod (UBA Regional Co-coordinator)
Dr. Krupesh A Chauhan (UBA Coordinator)
Dr. Shweta N Shah (UBA Co-coordinator)

RCI SVNIT Surat is working with total 36 Participating Institutes.

Sardar Vallabhbhai National Institute of Technology, Surat is a Participating Institute in Unnat Bharat Abhiyan and have adopted 5 Villages of Choryasi Taluka, Surat District for sustainable rural development.

(1). Mora (2). Rajagari (3) Suvali (4). Junagam (5). Bhatlai

http://www.svnit.ac.in/Unnat_Bharat/PI/index_pi.php



Special Achievement

Prof. Dr. Jigisha Parikh is selected as Fellow of The Royal Society of Chemistry.

MOU's Signed

GOVERNMENT MEDICAL COLLEGE, SURAT

IT Infrastructure Development

MINISTRY OF ROAD TRANSPORT & HIGHWAYS (MORTH) NEW DELHI, (IRC)

Curriculum / Course for Training of Road Safety & Safety Audit etc.

Patent Filed

“An integrated equipment for crushing and extraction”

(1)Dr. Desai M A (2) Dr. Parikh J K (3) Solanki K P
Filed January 2019

“Apparatus for Generation of Vibrations due to Cyclic Loading”

(1)Dr. A K Desai (2) Dr. C H Solanki (3) Pooja S Rao
Filed on 21.06.2019

“System and Method for Securing Smart Devices Field of Invention”

(1)Dr. Udai Pratap Rao (2) Dr. Piyush Kumar Shukla (3) Ankur Bang
Filed on 19.12.2019

“Polyethylene Terephthalate (PET) bottle fibers with knot”

(1)Mr. Sudhir B Gayake (2) Dr. Atul K Desai
Filed on 16.01.2020

Patent Granted

2019

“COMPOSTER”

(1) Dayanand Sharma (2) Kunwar Durg Vijaysingh Yadav
Granted on 01.02.2019

“An improved process for the preparation of Diarylpyrimidin-2(1H)-Ones”

(1) Dr. Kalpana C Maheria (2) Mistry Sunilkumar Rameshchandra
Granted on 30.08.2019

2020

“Novel Biologically Active Maleimide Compounds and Use Thereof”

(1) Dholakiya Bharatkumar Zaverbhai (2) Patel Jigarkumar Rameshbhai
Granted on 24.02.2020

“Novel Process for the Preparation of Furan-2, 5-Dione Derivatives”

(1) Dholakiya Bharatkumar Zaverbhai (2) Patel Jigarkumar Rameshbhai
Granted on 16.03.2020

“Novel 6-nitro-3-(4-oxo-thiazolidin-2-ylideneamino)-2-phenyl-3H-Quinazolin-4-One and 5-Benzilidine derivatives thereof”

(1) Jauhari Smita Manish (2) Rana Aniruddhasinh Mahendrasinh (3) Desai Kishor Ratilal
Granted on 08.05.2020

CONTACT US

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SARDAR VALLABHBHAI NATIONAL INSTITUTE OF TECHNOLOGY
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