FICCI Bharat R&D Summit 2024

Industry - Academia Collaboration

FICCI Compendium of Research Work/Technologies for Commercialization



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Foreword



India's growth and development are intrinsically linked to its ability to foster innovation and entrepreneurship. Research and Development (R&D) play a pivotal role in this endeavour, and collaboration between academia and industry is essential to translate cutting-edge research into real-world applications.

'FICCI Compendium of Research Work/ Technologies for Commercialisation' stands as a testament to the robust research ecosystem in India, featuring over 50 research works and technologies from esteemed academic institutions across the nation. These cutting-edge advancements span a wide range of critical domains, including Clean Energy, Environment & Climate Change, Electronics & White Goods Manufacturing, Drones, Defence & Homeland Security, Hydrocarbons, Sustainable Urban Development, E-Mobility, and others. These domains not only hold significance for India but also offer solutions to pressing global challenges. By fostering collaboration between academia and industry, we can leverage the immense potential of these research works and technologies to build a more sustainable, secure, and prosperous future.

This compendium serves as a valuable resource for industry leaders, investors, and researchers alike. It provides a platform for researchers to showcase their pioneering work and for industry partners to identify potential solutions to their technological challenges. The demonstration at the Summit and the evaluation by Jury further fortify this bridge by offering valuable feedback and facilitating potential collaborations.

On behalf of FICCI, I commend the researchers and institutions whose work has been featured in this compendium. I am confident that this compendium will serve as a catalyst for accelerating technology commercialisation in India, playing a significant role in propelling India's journey towards a knowledge-based economy.



Jyoti Vij
Director General,
FICCI





FICCI Compendium of Research Work/Technologies for Commercialization









FICCI Compendium of Research Work/Technologies for Commercialization

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45MW SILICON MONO PERC SOLAR PV PANEL

Key Facts:

Innovator's Name	Dr. S Sundar Manoharan
Name of the Institution	Pandit Deendayal Energy University
Address	Knowledge Hub, Raisan, Gandhinagar - 382426, Gujarat
Email	dg@pdpu.ac.in
Mobile No	9727100733
Product Maturity	NINE (9)
Product Discriminators	Silicon Monoperc Solar PV Panel of 540Wp fabricated in a semi-automated assembly line is aimed to give hands-on experience to semi-skilled and highly skilled trainees. This is the First of its kind demonstrating academia-Industry Partnership for Aatmanirbhar Mission. This training has NSDC certification as well.
Current Commercial Applications	So far 5MW worth of panels are fabricated and these are partially exported to African countries and to Australia.

Product/Technology/Innovation Brief:

In Collaboration with OEM Partner,



A NEW LOW-VOC AND VARIABLE SURFACE COMPATIBLE, ENVIRONMENT-FRIENDLY PAINT

Key Facts:

Innovator's Name	Mr. Rahul Mehta
Name of the Institution	IILM
Address	IILM Gurgaon, 1, Knowledge Center, Golf Course Rd, IILM Institute, Sector 53, Gurugram, Haryana 122011
Email	rahul.mehta@iilm.edu
Mobile No	8860336959
Product Maturity	One and half year
Product Discriminators	Existing paint materials have come a long way, but they still face several challenges that need innovative solutions. Some of the key problems with existing paint materials include: 1. VOC Emissions 2. Limited Durability 3. Complex Application Process 4. Lack of Innovation 5. Limited Aesthetics 6. Environmental Impact 7. Uneven Coverage and Texture 8. Complex Maintenance 9. Health and Safety Concerns 10. Incompatibility with Surfaces All the above problems will be completely removed by usage of this paint.
Current Commercial Applications	

Product/Technology/Innovation Brief:

The invention discloses a novel method and composition of sustainable materials and utilizing bio-based polymers to develop a paint which has low-VOCs and is suitable to variable kind of surfaces.



A PORTABLE REAL-TIME COLORIMETRIC DETECTION DEVICE FOR QUANTIFY PHOSPHATE AND NITRITE AND METHOD OF USING THE SAME

Key Facts:

Innovator's Name	Dr. Sanket Goel
Name of the Institution	Birla Institute Of Technology And Science, Pilani
Address	Birla Institute of Technology and Science, Pilani Pilani Campus Vidya Vihar Pilani - 333031, Rajasthan, India
Email	sgoel@hyderabad.bits-pilani.ac.in
Mobile No	7579151091
Product Maturity	Current TRL Level: 5
Product Discriminators	Plug and Play for Multiplexed Detection Integrated microfluidic chip for enhanced and highly repeatable colorimetric detection Portable Colorimetric Sensor
Current Commercial Applications	The device was tested to quantify Phosphate and Nitrite using colorimetric detection Validation was carried out using standard spectrophotometer at peak absorption wavelength Potential Application: 1.Soil and Water Parameter Quantification 2. Biological Chromophores

Product/Technology/Innovation Brief:

A Portable Real-Time Colorimetric Detection Device for quantify Phosphate and Nitrite And Method Of Using The Same. Low-cost, ultraportable, microfluidic colorimetric device for point of care application to quantify and monitor environmental and biological analytes.



A UNIVERSAL PROSTHETIC KNEE JOINT WITH DEEP SQUAT STABILITY TO SUPPORT ACTIVITIES OF DAILY LIVING

Key Facts:

Innovator's Name	Dr. Subramani Kanagaraj
Name of the Institution	IIT Guwahati
Address	Indian Institute of Technology, Guwahati-781039, Assam
Email	kanagaraj@gmail.com
Mobile No	+91-9101057923
Product Maturity	TRL 6
Product Discriminators	Polycentric, Assisted Deep Squat, 135-degree flexion angle,
Current Commercial Applications	No commercial applications exist to date. However, some trusts are using the device for social activities.

Product/Technology/Innovation Brief:

The knee joint is the worlds first Universal Polycentric Knee Joint with Deep Squat Stability to support Activities of Daily Living. It is a new-generation prosthetic knee joint that consists of features to support activities of rural and urban lifestyles. Deep squat support of more than 135 degrees enables people to access floor activities such as using an Indian toilet or agricultural activities. The stability parameters are also tuneable, which makes the Knee Joint a one-size-fits-all product.



AI-ENHANCED SMART TEA VENDING MACHINE

Key Facts:

Innovator's Name	Dr. Harinath Aireddy
Name of the Institution	Alliance University
Address	Alliance University - Central Campus, Chikkahadage Cross Chandapura-Anekal, Main Road, Bengaluru, Karnataka 562106
Email	harinath.aireddy@alliance.edu.in
Mobile No	9475175218
Product Maturity	TRL 6
Product Discriminators	The Customized Smart Tea Machine stands out from competitors through its integration of advanced facial recognition technology and personalized user experience. Unlike conventional beverage dispensers, this machine stores individual preferences, allowing users to recreate their exact choice of tea down to flavor, strength, and sweetness with just a simple confirmation. The ability to fully customize tea options, including green tea, cardamom, ginger, or regular tea, along with precise strength settings (strong, medium, light) and sugar control, gives users a tailored experience unmatched by traditional machines. The system seamless interaction, automatic preference recall, and ease of customization offer a unique and time-saving solution, ensuring consistency and convenience with every use. Furthermore, the machines adaptive learning technology allows for continuous improvement in user satisfaction by refining tea choices over time. This combination of smart technology and user-centric design sets it apart from competitors in the beverage dispensing market.
Current Commercial Applications	The product is currently not being used for commercial applications.

Product/Technology/Innovation Brief:

The AI-Based Smart Stream Tea Vending for Personalized Flavors is an intelligent beverage dispenser designed to cater to individual tea preferences with a variety of flavors and strengths. The machine offers options such as green tea, cardamom (elachi), ginger, and regular tea, each available in customizable strengths strong, medium, or light along with options for sugar-free or sweetened tea. Upon a user first interaction, the machine utilizes facial recognition technology to register and store their personalized tea preferences, including flavor combinations, strength, and sweetness level. For subsequent visits, the machine automatically prompts the user, asking if they would like to repeat their last order. If the user confirms, the machine dispenses the exact same tea. natively, the user can modify their selection for a custom blend. This smart system ensures a seamless, personalized tea-drinking experience by leveraging advanced user identification and data retention, streamlining beverage customization with every interaction.



ANATOMIX: IMMERSIVE LEARNING OF HUMAN ANATOMY THROUGH EXTENDED REALITY FOR MEDICAL STUDENTS

Key Facts:

Innovator's Name	Mr. Utanko Mitra
Name of the Institution	Indian Institute of Technology Kharagpur
Address	ATDC, Indian Institute of Technology Kharagpur, Kharagpur - 721302
Email	utankomitra@gmail.com
Mobile No	8334028780
Product Maturity	6-12 months
Product Discriminators	AnatomiX: IMMERSIVE LEARNING OF HUMAN ANATOMY THROUGH EXTENDED REALITY FOR MEDICAL STUDENTS XR Platform: An immersive learning platform for medical students with simulations of anatomy, pathological conditions, and anatomical variations. Personalized Learning and Analytics: Personalized learning profiles, adaptive content, and an analytics dashboard tracking student engagement and performance. AI-Driven Feedback and Assessments: Real-time feedback during training, automated assessments, and intelligent virtual assistants for personalized guidance. Scalable and Customizable System: A scalable online platform with AI/ML capabilities for customization based on individual learning styles and regional needs.
Current Commercial Applications	

Product/Technology/Innovation Brief:

AnatomiX: IMMERSIVE LEARNING OF HUMAN ANATOMY THROUGH EXTENDED REALITY FOR MEDICAL STUDENTS The project aims to transform medical education through "AnatomiX," a 3D XR platform enhanced with AI/ML, offering realistic anatomical simulations and personalized learning for a more immersive and dynamic educational experience.



BATCH REVERSE OSMOSIS- FORWARD OSMOSIS FOR BRACKISH WATER TREATMENT

Key Facts:

Innovator's Name	Dr. Anurag Mudgal
Name of the Institution	Pandit Deendayal Energy University
Address	Raisan, Knowledge Corridor, Gandhinagar
Email	anurag.mudgal@sot.pdpu.ac.in
Mobile No	919429000000
Product Maturity	TRL 8
Product Discriminators	The system is designed and fabricated under Horizon 2020 project call between Europe and India. The system is capable to produce 750 lts of good quality drinking water with feed rate of 1000 lt/ hour. Only 25% reject brine is produced which is utilized to grow a valuable halophytic crop called Salicornia. This concept makes it a Zero liquid discharge system.
Current Commercial Applications	We have already installed similar unit at a village site in Gujarat which is very close to coast line. The system is being operated by villagers and they are enjoying good quality of drinking water.

Product/Technology/Innovation Brief:

Batch Reverse Osmosis concept is two to three times more energy efficient and provides higher recovery in comparison of traditional continuous Reverse Osmosis systems. This technique involves a pressure exchanger which regulate the pressure of water to pass through the membrane as per the requirement according to variation of Osmotic pressure when clean water comes out and all the ionic concentration in the left out feed water keep accumulating. Specific energy consumption is as low as 1.5- 2 kWh per 1000 lt of product water.



BIODEGRADABLE POLYMERS AND VARIOUS PRODUCTS

Key Facts:

Innovator's Name	Prof. Vimal Katiyar
Name of the Institution	Indian Institute of Technology, Guwahati
Address	Amingaon, North Guwahati, Guwahati, Assam 781039
Email	vkatiyar@iitg.ac.in
Mobile No	7896123664
Product Maturity	TRL- 5 to 6
Product Discriminators	Biodegradable products which are demonstrated are commercialization and partnership
Current Commercial Applications	Replacement of conventional non-degradable plastics

Product/Technology/Innovation Brief:

Degradable straw, Food Packaging, Toys, Biodegradable Resin and formulations



CASHEW GRADING MACHINE

Key Facts:

Innovator's Name	Mr. Mahesh Mohan
Name of the Institution	Amrita Technology Enabling Center
Address	DST Technology Enabling Centre (TEC), Amrita Vishwa Vidyapeetham, Amritapuri, Clappana P. O., Kerala, India - 690 525
Email	maheshms@am.amrita.edu
Mobile No	8884855224
Product Maturity	The prototype is completed, and field trials are scheduled at cashew processing facilities. TRL: 6-7 (System testing in relevant operational environments.)
Product Discriminators	Key features: Automated grading, reduced labour dependency, high-speed processing, consistent and precise sorting.
Current Commercial Applications	The machine is in field trials with Designed Cashew Cluster.

Product/Technology/Innovation Brief:

Agriculture Technology Automation in Food Processing MSME Support for Agro-processing. The Cashew Grading Machine is designed to automate the grading process of cashew nuts. It uses sorting technique of mechanical sorting mechanisms to classify cashews based on size, and significantly improves processing efficiency in cashew production units.



CHILD SAFETY ENABLED AL LATCHES

Key Facts:

Innovator's Name	Dr. Rajesh Kaushal
Name of the Institution	Chitkara University, Punjab
Address	Chandigarh - Patiala National Highway, Distt. Patiala - 140401
Email	rajesh.kaushal@chitkara.edu.in
Mobile No	9888755130
Product Maturity	TRL 3 (Proof of concept/Prototype Ready)
Product Discriminators	The present invention pertains to a child safety enabled al latch comprising a spring based foldable hand-leaned a square rod. The novel and inventive design of the al latch comprising foldable handle makes it difficult and impossible for small children to operate the latch. Assistance of an adult or parent is required to operate the safety enabled al latch. The step of folding the handle and then moving the square rod requires applying force that cannot be achieved by small children. In one embodiment, the present invention relates to a child safety enabled al latch with a simple yet effective security feature with a simple design that can be easily manufactured, is affordable and can be easily installed.
Current Commercial Applications	Currently Wal latches are available in the market but they do not provide child safety mechanism. Thus, scope of getting commercialising this product is huge.

Product/Technology/Innovation Brief:

There is a flaw with conventional al latches used at inner side of room doors. The kids (age group of 1.5 to 3 years) can mistakenly lock themselves while playing and in such cases rescue operation is required. Thus, al latches needs safety mechanism that prevent kids to lock themselves mistakenly. The problem is solved by making some changes in the design of conventional al latches. The proposed design makes use of square shaped rod with foldable handle. As the rod is square shaped it cannot be rotated up and down. The only way to unlock the door is to first fold the handle and then moving the rod right to left. The process of folding the handle requires marginal force which makes this job difficult for kids. Once the door is unlocked the handle needs to be unfolded again. The al latch (after unlocked and unfolded) in this position cannot be locked by a kid as this process requires folding the handle again with a force and needs left to right movement of the rod. So, child safety can be achieved by just introducing squared shape rod and a foldable handle.



COMPACT PCB PRINTER

Key Facts:

Innovator's Name	Mr. Varun Raj
Name of the Institution	DRIIV, O/o PSA , GoI
Address	IIT DELHI
Email	varunrajsingh.iitd@gmail.com
Mobile No	9205842015
Product Maturity	Technology is at TRL-9 level and ready for industrial rollout.
Product Discriminators	COMPACT PCB PRINTER allows for rapid product development and testing
Current Commercial Applications	

Product/Technology/Innovation Brief:

Compact PCB Printer is a novel product which prints multilayer PCBs on various substrates. This allows for rapid product development with higher yield percentage



COMPOSITE POTENTIOMETRIC SENSOR MODULE FOR SELECTIVE LEAD ION DETECTION IN CONTAMINATED WATER

Key Facts:

Innovator's Name	Dr. Somak Chatterjee
Name of the Institution	Birla Institute Of Technology & Science (Bits) Pilani
Address	Birla Institute of Technology and Science, Pilani Pilani Campus, Vidya Vihar Pilani - 333031, Rajasthan, India
Email	somak.chatterjee@pilani.bits-pilani.ac.in
Mobile No	9432082635
Product Maturity	TRL-4
Product Discriminators	Onsite detection- This technology helps in detecting lead ions at the place of its origin. There is no need to collect samples and take it to the lab for measurement. This works as both upstream and downstream device. Selective detection- This sensor selectively detects lead ions in water countering the effect posed by competitive ions, such as, carbonate, bicarbonate, sulfate, nitrate and chloride, which are commonly present in groundwater. Wide operability limits- The sensor system can operate over a wide span of concentration (10 ppb-1000 ppb) and electrode material can be replaced after 9 months. Smart water management- The system can be integrated with IOT based devices to have a cloud storage for smart water management. Simultaneous detection in food and water- The sensor can also be used for detecting lead ions in food (which can be anaerobically digested), apart from water. Low cost- The sensor system is comparatively having lower cost than that of conventional measurement system, such as, AAS, ICP-OES and ion selective electrode systems. Non-requirement of specialized manpower- The installed systems does not required trained manpower to operate the same
Current Commercial Applications	Detection of heavy metal in soil, contaminants in water and food samples

Product/Technology/Innovation Brief:

Composite potentiometric sensor module for selective lead ion detection in contaminated water. The invention provides an advanced system for detecting lead ion concentration in water using a specialized electrode assembly coupled with an integrated electronic interface. The system features a three electrode system: (1) working electrode (composed of doped polyaniline impregnated iron oxide based carbonized electrospun nanofibers) (2) reference electrode (silver/silver chloride) and (3) platinum wired as counter electrode. These electrodes are immersed in aqueous media, where a potentiometer measures the potential difference between them, in presence of lead ions. In order to enhance portability and cost-effectiveness, sensor system integrates a voltage-generating circuit with an microprocessor, analog-to-digital er (ADC) model, liquid crystal display (LCD), submersible pumps, light emitting diodes (LEDs) and a buzzer. This setup delivers a real-time voltage signal corresponding to lead ion concentration and alerts users when levels exceed standard thresholds (10 ppb). Additionally, the system also includes buffers in the electrolyte cell to counter interference from competitive ions. These buffers also maintain pH consistency and ionic strength of the electrolyte, ensuring accurate measurement of reduction and oxidation (REDOX) reactions.



CONCRETE ING MOULD

Key Facts:

Innovator's Name	Dr. Pradeep Sivanantham
Name of the Institution	SRM Institute of Science and Technology
Address	CEF06, Department of Civil Engineering, SRM Institute of Science and Technology, Kattankulathur - 603203, Tamil Nadu, India
Email	pradeeps@srmist.edu.in
Mobile No	9025404808
Product Maturity	Ready to Commercialize
Product Discriminators	The novelty claim of this invention is the simpler and user-friendly mechanism that has been adopted. The claims in the invention are the use of toggle clamp lock, mechanical hinges, rubber ring, helicoil threads. Which made the process fast and easy while compared to the existing products.
Current Commercial Applications	

Product/Technology/Innovation Brief:

In the field of Civil Engineering, for both commercial and educational research purposes moulds are used in the transition of wet concrete into dry state and desired shape. In education and research institutes, as well as in the field of construction industry they are used to test the concrete cube specimens of sizes 100mm, 150mm and mortar cube specimen of size 70mm for its compressive strength at 3 days, 7 days, 14 days and 28 days. This invention is an nate solution for an existing iron mould. The mechanism of the existing mould has been changed to make it highly efficient and user friendly.improved product is made of Nylo material and High-Density Polymer (HDP), lighter in weight and has a toggle lock mechanism with mechanical hinges.



CONVERSION OF SLUDGE RECEIVED FROM THE SEWAGE TREATMENT PLANT OR INDUSTRIAL WASTEWATER TREATMENT PLANT INTO VALUE ADDED PRODUCTS. THIS IS A SELF SUSTAINABLE PROCESS LEADING TO ZERO DISCHARGE

Key Facts:

Innovator's Name	Mr. Amlan Banerjee
Name of the Institution	SSP Private Limited
Address	13th Milestone, Mathura Road, Faridabad, Haryana - 121003 (India)
Email	amlan@ssp.co.in
Mobile No	+91 9810007041
Product Maturity	Approximately 9. TRL definition is according to NETRA (National Establishment for Technology Readiness Assessment) which states: Actual System is Proven in Operational Environmental The technology is fully operational in sites of DJB (Delhi Jal Board) and in Uttarakhand.
Product Discriminators	Treatment of sludge coming out from Sewage Treatment Plants have been tried at many places. However, there are limited concepts that have been practically implemented and are operational on commercial basis. SSP™s technology suits the prevalent eco-system in India and is practically appropriate at all places where simplicity of technology is important. This is an easily accessible technology. Its basis is to fully exploit the energy potential of the sludge itself and ensure Zero Discharge. Although there are commercial plants already running with this technology, the research and innovation on this concept is still ongoing. SSP is working on projects to extract valuable components from the Sewage Sludge Ash.
Current Commercial Applications	Yes, it is in use for commercial applications. SSP™s technology for conversion of Sludge discarded by the Sewage Treatment Plant or Industrial Wastewater Treatment Plant into value added products and ensuring Zero Discharge has been commercially implemented at DJB (Delhi Jal Board)™s STP in Kondli, Delhi NCR. The said plant handles operates at a capacity of 200 Tonnes per day. A similar capacity plant has been commissioned in Uttarakhand

Product/Technology/Innovation Brief:

The significant aspects of this innovation are: The energy potential of the sludge coming out of the Sewage Treatment Plant or Industrial treatment Plant is extracted and utilised to process the same sludge. As a result of the above process, Sludge ash is obtained which is used for making Paver tiles or used as road construction material. This is a Zero Discharge process with minimal use of external energy (dependent on the calorific value of the sludge) and is thereby a self-sustainable process. It prevents the dumping of such sludge into landfills (risk of leaching) and agricultural areas (risk of infusion of heavy metals). Avoids transportation of wet sludge (generally 20 to 22% concentrations) and its associated logistical issues. Avoids the needs of solar drying beds and associated problems of bad smell etc.



CUSTOM PCBS FOR DRONES

Key Facts:

Innovator's Name	Mr. Varun Raj
Name of the Institution	DRIIV, O/o PSA , GoI
Address	IIT DELHI
Email	varunrajsingh.iitd@gmail.com
Mobile No	9205842015
Product Maturity	Technologiy is at TRL-9 level and ready for industrial rollout
Product Discriminators	Custom PCBs for drones allows to redesign the drones as per the endurance and payload capacity demand.
Current Commercial Applications	

Product/Technology/Innovation Brief:

Custom PCBs for Drone applications are designed for robust usage in flying. They have undergone exhaustive design and production steps to cater to thermal , electrical and mechanical stress.



CUSTOM SHOES FOR ENHANCED COMFORT AND BALANCE

Key Facts:

Innovator's Name	Dr. Harinath Aireddy
Name of the Institution	Alliance University
Address	Alliance University - Central Campus, Chikkahadage Cross Chandapura-Anekal, Main Road, Bengaluru, Karnataka 562106
Email	harinath.aireddy@alliance.edu.in
Mobile No	9475175218
Product Maturity	TRL-3
Product Discriminators	Previous approaches when compared to our personalized footwear stands out by addressing the problem in existing products through design innovations and material selection. One major issue in current shoes is the inability to adapt to variations in pressure and foot movement, leading to poor support and discomfort over time. In specifically, sports shoes with spring-loaded tend to fail due to the continuous use, as the springs often break due to stress. We have improved this by using a more durable spring mechanism in the insole, designed to absorb shock and provide even weight distribution without any kind of structural failure. Moreover, it can be better with cushioning and flexibility in the upper, midsole, and outsole, ensuring enhanced comfort, muscle fatigue reduction, and support over long-term use. So, by combining these features into a single solution, we stop the need for multiple accessories which sets our product apart as more comfortable, durable and well-structured for fatigue reduction for long-term joint health.
Current Commercial Applications	The product is currently not being used for commercial applications.

Product/Technology/Innovation Brief:

Our product is designed with the aim to develop a personalized footwear to reduce muscle fatigue and improve joint health by utilizing advanced materials and innovative design. The key components for designing the personalized footwear for enhanced comfort and posture are synthetic upper, insole with a spring mechanism, midsole, and outsole are re-engineered to provide enhanced support, cushioning, and flexibility. Another main component is the spring in the insole which contributes by absorbing the shock and distributes weight evenly, reducing strain on joints and muscles, specifically benefiting the elderly and the common problem among the individuals with the knee issue. This product aims to enhance comfort, reduce pain, and improve mobility, offering extensive solution for fatigue reduction and long-term joint health.



DEPRESSION DETECTION USING AUDIO, VIDEO AND EEG SIGNALS

Key Facts:

Innovator's Name	Dr. Gyanendra Tiwary
Name of the Institution	IILM University
Address	101 Golf Course Road, Gurugram, Haryana 122003
Email	gyanendra.tiwary@iilm.edu
Mobile No	7784930292
Product Maturity	TRL-2
Product Discriminators	The usage of Emotion Generative Adversarial Network made our Video Depression Detection ACNN model quite effective. Blending it with EEG has increased the model efficiency. In EEG also we idented and used only alpha waves and this is novel in the domain.
Current Commercial Applications	NA

Product/Technology/Innovation Brief:

A multimodal deep Convolutional Neural Network (CNN) based automatic depression detection system has been proposed. We have combined three CNN networks, one of which uses Long-Short-Term Memory (LSTM) to process EEG signals. Other two Attention based CNNs with E-GAN as one of it™s unique feature used for face video data and Audio signals. The subject is categorised by all three networks into one of three categories: depressed, somewhat depressed, or not depressed. The F1 score of all these three CNNs will be combined to the final output.



EDGE AI FRAMEWORK FOR DETECTION OF BREAST CANCER FROM DIGITAL MAMMOGRAM

Key Facts:

Innovator's Name	Dr. Malarvizhi Subramani
Name of the Institution	SRM Institute of Science and Technology
Address	SRM Nagar, Kattankulathur - 603 203 Chengalpattu District, Tamil Nadu
Email	malarvig@srmist.edu.in
Mobile No	9444383927
Product Maturity	Tested with real time images acquired from medical hospital of SRM IST.
Product Discriminators	Intelligence into the existing CAD based mammogram unit by deep learning. DL model and GUI enabled Hardware board (PYNQ-ZU) is a replacement for CPU based system. While testing the time developed hardware unit can provide BIRAD score of 99 images per unit of time than with i7, dual core 12th gen processor. Average speed reported to be 33.33 times that of the GPU RTX 2080, this reported power per image processing including GUI operation is 0.152 Watts , with 3.12 Watts power saving. It can be readily interfaced with existing PACS
Current Commercial Applications	The embedded AI board can be readily interfaced with PACS system

Product/Technology/Innovation Brief:

Motivated by the fact the need for development of computer assisted diagnostic system for early detection of breast cancer the most prevalent disease for the women folk. This project intend to provide an effective and speedy screening and diagnostic system CAD system which can replace the CPU with the hardware embedded board which has Field Programmable Array FPGA for good acceleration and power efficiency. The developed system can be compatible with the existing and from remotely a pathologist can operate on images taken at remote. We the team of three professors in the domain of technology and medical try to experiment in real time in the faculty of medicine, SRM IST.



ENERGY STORAGE SOLUTION

Key Facts:

Innovator's Name	Dr. Amrita Dawn
Name of the Institution	DRIIV (Delhi Science & Technology Cluster)
Address	Main Building, IIT Delhi
Email	amrita@driiv.co.in
Mobile No	9205842015
Product Maturity	9
Product Discriminators	10 MWh battery cell facility in Odisha, coupled with a robust 4-ton graphene production unit, positions us as a key player in the rapidly evolving market for advanced energy solutions.
Current Commercial Applications	

Product/Technology/Innovation Brief:

Cutting edge of graphene and battery cell manufacturing, driving innovation in Indias energy storage industry.



ERGONOMIC DESIGNED TOILET-INTEGRATED WALKER

Key Facts:

Innovator's Name	Dr. Surya Narayan Panda
Name of the Institution	Chitkara University, Punjab
Address	Chitkara University, Chandigarh-Patiala National Highway (NH- 64), Village, Jansla, Rajpura, Punjab 140401
Email	snpanda@chitkara.edu.in
Mobile No	9466496257, 9416666115
Product Maturity	At this stage: Concept Formulation: The idea of a portable walker with an integrated toilet unit and curtain facility is in the early stages of conceptual development. Basic principles underlying the product™s design have been observed and explored, but detailed designs and prototypes have not yet been constructed. Applied Research Initiated: The products intended functionality"combining a walker, toilet unit, privacy curtain, and emergency water pouch"has been identified, and initial research has been conducted to evaluate feasibility. This stage primarily involves research on materials, mechanisms, and integration possibilities. Potential Utility: At TRL 2, the core concept of the portable walker is understood to address a real need for elderly or disabled individuals. The technical components (such as the folding mechanism, biodegradable waste system, and privacy curtain) are defined but not yet tested in any form.
Product Discriminators	The key features that set this portable walker with an integrated toilet unit apart from the competition include: 1. Integrated Toilet Unit: Unlike standard walkers, this product includes a built-in, foldable toilet unit that provides immediate access for users who face challenges in reaching conventional toilet facilities. It offers an all-in-one solution for mobility and toileting, enhancing user independence. 2. Privacy Curtain: A foldable privacy curtain distinguishes this product by providing complete discretion during use. Operated with a simple button mechanism, it ensures the user privacy without needing an additional structure or assistance. 3. Portability and Compact Design: The walker foldable structure, with hinges and simple linkage mechanisms, makes it highly portable. It can be easily transported, unlike most mobility aids that require separate arrangements for toileting. 4. Single-Button Waste Management: The biodegradable waste collection bag can be removed with a single-button operation, simplifying the cleaning process. This feature enhances the ease of maintenance, making it more user-friendly and hygienic. 5. Emergency Water Pouch: The inclusion of an emergency water bag, made of flexible materials like leather or rubber, sets it apart from other walkers. This ensures users have access to water for cleaning purposes, especially in urgent situations. These unique features address the specific needs of elderly and disabled individuals, offering a portable, hygienic, and independent solution that isnt typically available in conventional walkers or portable toilet products.
Current Commercial Applications	As of now, the portable walker with an integrated toilet unit does not appear to be in widespread commercial use. However, it has clear potential applications in several sectors: 1. Healthcare Facilities: The product can be used in hospitals, rehabilitation centers, and nursing homes to assist patients who have limited mobility and need frequent access to toileting facilities. 2. Home Care for the Elderly or Disabled: This walker could be adopted by individuals or caregivers in home settings to help elderly or disabled users manage daily toileting needs without the assistance of others. 3. Travel and Emergency Use: The portability and foldability make it ideal for use during travel, where access to toilets may be limited, and in emergency situations for elderly or disabled individuals.



Product/Technology/Innovation Brief:

The product is a portable walker designed to assist elderly, disabled, or physically challenged individuals who require a combination of mobility support and toilet facilities. It is a multifunctional device that integrates a toilet unit and a foldable privacy curtain, offering users greater independence, especially when accessing toilets during emergencies or while traveling. The walker is equipped with a foldable frame using a simple linkage and hinge mechanism, making it compact and easy to transport. A toilet unit is attached to the walker and can be easily shifted between an open and closed position. The magnetic catchers ensure the toilet seat remains securely in place when folded. The design includes a bio-degradable waste collection bag, which runs in a channel under the toilet unit, and can be easily removed using a switch mechanism. A privacy curtain can be deployed with the push of a button, covering the entire walker to provide the user with discretion while using the toilet. An emergency water bag is also attached to the walker, complete with connecting pipes for cleaning purposes. This water pouch is flexible and can be removed when not needed. The inventions focus is on user convenience, hygiene, portability, and privacy, making it an ideal solution for individuals who face difficulty accessing traditional bathroom facilities independently. The Portable Walker with Toilet Unit and Curtain Facility is an innovative mobility aid designed specifically for elderly and disabled individuals who require support while walking and managing personal hygiene needs. This ergonomically designed walker integrates a foldable toilet unit, allowing users to easily access toilet facilities without the need to move to a separate location, thereby enhancing their independence and comfort. Key features include: Ergonomic Design: Crafted for ease of use, the walker ensures optimal support and stability for users with musculoskeletal disorders or lower limb injuries. Integrated Toilet Unit: The toilet unit can be deployed when needed and folds away when not in use, featuring a biodegradable waste collection system that can be removed with a simple one-button operation. Curtain Facility: A foldable curtain provides privacy while using the toilet, easily deployable through a straightforward mechanism that can be operated with one hand. Portability: Designed for easy transport, the walker incorporates lightweight materials and a foldable structure, making it convenient for use at home or while traveling. Emergency Water Supply: The walker is equipped with a flexible water pouch that can be used in emergencies, ensuring users have access to essential hygiene resources. This innovative solution addresses the daily challenges faced by individuals with limited mobility, promoting dignity, safety, and enhanced quality of life.



ERGONOMIC PORTABLE COMMODE CHAIR

Key Facts:

Innovator's Name	Dr. Naveen Kumar
Name of the Institution	Chitkara University
Address	Chandigarh-Patiala National Highway Village Jansla, Rajpura (Punjab)
Email	naveen.sharma@chitkara.edu.in
Mobile No	9467377281
Product Maturity	TRL-6
Product Discriminators	- Linear actuator that runs the commode assembly unit using controller and remote. -Cistern and water jet unit for cleaning of gentile parts of a patient. -Seat height provision, backrest seat adjustment facility, I.V. stand facility, sanitizer holder, water pump switch, removable armrests, service tray/table, headrest, seat belt facility, etc. -Recliner arrangement for more comfort. -Robust design. -Ergonomic design based on IS Standards and Anthropometric principles. -Big or wheels for more grip and safety.
Current Commercial Applications	This product features an ergonomic design that prioritizes user comfort and safety by adhering to IS (Indian Standards) guidelines, ensuring it meets established quality and safety norms. It also incorporates anthropometric principles, which consider human body measurements to enhance the wheelchairs functionality and comfort for users. We have showcased this innovative wheelchair at various NGOs, where it has received widespread praise for its unique and practical design. Although the product has not yet been brought to the commercial market, it holds significant potential, as there is currently no other wheelchair available that combines adherence to IS standards with anthropometric principles. This positions the product as a pioneering solution in the market. Furthermore, we have taken legal steps to protect this innovation by filing for a patent, which has already been successfully granted, confirming the originality and utility of the design.

Product/Technology/Innovation Brief:

This advanced wheelchair, designed for individuals with disabilities and the elderly, includes an integrated commode unit and adheres to IS standards and ergonomic principles. It eliminates the need for manual transfers and features a remote-controlled actuator for seamless operation. Key features include adjustable seat height, removable armrests, an IV stand holder, a reclining system, a tilting backrest, a service tray, a seatbelt, a sanitizer holder, and a water cistern with a pump.



EXTRACTION OF PROTEIN, SILICIC ACID AND ETHANOL FROM DE-OILED RICE BRAN CAKE (DORB) (PATENTED)

Key Facts:

Innovator's Name	Mr. Amlan Banerjee
Name of the Institution	SSP Private Limited
Address	13th Milestone, Mathura Road, Faridabad, Haryana - 121003 (India)
Email	amlan@ssp.co.in
Mobile No	+91 9810007041
Product Maturity	Approximately between 8 & 9. TRL definition is according to NETRA (National Establishment for Technology Readiness Assessment) which states: TRL Scale 9 Actual System is Proven in Operational Environment TRL Scale 8 System complete and qualified The technology has been tested under realistic conditions (operational environment) in the Demonstration Plant in SSP Innovation Centre.
Product Discriminators	Conversion of Deoiled Rice Bran (DORB) to such value-added products has not been tried or implemented in India. There are no functional references known worldwide. SSP technology suits the prevalent eco-system in India and all rice growing regions of the world. The technology ensures Zero Discharge.
Current Commercial Applications	Presently discussions are ongoing to use this technology as an extension to the processes in Rice Mills. Demonstration of the process are being carried out within SSP Innovation Centre for testing different types of Deoiled Rice Bran (DORB) cake.

Product/Technology/Innovation Brief:

The significant aspects of this innovation are: The Deoiled Rice Bran (DORB) is liquified and saccharified and thereafter decanted. The liquid stream is fermented, distilled and ed to Ethanol. The other stream is subjected to Acid Hydrolysis for extraction of Silicic Acid. The solid mass is separated and subsequently processed to extract the proteins.



GAS SENSOR MODULE

Key Facts:

Innovator's Name	Dr. Navaneethan M
Name of the Institution	SRM Institute of Science and Technology
Address	Kattankulathur
Email	navaneem@srmist.edu.in
Mobile No	8754420369
Product Maturity	The fabricated sensor prototype is currently in the TRL 4 range. A sensor prototype has been developed and tested in controlled laboratory conditions, where its sensing capabilities such as performance under different humidity, sensitivity and selectivity have been validated.
Product Discriminators	The fabricated sensor operates efficiently at room temperature, reducing energy consumption, and is fabricated using CVD, ensuring precise, scalable, and low-cost manufacturing. It offers stability under humid conditions, making it reliable for real-world applications. Additionally, the sensor is highly durable, ensuring long-term, consistent performance.
Current Commercial Applications	No, the product is not currently in use for commercial applications. It has been tested and is at TRL 4, i.e., it has been validated in a laboratory environment. Currently, it is not deployed for commercial use. It has a potential application in environmental monitoring, industrial safety, automotive emission control, indoor air quality, and research.

Product/Technology/Innovation Brief:

The research is focuses on a thin film-based gas sensor designed for room temperature detection. This sensor utilizes advanced thin film materials to achieve high sensitivity and selectivity for gases. It operates effectively at ambient temperatures, eliminating the need for additional heating elements, which enhances its practicality and reduces energy consumption. The sensor design incorporates features that allow it to maintain performance stability and accuracy under varying environmental conditions.



GEOSCIENCE EXPLORAITON OF ONSHORE & OFFSHORE KACHCHH BASIN

Key Facts:

Innovator's Name	Dr. Bhawanisingh Desai
Name of the Institution	Pandit Deendayal Energy University
Address	Raisan Village, Gandhinagar
Email	bhawanisingh.desai@spt.pdpu.ac.in
Mobile No	+91-9998000000
Product Maturity	seven (7)
Product Discriminators	Expertise in integrated Geoscience -Geophysical Basin Analysis for Hydrocarbon Exploration. Training and Skilling Industry personals for Geological and Geophysical Mapping in Hydrocarbon bearing sedimentary basins. Interpretation of the geoscience data.
Current Commercial Applications	No Commercialization

Product/Technology/Innovation Brief:

PDEU have ventured into Geological and Geophysical exploration of Kachchh Basin (Onshore-Offshore) for identifying potential and probable Hydrocarbon sites and deep data mining for identifying and characterizing hydrocarbon bearing reservoirs.



GREEN FLUORESCENCE EMITTING DYE TO STAIN LIVE OR FIXED CELLS AND METHOD OF PREPARING THE SAME

Key Facts:

Innovator's Name	Dr. Subhadeep Banerjee
Name of the Institution	Birla Institute Of Technology And Science Pilani Kk Birla Goa Campus
Address	NH 17B Bypass Road Zuarinagar Goa 403726
Email	subhadeepb@goa.bits-pilani.ac.in
Mobile No	7083594823
Product Maturity	We claim a TRL of 8 since our products are currently in the market with different customers. The preparative protocols for our products are established and the molecular structural and spectroscopic characterization is completed. Validation on biological cell lines performed at our end to define product application areas are ongoing and currently products are with several customers for user trials and feedback. Hence, we believe that the current TRL of 08 is justified.
Product Discriminators	Our products have high quantum yields, good photostability and larger Stokes shifts as compared to commercial dyes. Both these properties are crucial for long duration fluorescence imaging, especially of live cell samples, where laser induced photobleaching is a major issue. Importantly, our products are easily diffusible into live cells which some commercial dyes cannot do.
Current Commercial Applications	Our fluorescent dyes are currently being purchased for bioimaging applications through fluorescence microscopy like as in live cell imaging, fixed cell imaging, study of cell morphology.

Product/Technology/Innovation Brief:

We offer, first of its kind India-made biocompatible fluorescent molecular probes with bright photostable emission and easy cell penetration and high in vitro glow. These are made readily available through a short-synthetic chemistry protocol developed in-house, which makes them very affordable and thus, will cut down the costs and procurement times for bio-scientists dependent on expensive foreign brands, for their microscopic imaging applications.



GREEN HYDROGEN SETUP USING ORGANIC RANKINE CYCLE

Key Facts:

Innovator's Name	Dr. Anirbid Sircar
Name of the Institution	Pandit Deendayal Energy University
Address	Nr Rysan Village, Gandhinagar, Gujarat
Email	anirbid.sircar@spt.pdpu.ac.in
Mobile No	+91-9924000000
Product Maturity	Geothermal based hydrogen production- TRL6
Product Discriminators	Geothermal based hydrogen production is a new concept in India. The current generated from geothermal energy is the differentiator for water splitting
Current Commercial Applications	Commercially viable for both generation and storage

Product/Technology/Innovation Brief:

Wells are drilled in Unai, Gujarat. 75 degree Celcius water is fed to Organic Rankine Cycle which produces 45-60 KW of electricity. The electricity splits geothermal water. The oxygen is absorbed by palladium palate and hydrogen is produced. The produced hydrogen is stored in a cylinder which can hold 20 litre of hydrogen.



HELICOPTER SIMULATION

Key Facts:

Innovator's Name	Mr. Utanko Mitra
Name of the Institution	Indian Institute Of Technology Kharagpur
Address	Atdc, Indian Institute of Technology Kharagpur, Kharagpur-721302
Email	utankomitra@gmail.com
Mobile No	8334028780
Product Maturity	6-12 months
Product Discriminators	HELICOPTER SIMULATION- Virtual Helicopter Simulator: A VR-based helicopter simulation system with 3D environments, integrated helicopter model, and Oculus VR headset controls for immersive training. Custom Training Scenarios: Pre-built and customizable helicopter scenarios for different sectors (military, law enforcement, EMS), including challenging terrains and emergency situations. User Experience Survey: A comprehensive user feedback report assessing simulator usability, realism, effectiveness, and areas for improvement. SWOT Analysis: A strategic report detailing strengths, weaknesses, opportunities, and threats to guide product positioning and future developments.
Current Commercial Applications	

Product/Technology/Innovation Brief:

HELICOPTER SIMULATION- The aim of this project is to showcase the development, technical specifications, and potential applications of a virtual helicopter simulator, highlighting its benefits in enhancing training safety, realism, and cost-effectiveness.



I3D-CAM A SOLUTION TO MAKE CUSTOM FOOTWEAR FOR DIABETIC FOOT AND FOOT-ANKLE DISORDERS

Key Facts:

Innovator's Name	Dr. Subramani Kanagaraj
Name of the Institution	IIT Guwahati
Address	Indian Institute of Technology, Guwahati-781039, Assam
Email	kanagaraj@gmail.com
Mobile No	9101057923
Product Maturity	TRL 4 has been demonstrated by fabrication of custom footwear prototype using developed process and indigenous equipment. The early stage deployment is in process for selection of interested clinical partners, capacity development and relevant IS and Indian Standard.
Product Discriminators	The I3D-CAM solution provided advance technological solution in area of custom foot orthotic solutions to Orthotic professional by enabling them to produce custom footwear for there patients who face problem of improper fitments and inaccurate pressure distribution due to human error in traditional fabrication methods used in India. The foot impression device is provided to orthotic professional with zero initial cost, which is used for foot impression capture. The digitization and fabrication of custom footwear using CADCAM is performed by us as service. This model of B2B service enable easy adoption system with higher return of investment for orthotic professional compare to procure a full fledged system and running themselves as custom footwear market is profitable but yet small.
Current Commercial Applications	Currently for foot orthotic solutions are hand custom insoles are used which then fitted in off the self footwear generally shoes. recently 3D printed versions also come in but lack considerably in level of fitment and comfort.

Product/Technology/Innovation Brief:

The developed I3D-CAM solution is a integrated process for capturing of accurate foot impression and Realtime foot ankle correction in standing posture by orthotic professional, digitization of captured foot impression to use CADCAM techniques for accurate fabrication of custom footwear solutions based on orthotic prescription.



IMMERSIVEOPS - ADVANCED VR TRAINING FOR INDUSTRIAL APPLICATIONS

Key Facts:

Innovator's Name	Dr. Praveen Kumar Khosla
Name of the Institution	Chitkara University
Address	Chandigarh-Patiala National Highway (NH- 64 Village Jansla, Rajpura, Punjab 140401
Email	pkkhosla@chitkara.edu.in
Mobile No	9779917776
Product Maturity	Technology Readiness Level (TRL): TRL 8 - System complete and qualified. Our VR-based training systems have been thoroughly tested in relevant environments and are ready for full deployment in industrial settings. The solution is currently being used in multiple industries and is operational in real-world environments.
Product Discriminators	Our VR-Based Industrial Training Solutions stand out through several key differentiators: Industry-Specific Customization: Our VR training modules can be tailored to meet the specific needs of various industries, allowing for flexibility and versatility in training different industrial processes, machinery, or safety protocols. Real-Time Feedback: The system provides real-time feedback to trainees, enhancing the learning experience by allowing immediate adjustments and reinforcing correct procedures. Compliance with Industry 4.0: Our VR training solutions are fully integrated with Industry 4.0 principles, allowing for smart manufacturing integration, data-driven insights, and seamless connectivity with other systems. Cost-Effectiveness: Compared to traditional on-site training, our VR system significantly reduces downtime, operational costs, and risks associated with live training, offering a scalable and affordable training solution. Safe Learning Environment: Workers can train on dangerous tasks without exposure to actual hazards, reducing accidents and improving workforce readiness. These features position our VR solutions as a cutting-edge and cost-effective technology for industries seeking to elevate their training processes.
Current Commercial Applications	Our VR-based industrial training solutions are currently being used in various industrial applications, particularly in the manufacturing and engineering sectors, for machinery operation, safety training, and maintenance procedures. These solutions are helping businesses enhance productivity, reduce accidents, and optimize workforce skills. A high end system has been developed and delivered to IAF.

Product/Technology/Innovation Brief:

Our solution offers an immersive, interactive environment for industrial workers and their clients to gain practical experience with complex tasks, hazardous operations, or technical processes in a safe, virtual setting. By simulating real-world environments, workers can train on machinery operations, maintenance tasks, safety protocols, and other operational processes. This reduces manual efforts, improves skill acquisition, accelerates production times, and minimizes risksâ€"all while boosting operational efficiency and productivity. Our solution is highly adaptable to the needs of various industries, from manufacturing to engineering, and helps businesses streamline their training processes.



ISTAR: INTELLIGENTLY STIRRED THERMOPHILIC ANAEROBIC REACTOR

Key Facts:

Innovator's Name	Dr. Sankar Ganesh Palani
Name of the Institution	BITS Pilani, Hyderabad Campus
Address	Jawahar Nagar, Kapra Mandal, Medchal District, Hyderabad 500078, Telangana
Email	sangan@hyderabad.bits-pilani.ac.in
Mobile No	9652345167
Product Maturity	iSTAR is at the Technology Readiness Level of 7 (system prototype demonstration in an operational environment)
Product Discriminators	The uniqueness of iSTAR is the optimized mixing of reactor contents to ensure (i) near-uniform concentration of substrates and microorganisms throughout the reactor and (ii) maintaining even process temperature. Ensuring the above process parameters has a direct impact on improving the efficiency of thermophilic anaerobic digestion. (iii) Another unique feature of iSTAR is its Continuous Remote Monitoring System (CRMS), which monitors critical process parameters such as pH, temperature, and pressure. CRMS helps promptly fix those problems that might compromise microorganisms and the overall health of the reactor.
Current Commercial Applications	12m3 and 25 m3 reactors are operational to treat food waste alone or in combination with sewage sludge

Product/Technology/Innovation Brief:

The iSTAR is based on a single-stage anaerobic digestion process designed to treat organic waste, which undergoes a series of biochemical reactions and gets ed to methane-rich biogas, which can be used as a biofuel.



MOBILAB

Key Facts:

Innovator's Name	Ms. Ekta Sharma
Name of the Institution	Primary Healthtech Private Limited
Address	Block E-12, Sector 6, Noida, Uttar Pradesh, 201301
Email	ekta@mobilab.in
Mobile No	9289811391
Product Maturity	TRL 9
Product Discriminators	The key differentiator of Mobilab lies in its digital connectivity and integrated health solutions. Unlike traditional systems that lack digital integration, Mobilab connects all results digitally, facilitating seamless data sharing and storage. This connectivity enables healthcare providers to access a patient comprehensive medical history, enhancing diagnostic accuracy and enabling timely, informed treatment decisions. Mobilab pushes the boundaries of traditional healthcare by offering a portable, efficient, and cost-effective diagnostic solution. It bridges gaps in healthcare access, especially in underserved regions, and supports early disease detection and management, ultimately improving global health outcomes.
Current Commercial Applications	Yes. Mobilab devices are currently being deployed in rural areas of Northeast India and other regions of the country to test their effectiveness and gather feedback.

Product/Technology/Innovation Brief:

The Mobilab device revolutionizes healthcare with its portable, battery-operated, IoT-enabled, and AI/ML-powered capabilities. It can instantly analyze over 25 critical health parameters related to the kidney, liver, heart, pancreas, diabetes, and anemia from blood samples, with all results connected digitally. Mobilab focuses on primary care, providing all 25 important parameters within 20 minutes, ensuring that patients receive immediate consultation without needing to return



NANOMATERIAL BASED AIR QUALITY MONITORING SYSTEM

Key Facts:

Innovator's Name	Mr. Subhadip Mondal
Name of the Institution	Indian Institute of Technology Kharagpur
Address	Kharagpur, 721302, west Bengal
Email	subhadipmondaliitkgp@gmail.com
Mobile No	7797630149
Product Maturity	TRL 7
Product Discriminators	The cost of this Air Quality Monitoring (AQM) system is less compared to other market available AQM system. AQM system will be IoT enabled and equipped with an appropriate display to show the AQI, temperature, humidity, CO, CO2, NO2, NH3, temperature, humidity, and particulate matters (2.5Î¼m and 10Î¼m) value. Maximum eight sensors will be integrated to the developed electronic platforms with specialized analogue front-end and wireless communication facilities. The two developed indigenous sensors were selective for NOx and NH3 gas.
Current Commercial Applications	

Product/Technology/Innovation Brief:

The Air Quality Monitoring (AQM) system is a low cost and low maintenance indigenous AQM system to monitor the air quality in urban and industrial environment. The AQM system is capable of sensing and monitoring the values of temperature, humidity, PM (2.5Î¼m and 10Î¼m) and concentration of NO2, NH3, CO, VOC gases. The developed prototype allows remote monitoring of the aforesaid pollutants in an industrial environment. NO2 and NH3 chemiresistive sensors are being indigenously developed out of all these sensors. A suitable user friendly electronic module board equipped with IoT connectivity has been developed to monitor the acquired data on a smart phone/screen. Our industrial partner Ms ScholarLab Foundation and will package the AQM systems and develop necessary APP for its application.



NANOSPR HANDHELD SURFACE PLASMON RESONANCE DEVICE FOR SENSING AND BIO-ANALYSIS

Key Facts:

Innovator's Name	Mr. Raj Kumar Gupta
Name of the Institution	Birla Institute of Technology And Science, Pilani
Address	Birla Institute of Technology and Science, Pilani Pilani Campus, Vidya Vihar Pilani - 333031, Rajasthan, India
Email	raj@pilani.bits-pilani.ac.in
Mobile No	9828041535
Product Maturity	TRL-3
Product Discriminators	Very high resolution & sensitivity, Fixed spot measurement ensures reliable data, angular scan range ~ 48o (very unique), variable angular resolution (unique), single channel, approx. 5 kg. Low cost and easily installable in any condition. Single software for control and data acquisition.
Current Commercial Applications	It device offers label-free measurement at a very high resolution and sensitivity towards sensing chemical species such as proteins, DNA Microorganisms, organic/inorganic molecules. It is one of the useful devices for biosensing and bio-analysis applications.

Product/Technology/Innovation Brief:

This is a physical transducer based on optical phenomenon known as Surface plasmon resonance (SPR). It device offers label-free measurement at a very high resolution and sensitivity towards sensing chemical species such as proteins, DNA Microorganisms, organic/inorganic molecules. It is one of the useful devices for biosensing and bio-analysis applications. It can find applications in bio-medical, pharmaceutical (drug design and discovery), gas and chemical sensing.



OPTIMISTIC INDEX 1.1 PREDICTIVE TOOL FOR SUCCESS

Key Facts:

Innovator's Name	Dr. Padmakali Banerjee
Name of the Institution	IILM University, Gurugram
Address	1, Knowledge Center, Golf Course Road, Sector 53, Gurugram, Haryana, 122011
Email	padmakali.banerjee@iilm.edu
Mobile No	9871054449
Product Maturity	TRL 7+
Product Discriminators	The Optimism Index tool is an innovative assessment designed for psychometric profiling containing elements of positive emotions and well-being with a futuristic perspective to live a life with self-actualization. The tool is a "Trademark" has implications on professional and personal growth.
Current Commercial Applications	Currently it is available in public domain for B2B requirements. The application is for psychometric screening/training in business organizations and institutions.

Product/Technology/Innovation Brief:

The Optimism Index, created by Professor (Dr) Padmakali Banerjee, is a predictive tool designed to assess and enhance individuals potential for success. Grounded in extensive research, this tool helps users determine their "optimism quotient," offering valuable insights into personal and professional development. Central to the Optimism Index is the PEROMA framework, which emphasizes the key components of optimism. The model provides a comprehensive approach to fostering a positive mindset, equipping users with strategies to cultivate resilience, perseverance, and motivation. To meet contemporary needs, a digital interface has been developed, making the Optimism Index accessible online and ensuring its relevance and sustainability in today fast-paced environment. This innovative approach allows individuals to leverage the tool for effective selection and training, ultimately guiding them toward greater success.



PENTA NANOPLAST

Key Facts:

Innovator's Name	Dr. Sivaraman Dhanasekaran
Name of the Institution	Pandit Deendayal Energy University, Gujarat
Address	Department of Biotechnology, School of Energy Technology, Pandit Deendayal Energy University, Knowledge Corridor, Raisan Village, PDPU Road, Gandhinagar, Gujarat 382426, India
Email	sivaraman.Dhanasekaran@sot.pdpu.ac.in
Mobile No	9841575334
Product Maturity	Product with the TRL level : 6-7 The technology is currently at the preclinical development stage, with a well-defined product concept and design in place. Initial prototypes of the nanofibrous scaffold have been fabricated using electrospinning, and preliminary in vitro studies have demonstrated its potential for controlled drug release. Further studies, including in vivo evaluations and clinical trials, are needed to establish its efficacy and safety before commercialization
Product Discriminators	Key discriminators include: 1. Multiple Layers for Controlled Release: A burst release matrix combined with a controlled release matrix optimizes drug delivery, offering sustained relief while minimizing side effects like sedation and gastritis. 2. Synergistic Combination of Therapeutics: The incorporation of proteolytic enzymes like trypsin/chymotrypsin enhances anti-inflammatory action and promotes tissue healing, a novel feature in pain management patches. 3. Improved Safety Profile: The product bypasses liver first-pass metabolism, reducing systemic side effects and improving bioavailability. 4. Advanced Adhesion and Permeation: The patch includes a pressure-sensitive adhesive layer with permeation enhancers like hyaluronic acid and lecithin, ensuring faster drug absorption and improved skin compatibility. 5. Nanofibrous Scaffold Architecture: The use of electrospun nanotechnology provides a robust and flexible structure, ensuring high breathability, improved drug retention, and enhanced patient comfort. Research/Technology/Product Acquisition Cost: The cost of acquiring Penta Nanoplast is projected to be competitive due to the use of readily available biodegradable polymers and scalable electrospinning technology. The initial R&D and fabrication costs are expected to be higher due to the specialized nanofiber production process, but mass production will reduce costs over time. This product offers significant long-term savings due to reduced dosage frequency, improved efficacy, and better patient compliance, minimizing the need for additional medications to manage side effects.
Current Commercial Applications	Current Commercial Applications: At present, Penta Nanoplast is still in the preclinical development phase and has not yet been commercially launched. However, the concept and technology behind Penta Nanoplast multilayered, nanofibrous transdermal patch have potential commercial applications in the pharmaceutical and medical device industries, particularly in the market for pain management and anti-inflammatory therapies. Transdermal patches using electrospun nanofibers are already in use for drug delivery, but Penta Nanoplast differentiates itself by offering a multifunctional solution combining analgesic, anti-inflammatory, and muscle relaxant properties in a single patch. This product could be a commercially viable native to traditional oral NSAIDs, muscle relaxants, and existing single-layer transdermal plasters, offering improved bioavailability, faster relief, and fewer side effects. Once Penta Nanoplast undergoes successful clinical trials and regulatory approval, it could target markets for chronic musculoskeletal pain, work-related injuries, and sports injuries, offering patients a safer, more effective transdermal option for pain and inflammation management.



Product/Technology/Innovation Brief:

The proposed research and technology of Penta Nanoplast: A Multifunctional Hybrid Nanofibrous Scaffold will primarily impact the pharmaceutical and biomedical sectors, particularly in the areas of pain management and anti-inflammatory treatments. The product specifically addresses the transdermal drug delivery sub-sector, focusing on novel, non-invasive delivery systems for analgesics and anti-inflammatory agents. Additionally, it has significant implications for the medical devices sub-sector, particularly in the growing market for advanced wound care and therapeutic patches. This technology targets the treatment of musculoskeletal pain, providing a safer native to oral medication, thus also contributing to advancements in the muscle relaxants and NSAIDs market. The scaffolds biodegradable, nanofibrous architecture integrates with nanotechnology applications, making it relevant to the nanomedicine field as well. Overall, this product will advance therapeutic approaches in the healthcare and biopharmaceutical industries, enhancing patient care and compliance in pain and inflammation management.



PHARMACEUTICAL RESEARCH AND DEVELOPMENT IN CANCER THERANOSTICS

Key Facts:

Innovator's Name	Dr. Tanima Bhattacharya
Name of the Institution	Lincoln University College
Address	Wisma Lincoln, No. 12-18, Jalan SS 6/12, 47301 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
Email	tanimabhattacharya@lincoln.edu.my
Mobile No	60173518429
Product Maturity	TRL 5-6 (Pilot scale production and Preclinical evaluation Stage)
Product Discriminators	Our product leverages Papain-loaded solid lipid nanoparticles formulated through an advanced ultrasonication method, specifically designed to enhance both the stability and anticancer activity of Papain in the treatment of colorectal cancer. The ultrasonication technique allows for the creation of nanoparticles with precise control over size and structure, ensuring optimal drug encapsulation and stability. In addition to improved stability, ultrasonication offers significant advantages in terms of scalability and cost-efficiency. Unlike conventional methods, this technique can be easily scaled up for mass production, making it suitable for both laboratory research and commercial pharmaceutical applications. Furthermore, ultrasonication enhances the uniformity of nanoparticle size distribution, leading to more consistent and predictable drug delivery outcomes. Compared to other delivery systems, these nanoparticles not only improve bioavailability but also promote enhanced tumor penetration and trigger an immunostimulatory response, boosting the immune systems ability to target and destroy colorectal cancer cells. The combination of these factors sets my product apart by offering a targeted, scalable, and cost-effective solution with superior therapeutic potential.
Current Commercial Applications	Papain nanoparticles offer a versatile platform in various industries, particularly in pharmaceuticals, cosmetics, biotechnology, and food processing. Their ability to enhance the stability, bioavailability, and controlled release of papain makes them a valuable tool for therapeutic, cosmetic, and industrial applications.

Product/Technology/Innovation Brief:

In recent decades, herbal medicine has gained significant attention for treating and preventing various cancers. Papain, a potent proteolytic enzyme, is widely recognized for its ability to prevent chronic diseases such as cardiovascular disease, cancer, and diabetes. However, its use in cancer therapy has been limited due to poor stability, which is affected by factors like temperature, pH, and humidity. This research aimed to develop Papain-loaded Solid Lipid Nanoparticles (P-SLNs) to enhance papainâ€™s stability and evaluate its in vitro drug release, anticancer efficacy on human colorectal adenocarcinoma cells (HT-29 and HCT-15), and immunostimulatory potential. Papain was successfully encapsulated into solid lipid nanoparticles using the melt dispersion-ultrasonication technique with cetyl alcohol as the carrier and PEG 4000 as the surfactant, achieving an encapsulation efficiency of 76% and a particle size of approximately 150 nm. Zeta potential measurements indicated good colloidal stability, while FTIR analysis confirmed compatibility between papain and formulation excipients. Additional analyses using X-RD and DSC provided insights into the crystalline structure and heat enthalpy of the formulation. Proteolytic and storage stability studies demonstrated significantly improved stability for papain within SLNs. The drug release profile showed a biphasic pattern, with an initial rapid release followed by sustained release. The cytotoxicity efficacy against HT-29 and HCT-15 cells revealed that P-SLNs exhibited greater anticancer efficacy compared to plain papain while sparing healthy cells. The nanoparticles optimized size (~150 nm), lipophilicity, and spherical shape facilitated higher cellular uptake, leading to enhanced internalization by colon cancer cells, ultimately inhibiting proliferation and inducing cancer cell death. The research further highlighted that re-establishing immune function is crucial in treating cancer metastasis, as cancer cells compromise immune mechanisms during the metastatic process. P-SLNs not only serve as a potential drug delivery system for colorectal cancer treatment but also help restore immune modulation, making them an effective anticancer agents with fewer side effects.



PHYCOREMEDIATION ENERGY STORAGE SOLUTION

Key Facts:

Innovator's Name	Dr. Amrita Dawn
Name of the Institution	DRIIV (Delhi Science & Technology Cluster)
Address	Main Building, IIT Delhi
Email	amrita@driiv.co.in
Mobile No	9205842015
Product Maturity	9
Product Discriminators	Algae-based wastewater treatment stands out as a nature-based solution with significant potential for sustainability.
Current Commercial Applications	

Product/Technology/Innovation Brief:

Algae-based wastewater treatment primarily relies on the natural growth of algae in ponds, tanks, or other controlled environments where wastewater is treated.



PLASMA-BASED GRAPHENE FIELD EFFECT TRANSISTOR (GFET) AS BIOSENSORS

Key Facts:

Innovator's Name	Dr. Aarti Tewari
Name of the Institution	IILM University , Gurugram
Address	Plot No. 69-71, Golf Course Road Sector 53, Gurugram, Haryana
Email	aarti.tewari@iilm.edu
Mobile No	9910757461
Product Maturity	2026
Product Discriminators	The product is a simulator version of the plasma -functionalized graphene-field effect transistors. It is one of the kind that highlights the in-situ plasma functionalization on graphene- field effect transistors
Current Commercial Applications	It is used for biosensing applications of graphene-field effect transistors.

Product/Technology/Innovation Brief:

Graphene Field Effect Transistors



POLYMERIZATION OF LACTIC ACID

Key Facts:

Innovator's Name	Dr. Mohan Das
Name of the Institution	Indian Institute of Technology Kharagpur
Address	Agricultural and Food Engineering Department
Email	mohandas1909@gmail.com
Mobile No	6297874811
Product Maturity	TRL6
Product Discriminators	Cheap, Eco-friendly, Sustainable, Devoid of Chemicals
Current Commercial Applications	Cosmetic Industry, Pharmaceutical Industry, Plastic Industry

Product/Technology/Innovation Brief:

Utilization of agro-wastes for lactic acid acid production and its polymerization to polylactide for biomedical applications



PREFABRICATED LIGHTWEIGHT BULLET-PROOF WALL

Key Facts:

Innovator's Name	Dr. Pradeep Sivanantham
Name of the Institution	SRM Institute of Science and Technology
Address	CEF06, Department of Civil Engineering, Engineering and Technology, SRM Institute of Science and Technology, Kattankulathur - 603203, Chengalpattu, Tamil Nadu, India
Email	pradeeps@srmist.edu.in
Mobile No	9025404808
Product Maturity	The product was developed and tested in Lab, Environment testing has to be conducted
Product Discriminators	Light weight, Prefabricated, Cost effective
Current Commercial Applications	

Product/Technology/Innovation Brief:

As the threat of terrorism continues to happen, novel approaches to resistance in structures have to be considered. There are various types of protection barriers used to enhance security and defense. The bulletproof panels must not only prevent complete penetrating but also possess high strength, ductility, reduced density, and portable properties. Thus, the high-velocity impact-resisting lightweight ferrocement panel is proposed by two processes of hybridization. One of the processes of hybridization is the effective combination of different cementitious material and strength-enhancing admixture to get the required high strength cementitious matrix and the second process is hybridization on the reinforcement layer, which are the effective combination of the steel welded wire mesh and impact resisting fabric material such as Kevlar and Kevlar-carbon hybrid fabrics to design the ferrocement panel which resist the impact load of the projectile.



PROCESS AND SYSTEM FOR RECOVERY OF INDUSTRIAL GRADE POTASSIUM SULPHATE FROM DISTILLERY BOILER ASH (PATENTED)

Key Facts:

Innovator's Name	Mr. Amlan Banerjee
Name of the Institution	SSP Private Limited
Address	13th Milestone, Mathura Road, Faridabad, Haryana - 121003 (India)
Email	amlan@ssp.co.in
Mobile No	+91 9810007041
Product Maturity	Approximately between 8 & 9. TRL definition is according to NETRA (National Establishment for Technology Readiness Assessment) which states: TRL Scale 9 â€œActual System is Proven in Operational Environment TRL Scale 8 System complete and qualified The technology has been tested under realistic conditions (operational environment) in the Demonstration Plant in SSP Innovation Centre.
Product Discriminators	Extracting Potassium Sulphate from Distillery Boiler Ash is not commonly known. Distillery Boiler Ash is considered a waste of the Distillery units and it is not financially remunerative. Thus, extraction of Potassium Sulphate from Distillery Boiler Ash becomes a sustainable zero discharge process. India imports substantial quantity of fertilisers and this process of recovering fertilizer grade Potassium Sulphate would lead to significant import substitution.
Current Commercial Applications	Presently discussions are ongoing to use this technology in Distilleries or with organizations who handle such Boiler Ash. Demonstration of the process is carried out within SSP Innovation Centre for testing and exhibiting the feasibility of the process to prospective Customers.

Product/Technology/Innovation Brief:

The significant aspects of this innovation are: Potassium Sulphate (fertilizer grade) is recovered from Distillery Boiler Ash by a two-path process. The extraction process primarily involves leaching and subsequent acidification. The resultant liquid from first stage is crystallised to pure Potash. Re-extraction process is employed on the left-over residues to generate Potassium Sulphate and Magnesium Sulphate.



REAL-TIME SPEED MONITORING, VIOLATION MANAGEMENT, AND PENALTY SYSTEM

Key Facts:

Innovator's Name	Dr. Harinath Aireddy
Name of the Institution	Alliance University
Address	Alliance University - Central Campus, Chikkahadage Cross Chandapura-Anekal, Main Road, Bengaluru, Karnataka 562106
Email	harinath.aireddy@alliance.edu.in
Mobile No	9475175218
Product Maturity	TRL-6
Product Discriminators	Previous approaches, when compared to our real-time speed monitoring, violation notification, and penalty system designed to reduce traffic accidents have limitations in terms of real-time alerting and integration with penalty generation and including fixed speed cameras and GPS-based monitoring systems. Manual enforcement by traffic police officers is quite hectic and impractical for comprehensive monitoring. To overcome these issues, our Speed Monitoring Device and Violation Notification System offers real-time speed tracking, immediate alerts, and automated penalty generation. The system includes a PDF report with the violation details, including location and speed, sent to the driver email and mobile number. The device also features a screen displaying the current speed limit, the vehicles speed, and Google Maps for navigation.
Current Commercial Applications	The product is currently not being used for commercial applications.

Product/Technology/Innovation Brief:

The device is engineered for real-time monitoring of vehicle speed relative to set speed limits, while simultaneously tracking precise location data using GPS technology. It helps follow with traffic regulations by providing instant feedback and location-based insights. If the driver crosses the speed limit an alert message is sent to registered mobile number. The device is built to monitor real-time speed and location, providing instant alerts and automatically generating penalties. It sends a detailed PDF report, including location and speed data, to both email and mobile devices. Additionally, the device features a blinking screen that alerts the user when a speed limit is exceeded. The screen also displays the road speed limit, the vehicle current speed, and integrates Google Maps for navigation and location awareness. Our device stands out for its unique design, as all the outer surface components are 3D printed using eco-friendly Polylactic Acid (PLA) material. This makes the speed monitoring device not only environmentally sustainable but also fully customizable with our innovative design, ensuring ease of use and comfort for drivers.



RECONFIGURABLE WIRELESS CHARGERS FOR ELECTRIC VEHICLES

Key Facts:

Innovator's Name	Dr. Bharatiraja Chokkalingam
Name of the Institution	SRM Institute of Science and Technology
Address	Dr.C.Bharatiraja., M.E, Ph. D., PDF (USA and ZA). INDO - US BASE Fellow Professor, Department of Electrical and Electronics Engineering, Centre Head - Centre for Electric Mobility (CEM) SRM Institute of Science and Technology, SRM Nagar,Kattankulathur, 603203,Chengalpattu, Chennai, TN, India E-mail : bharatic@srmist.edu.in
Email	bharatic@srmist.edu.in
Mobile No	9042701695
Product Maturity	TRL 6 (3 patent granted, 2 patent published)
Product Discriminators	This Charger has developed for 3.3kW (ranging 72-96V/ 32A) This Charger also provides a multi-winding wireless charging system with a reconfigurable topology to realize CC and CV battery charging with different optimal range and high efficiency In addition, the half-bridge scheme and the full-bridge scheme are the other two functioning modes for each topology. At the same time, the efficiency of the system can reach up to 94.34% and 95.13% in the half-bridge as well as full-bridge schemes under the CC mode The main advantages of wireless EV chargers Reduced infrastructure costs High power transfer efficiency Possibility of high-speed charging (but increasing costs) Low maintenance requirements Virtually no electromagnetic emissions
Current Commercial Applications	The direct Commercial Application is EV Battery charging with plug in. The wireless EV chargers are not yet developed in India. This technology is in the pilot study in few overseas. However, they are charging till CC mode charging. Our charger is operation in CC and CV mode. Hence 100% battery charging is possible by using this charger. Also, the chargers are mode such a way in modular structure. Hence, without charging much design matrices, the power level this wireless charger can be extended in any EV vehicles segments Our chargers also have a recitation type and used AI algorithm to detect the EVs and respective coils (road/parking coil) to be excitation to send the power to corresponding Received coils (EV Coil) This method has many advantages over other estimation techniques: 1. It allows to control the primary side without knowing the receiver parameters in advance. 2. The application is straightforward and needs just a single voltage sensor for zero crossing phase detection. 3. The determine process is extremely fast and typically takes about ten milliseconds.

Product/Technology/Innovation Brief:

Globally Auto manufacturers and tech firms are heavily investing in smart EV charging, striving to enhance its efficiency and affordability. Different EV models may require different charging connectors, and standardization has not been fully achieved. This lack of uniformity can lead to compatibility issues, making it challenging for users to find compatible charging stations for their specific vehicles. Wireless power transfer (WPT) for EVs has the prospective technology to overwhelm the problems of wired (plugged-in) chargers and eliminate certain hurdles to EV electrification for



sustainable mobility. We developed the market-ready product of a 3.3 kW Wireless charger module with a modular design, enabling its seamless integration into various EVs. The proposed product has simple switching circuits that are capable of achieving (SAE) J1772 standards constant voltage (VC) and constant current (CC) charging with zero cross-coupling. The drive intelligent power novel power electronics resonant er modules (IPMs) are planned using next-generation SiC IGBTs to deal with the thermal system performance and power density energy efficiency, system ruggedness, and reliability. This project employs EUC PCB with CAN and automotive communication protocols. Outer case and home allocation for the Rx charging pad with "Compliance Assurance": Ensuring the charging system adheres to both ICNIRP 2020 and SAE J2954 standards, IP 65 and IP 67. (ARAI/IEC- Certification). This developed Wireless Chagres has the following advantages over other chargers: Advanced Parking System - Convenient and effortless charging experience. The invented design is modular in nature hence it can be designed in any EV with a High degree of freedom Reduced wear and tear on connectors with enhanced safety measures. Improvements in charging efficiency. Present TRL: TRL 6 (3 patent granted, 2 patent published)



RECOVERY OF POTABLE WATER, VACUUM REFINED SALT AND MARINE MINERALS FROM THE CONCENTRATED AND REJECTED BRINE DISCARDED BY THE DESALINATION PLANTS

Key Facts:

Innovator's Name	Mr. Amlan Banerjee
Name of the Institution	SSP Private Limited
Address	13th Milestone, Mathura Road, Faridabad, Haryana - 121003 (India)
Email	amlan@ssp.co.in
Mobile No	+91 9810007041
Product Maturity	Approximately 9. TRL definition is according to NETRA (National Establishment for Technology Readiness Assessment) which states: Actual System is Proven in Operational Environment The technology is proven at our customer site in Kenya.
Product Discriminators	Extracting valuable materials from rejected brine concentrate is rare. Rejected brine concentrate is considered a waste of the Desalination Process and hence it is discarded back to the sea. The infusion of high salinity brine rejects is a major hazard for aquatic life. SSP has utilised this rejected brine concentrate to generate value added products and ensure that there is no infusion of concentrated brine back to sea. Thus, the Desalination process overall becomes a sustainable zero discharge process. Other available and known technologies do not provide the above-mentioned benefits.
Current Commercial Applications	SSP technology for extracting and producing potable water & pure salt from concentrated brine has been practically implemented at KENSALT in Malindi, Kenya, which produces 120 MT of salt (>99.6% purity) and 329,000 Litters of water per day. Please note that SSP Private Limited has over three decades of experience in handling of Saline water and Brine concentrations. For our Customer EMISAL in Egypt, we have provided the solution for extraction of valuable chemicals, pure salt and potable water from bitterns of Qarun Lake. In Bangladesh, we have provided innovative process for extraction of salt and water from saline water having excessive carryover of Indo-Gangetic River mud.

Product/Technology/Innovation Brief:

The significant aspects of this innovation are: Potable water production of the desalination plant is increased from an average between 40% to 55% to over 95%. Good quantity of vacuum refined edible/industrial salts (greater than 99.6% purity) is obtained. Disposal cost of desalination brine rejects is eliminated, leading to Zero Discharge system. As an option (depending on the composition of the Desalination rejects), it is possible to also extract other valuable chemicals like MgSo4, MgCl2, KCl etc. The sensitive marine eco-system is protected from effects of concentrated brine rejects thereby ensuring Sustainability and restricting Climate change.



RECOVERY OF POTASSIUM SULPHATE AND OTHER VALUABLE PRODUCTS FROM SPENT WASH LEADING TO ZLD SYSTEM

Key Facts:

Innovator's Name	Mr. Amlan Banerjee
Name of the Institution	SSP Private Limited
Address	13th Milestone, Mathura Road, Faridabad, Haryana - 121003 (India)
Email	amlan@ssp.co.in
Mobile No	+91 9810007041
Product Maturity	Approximately between 8 & 9. TRL definition is according to NETRA (National Establishment for Technology Readiness Assessment) which states: TRL Scale 9 â€œActual System is Proven in Operational Environment TRL Scale 8 System complete and qualified. The technology has been tested under realistic conditions (operational environment) in the Demonstration Plant in SSP Innovation Centre.
Product Discriminators	Extraction of Potassium Sulphate from Distillery Spent Wash in such a convenient industrial operation is not commonly known. Spent Wash is an effluent and a source of serious pollution. Distilleries incur huge costs to handle this effluent. Thus, extraction of Potassium Sulphate from Distillery Spent Wash becomes a sustainable zero discharge process. India imports substantial quantity of fertilisers and this process of recovering fertilizer grade Potassium Sulphate would lead to significant import substitution.
Current Commercial Applications	Presently discussions are ongoing to use this technology in Distilleries or with organizations who are willing to handle Spent Wash from Distilleries. Demonstration of the process is carried out within SSP Innovation Centre for testing and exhibiting the feasibility of the process to prospective Customers.

Product/Technology/Innovation Brief:

The significant aspects of this innovation are: Potassium Sulphate (fertilizer grade) is recovered from Distillery Spent Wash by a two-route process. Extraction from Spent wash itself. Extraction after Bio methanation of the Spent wash. The process involves segregation of Heavy Molecular Weight Organic Compounds and treatment of Mother Liquor to generate pure Potash. Activated Charcoal is a byproduct of the process.



SEMICONDUCTOR MICROFABRICATION SIMULATION

Key Facts:

Innovator's Name	Mr. Utanko Mitra
Name of the Institution	Indian Institute of Technology Kharagpur
Address	ATDC, Indian Institute of Technology Kharagpur, Kharagpur - 721302
Email	utankomitra@gmail.com
Mobile No	8334028780
Product Maturity	6-12 months
Product Discriminators	SEMICONDUCTOR MICROFABRICATION SIMULATION Enhanced Engagement: VR provides immersive experiences that improve focus and knowledge retention. Safety and Cost Efficiency: Allows practice without risking equipment damage or material waste. Realistic Simulations: Replicates diverse real-world scenarios for hands-on learning. Real-time Feedback: Offers immediate performance metrics and customizable training scenarios.
Current Commercial Applications	

Product/Technology/Innovation Brief:

SEMICONDUCTOR MICROFABRICATION SIMULATION This project aims to create a virtual reality simulation for semiconductor microfabrication that allows users to engage with 3D objects, thereby improving comprehension of fabrication processes and emphasizing the advantages of immersive learning in engineering education.



SMART MIST FAN FOR ULTIMATE COMFORT

Key Facts:

Innovator's Name	Dr. Harinath Aireddy
Name of the Institution	Alliance University
Address	Alliance University - Central Campus, Chikkahadage Cross Chandapura-Anekal, Main Road, Bengaluru, Karnataka 562106
Email	harinath.aireddy@alliance.edu.in
Mobile No	9475175218
Product Maturity	TRL- 6
Product Discriminators	The previous approaches were not able to sense and adapt to variations in temperature and humidity, without optimal cooling where wastage of energy is more. It addresses the shortcomings of conventional fans, which lack the ability to spray, repel mosquitoes, or refresh the air. In contrast, conventional setups require multiple devices for cooling, mosquito repellent, and air refreshing, with each device powered and operated separately. As a result, the process becomes more complex and inherently less efficient. Our product combines all these features in one device, streamlining the process and setting it apart from the competition. To address the issues, this fan combines all the mentioned above and our device also features a screen displaying the automatic and manual modes, 3 different speeds, mosquito Repeller, mist control.
Current Commercial Applications	The product is currently not being used for commercial applications.

Product/Technology/Innovation Brief:

The versatile and convenient automated mist fan can be operated both manually and automatically and has other features including the ability to repel mosquitos, create mist, switch on and off if human presence is detected, the speed of the fan is adjusted based on the surrounding temperature. A high-resolution TFT display offers simple control and real-time s. A device with an internet connection can be used to remotely operate the fan system using a web application. The fans room freshener feature improves comfort by keeping the room smelling fresh. Our device stands out for its unique design, as all the outer surface components are 3D printed using eco-friendly Polylactic Acid (PLA) material. This not only makes the fan environmentally sustainable but also allows for complete customization with our own innovative design, ensuring both functionality and aesthetics are optimized.



SMARTPLY: IOT ENABLED PRODUCTION MONITORING AND CONTROLLING SYSTEM FOR PLYWOOD MANUFACTURING

Key Facts:

Innovator's Name	Mr. Mahesh Mohan
Name of the Institution	Amrita Technology Enabling Center
Address	DST Technology Enabling Centre (TEC) , Amrita Vishwa Vidyapeetham, Amritapuri, Clappana P. O. , Kerala, India - 690 525.
Email	maheshms@am.amrita.edu
Mobile No	8884855224
Product Maturity	Deployed and running live at Seepisons Plywood Manufacturing Unit, Kerala.
Product Discriminators	It automates the plywood production process, reduces human intervention, improves product quality, and enhances productivity. The system provides precise monitoring and alarms for any parameter mismatch.
Current Commercial Applications	Currently deployed at Seepisons Plywood Manufacturing Unit, Kerala.

Product/Technology/Innovation Brief:

SmartPly is a fully automated plywood production monitoring and control system. It standardizes the hot press process in plywood manufacturing by monitoring and controlling parameters like pressure, temperature, curing time, and thickness. (TRL 8)



SOFTWARE-BASED END-TO-END GAMES IN VIRTUAL REALITY THAT MIMIC THE COGNITIVE LOAD OF REAL WORLD AND PROVIDE COGNITIVE SCORES BASED ON USER PERFORMANCE. THE SCORES ARE CONCEPTUALIZED IN A MANNER THAT INTUITIVELY ADVISE COGNITIVE ENGAGEMENT AND PERFORMANCE

Key Facts:

Innovator's Name	Dr. Veeky Baths
Name of the Institution	Birla Institute Of Technology And Science, Pilani
Address	Birla Institute of Technology and Science, Pilani Pilani Campus, Vidya Vihar Pilani - 333031, Rajasthan, India
Email	veeky@goa.bits-pilani.ac.in
Mobile No	9823764896
Product Maturity	TRL 7
Product Discriminators	A, Benefits 1.Nuanced cognitive assessment, more informative than traditional neuropsychological assessment scores. 2. Automated scoring and possibility to track cognition longitudinally. 3. Subjective scoring, inter-rate variability eliminated, as objective assessment. B. Potential Application 1.Cognitive Assessment in geriatric settings, neuropsychological, neurotherapeutic, neurophysiotherapy settings. 2. Cognitive Rehabilitation.
Current Commercial Applications	Cognitive Assessment in geriatric settings, neuropsychological, neurotherapeutic, neurophysiotherapy settings. Cognitive Rehabilitation.

Product/Technology/Innovation Brief:

What is the Problem Statement : Current neuropsychological assessment is passive, does not take into account the multi-sensory aspect of real-world tasks, and is useful only for patients with symptoms of cognitive decline. As a result, they are not useful for early detection of cognitive deterioration. Moreover, the scores obtained from these assessments are based on correct/incorrect responses and do not consider more nuanced aspect of decision making which involves time, information processing, and reflexes. Solution Provided: Goal-oriented games in Virtual Reality that mimic the cognitive load of real-world and engage user in real-world analogous decision-making. Key Features & Benefits: Over existing technology solutions (bullet form) Features Virtual-Reality based 3D Cognitive Assessment. Game situations that mimic multi-sensory cognitive engagement akin to real-world. Scores that account for time in cognitive processes and game performance



SUPERHYHOBIC COATING/PAINT FOR DRAG REDUCTION AND FUEL ECONOMY IN MARINE VESSELS

Key Facts:

Innovator's Name	Dr. Rahul Dev Mukhopadhyay
Name of the Institution	SRM Institute of Science and Technology (SRMIST)
Address	Department of Chemistry, College of Engineering and Technology, SRMIST, SRM Nagar, Kattankulathur - 603 203, Chengalpattu District, Tamil Nadu, India.
Email	rahuldem@srmist.edu.in
Mobile No	9477368347
Product Maturity	Technology Readiness Level (TRL): 5-6, tested in relevant environments with model boat and ready for further field validation.
Product Discriminators	Superior drag reduction, higher fuel savings, higher cargo loading capacity, and enhanced durability compared to conventional marine coatings.
Current Commercial Applications	

Product/Technology/Innovation Brief:

Superhyhobic coatings from hybrid materials formulated to reduce drag and enhance fuel efficiency in marine vessels.



THE AI-BASED DEFECT DETECTION MECHANISM IS CUSTOMIZED TO MEET SPECIFIC INDUSTRY REQUIREMENTS, DRIVING EFFICIENCY BY REDUCING COSTS, TIME, AND MANUAL EFFORT. THIS RESULTS IN A SIGNIFICANT BOOST IN OVERALL OPERATIONAL PRODUCTIVITY WHILE ENSURING HIGHER PRECISION AND RELIABILITY IN DEFECT DETECTION. BEING INDUSTRY 4.0 COMPLIANT, IT PROVIDES FOR BETTER PRODUCTIVITY, PREDICTIVE MAINTENANCE, QUALITY CONTROL AND ENERGY SAVING.

Key Facts:

Innovator's Name	Dr. Praveen Kumar Khosla
Name of the Institution	Chitkara University
Address	Chandigarh-Patiala National Highway (NH- 64 Village Jansla, Rajpura, Punjab 140401
Email	pkkhosla@chitkara.edu.in
Mobile No	9779917776
Product Maturity	The proposed AI-based solution is currently at Technology Readiness Level (TRL) 9, as it has been successfully deployed and is operational in multiple locations within the orthopedic industry. Its proven performance in real-world environments demonstrates its maturity and readiness for broader industrial application.
Product Discriminators	Industry-Specific Customization: While many defect detection systems offer general-purpose solutions, the system can be specifically tailored to the needs of the industry and beyond. Minor algorithm adjustments allow seamless adaptation for various industries, offering a versatile and flexible solution. Machine Vision Integration: The solution utilizes advanced machine vision technology, ensuring precise and real-time defect detection. This allows for higher accuracy and efficiency compared to traditional manual inspections or simpler automated systems. Compliance with Industry 4.0: The machine is designed to integrate with Industry 4.0 standards, ensuring compatibility with smart manufacturing processes. This includes automation, data-driven insights, and connectivity with other systems, which provides a future-ready, scalable solution. Cost-Effectiveness: With an approximate cost of 20 lakhs per unit, the machine provides an affordable option for businesses, particularly those in emerging markets, while maintaining high performance and cutting-edge AI capabilities. Continuous Learning Capabilities: The AI-based system likely includes machine learning algorithms that improve over time by learning from defect patterns, making it smarter and more efficient as it operates. This distinguishes it from static systems that do not adapt to new data. These factors position our AI solution as an adaptable, cost-effective, and cutting-edge technology that can deliver significant value in various industrial sectors.
Current Commercial Applications	This AI-based solution is currently being utilized in the orthopedic appliance industry, where it employs machine vision technology to detect defects in products.

Product/Technology/Innovation Brief:

The AI-based defect detection system is an advanced technological solution designed to identify flaws or inconsistencies in products during the manufacturing process. Leveraging machine vision and artificial intelligence, this system automates the detection of defects such as surface irregularities, dimensional discrepancies, or structural issues in real-time. The technology is customizable to industry-specific needs, making it highly adaptable for various sectors, including the orthopedic industry, where it is already in operation. By improving the accuracy of quality control, it reduces manual inspection efforts, accelerates production time, and lowers costs, ultimately enhancing overall productivity and ensuring higher product quality.This technology is positioned at Technology Readiness Level (TRL) 9, indicating its maturity and successful deployment in real-world applications. Its adaptability across different industries further demonstrates its potential for broader implementation.



TOTALLY IMPLANTABLE COCHLEAR IMPLANT (TICI)

Key Facts:

Innovator's Name	Dr. Subramani Kanagaraj
Name of the Institution	IIT Guwahati
Address	Indian Institute of Technology, Guwahati-781039, Assam
Email	kanagaraj@gmail.com
Mobile No	+91-9101057923
Product Maturity	The Technology Readiness Level (TRL) of the Totally Implantable Cochlear Implant (TICI) is currently at TRL 5. The POC device has been successfully developed and validated in laboratory environments, and in vitro testing is underway to assess its performance in simulated conditions.
Product Discriminators	The Totally Implantable Cochlear Implant (TICI) has several unique features that differentiate it from existing cochlear implants: Fully Implantable & Self-Powered: Unlike traditional cochlear implants that rely on external components and power sources, TICI is fully implantable and self-powered, providing greater user convenience and eliminating visible external parts. MEMS-Based Design: The device uses a microelectromechanical system (MEMS)-based cantilever beam array for precise, frequency-specific stimulation, ensuring accurate sound processing across the entire human auditory range. Minimally Invasive: The compact design, with a footprint of 2 mm x 2 mm, allows for minimally invasive implantation, reducing surgical complexity and enhancing patient comfort. Cochlear Tonotopy Replication: TICI mimics the natural frequency mapping of the cochlea, providing more natural and effective hearing restoration. These innovations make TICI a breakthrough in cochlear implant technology, offering enhanced comfort, aesthetics, and functionality.
Current Commercial Applications	The Totally Implantable Cochlear Implant (TICI) is not yet commercially available and is currently in the development and validation phase. It is being tested in in vitro environments to assess its functionality, performance, and readiness for further preclinical and clinical trials. Once fully validated, TICI is expected to be a transformative solution in the field of hearing restoration for individuals with sensorineural hearing loss, offering a fully implantable, self-powered cochlear implant that eliminates the need for external components.

Product/Technology/Innovation Brief:

The Totally Implantable Cochlear Implant (TICI) is a self-powered, fully implantable hearing device designed to restore hearing for individuals with sensorineural hearing loss (SNHL). Utilizing a microelectromechanical system (MEMS)-based cantilever beam array, TICI fits within the inner ear, mimicking cochlear tonotopy to cover the entire human auditory range. The device is designed to operate without external components and generates sufficient electrical potential to stimulate auditory nerve fibers, offering a convenient and minimally invasive solution for hearing restoration.



TRABODA ARENA

Key Facts:

Innovator's Name	Mr. Vipin Pavithran
Name of the Institution	Amrita Vishwa Vidyapeetham
Address	Vallikavu PO, Amritapuri, Clappana, Kerala 690525
Email	vipinp@am.amrita.edu
Mobile No	9447490804
Product Maturity	Technology Readiness Level (TRL): 7 The platform has been developed and validated in real-world environments through successful deployments in both national and international-level CTFs and cybersecurity training events.
Product Discriminators	- Supports a wide variety of formats: Jeopardy, A&D, Red vs. Blue team exercises. - Scalable platform capable of handling over 10,000 participants simultaneously. - Integrated with real-world ICS/SCADA systems for realistic attack simulation. - Built-in support for event registration, notifications, and challenge instructions. - Highly customizable challenges based on event requirements. - Comprehensive support for different types of cybersecurity exercises, making it suitable for training, competitions, and simulated cyber warfare scenarios.
Current Commercial Applications	The platform is currently used by major organizations, including Schneider Electric, Cisco, and Adobe, for conducting cybersecurity training exercises and Capture The Flag (CTF) competitions. These deployments involve both internal team training and external participant events, enabling organizations to enhance their cybersecurity resilience.

Product/Technology/Innovation Brief:

Our CTF hosting platform supports multiple cybersecurity training modes, including Jeopardy-style challenges, Attack and Defense (A&D) scenarios, and Red vs. Blue team exercises. The platform is designed to cater to cybersecurity professionals and enthusiasts, providing real-world simulation environments to practice, learn, and enhance their skills across various security domains.



UTILIZATION OF AGRO WASTE FOR 2G BIOETHANOL PRODUCTION

Key Facts:

Innovator's Name	Mr. Sayantan Santra
Name of the Institution	Indian Institute of Technology Kharagpur
Address	Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India, PIN - 721302
Email	sayantansantra40@gmail.com
Mobile No	7980984189
Product Maturity	The technology is at the TRL 7 level
Product Discriminators	The consolidated bioprocessing of lignocellulosic biomass for 2G bioethanol production is a sustainable solution. This innovative technology is environmentally friendly and minimizes the utilization of chemical-based fuel.
Current Commercial Applications	

Product/Technology/Innovation Brief:

Sustainable production of 2G bioethanol utilizing lignocellulosic agro-waste for renewable bioenergy production



WEARICO

Key Facts:

Innovator's Name	Dr. Subramani Kanagaraj
Name of the Institution	Indian Instutite Of Technology Guwahati
Address	Indian Institute of Technology, Guwahati - 781039, Assam
Email	kanagaraj@gmail.com
Mobile No	9.19101E+11
Product Maturity	TRL-5
Product Discriminators	1. Customized weable device 2. IoT enabled mobile control 3. Enhanced upward blood flow 4. Therapeutic and Preventive applications
Current Commercial Applications	

Product/Technology/Innovation Brief:

Presenting an innovative wearable gadget with adjustable pressure, designed to serve both therapeutic and preventive roles for varicose veins. The primary goal of this device is to enhance patients mobility while effectively addressing conditions such as varicose veins. Additionally, it features mobile control and IoT (Internet of Things) integration, allowing users to customize settings and monitor their vascular health remotely through a user-friendly mobile app



Addendum









AI AND IOT BASED CHEM ANALYTICS

Key Facts:

Innovator's Name	Dr. Tanima Bhattacharya
Name of the Institution	Lincoln University College (LUC)
Address	Wisma Lincoln, No. 12-18, Jalan SS 6/12, 47301 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
Email	tanimabhattacharya@lincoln.edu.my
Mobile No	60173518429
Product Maturity	The current Technology Readiness Level (TRL) of the "AI and IoT Based Chem Analytics" product is TRL 6. The hardware and software interface components have been successfully developed and tested in relevant industrial environments. However, the integration of AI and Machine Learning (ML) features, which are critical for predictive analytics and decision-making, is still in progress. Once these components are incorporated and fully validated, the product will progress to higher TRL levels.
Product Discriminators	1. Real-Time IoT-Driven Data Collection: The product leverages a robust network of IoT sensors that continuously monitor various chemical parameters such as temperature, pressure, and composition in real-time, offering more precise and timely data compared to competitors. 2. Scalable and Modular Design: The solution is designed to be flexible and scalable, allowing easy integration into existing industrial setups with minimal disruption. Its modular nature enables customization according to specific industry requirements. 3. Predictive Maintenance and Anomaly Detection: Once the AI/ML components are integrated, the system will offer advanced predictive maintenance features. This allows industries to foresee potential equipment failures and process anomalies, preventing costly downtime, a step beyond basic monitoring solutions provided by competitors. 4. Seamless Hardware and Software Integration: The product ensures smooth interaction between hardware sensors and software analytics platforms, offering a seamless experience. This integration enables rapid deployment and ease of use, surpassing the often fragmented systems seen in competing products. 5. Environmental and Regulatory Compliance: By providing accurate, real-time emissions monitoring and chemical tracking, the product helps industries meet environmental standards and regulatory compliance more effectively than other solutions. 6. Industry-Specific AI Algorithms: The AI models are being tailored specifically for the chemical and related industries, offering insights that are highly relevant to process optimization, safety, and efficiency, distinguishing the product from generic AI systems offered by competitors. These features combine to deliver a powerful, future-ready solution that addresses the specific challenges of chemical analytics with greater precision, efficiency, and adaptability than competing products.



Current Commercial Applications	The "AI and IoT Based Chem Analytics" product is currently in the testing phase and has not yet been fully deployed for commercial use. However, it is being trialled in real-world industrial environments to validate its performance. These testing applications include: 1. Chemical Manufacturing Plants: The product is being used to monitor real-time chemical processes, track production parameters, and detect any deviations in operational performance to enhance efficiency and safety. 2. Environmental Monitoring: The system is being tested for tracking emissions and pollutants in industrial facilities, ensuring compliance with environmental regulations, and improving sustainability efforts. 3. Pharmaceutical Industry: The product is undergoing trials for ensuring precision in chemical compositions during the manufacturing process, which is critical for product quality and regulatory compliance. These tests provide valuable insights to refine the AI and ML components before full commercial deployment.

Product/Technology/Innovation Brief:

"AI and IoT Based Chem Analytics" is an advanced technological solution designed to revolutionize chemical analysis and monitoring in industrial settings. The product integrates Artificial Intelligence (AI) and the Internet of Things (IoT) to provide real-time data collection, predictive analytics, and automated decision-making for chemical processes. Equipped with sensors, the system continuously monitors critical parameters such as temperature, pressure, chemical composition, and emissions. AI algorithms then process this data to detect anomalies, predict maintenance needs, and optimize chemical operations. This helps industries improve efficiency, reduce operational risks, ensure compliance with environmental regulations, and minimize downtime. Targeted for use in sectors such as chemical manufacturing, environmental monitoring, pharmaceuticals, and more, the solution is scalable, adaptable, and designed to enhance overall process automation and decision-making.



AI AND IOT BASED AGRICULTURAL SENSOR

Key Facts:

Innovator's Name	Dr. Tanima Bhattacharya
Name of the Institution	Lincoln University College (LUC)
Address	Wisma Lincoln, No. 12-18, Jalan SS 6/12, 47301 Petaling Jaya Selangor Darul Ehsan, Malaysia.
Email	tanimabhattacharya@lincoln.edu.my
Mobile No	60173518429
Product Maturity	The current Technology Readiness Level (TRL) of the "AI and IoT Based Agriculture Sensor product" is TRL 7. The hardware components and software interface have been successfully developed and tested in relevant agricultural environments. However, the integration of AI and Machine Learning (ML) features, which are essential for data analysis and predictive insights, is still in progress. Once these AI/ML functionalities are fully implemented and validated, the product will advance to higher TRL levels.
Product Discriminators	Key Features of the "AI and IoT Based Agriculture Sensor Product" that Set it Apart from Competition: 1. Real-Time Data Monitoring: The product employs a comprehensive network of IoT sensors to continuously monitor vital agricultural parameters such as soil moisture, temperature, humidity, and nutrient levels, providing farmers with real-time insights that enhance decision-making. 2. AI-Driven Analytics: Utilizing advanced AI algorithms, the product analyzes collected data to offer predictive insights and recommendations tailored to specific crops and environmental conditions, distinguishing it from competitors that may only provide basic monitoring. 3. Automated Irrigation Management: The product features intelligent irrigation control that optimizes water usage based on real-time soil moisture data and weather fores, promoting sustainability and reducing water waste compared to traditional systems. 4. User-Friendly Interface: The mobile and web applications are designed for ease of use, allowing farmers to easily monitor their fields, receive alerts, and access actionable insights without needing advanced technical skills. 5. Customizable Solutions: The system is scalable and can be tailored to meet the unique needs of various farming operations, from smallholder farms to large agricultural enterprises, providing flexibility that many competitors do not offer. 6. Integration with Agricultural Practices: The product is designed to complement existing farming practices, making it easy for farmers to adopt and integrate into their current operations without major disruptions. 7. Sustainability Focus: By optimizing resource usage and minimizing waste, the product promotes environmentally friendly farming practices, appealing to modern farmers who are increasingly prioritizing sustainability. These features collectively provide a comprehensive, user-centric solution that enhances agricultural productivity and sustainability, giving it a competitive edge in the agritech market.



Current Commercial Applications	Please indicate whether or not your product is currently in use for commercial applications and provide a brief description of these applications. Commercial Applications and Testing Phase The "AI and IoT Based Agriculture Sensor product" is currently in the testing phase and has not been fully commercially deployed. However, it has been successfully tested and validated in various agricultural settings, including: Pilot Projects: The product has been deployed in several pilot projects with partner farmers and agricultural organizations to test its efficacy and gather feedback. Research and Development: The product is being used in research and development projects to study its impact on crop yields, water usage, and soil health. Proof-of-Concept Trials: The product has been used in proof-of-concept trials to demonstrate its potential to improve agricultural productivity and sustainability. While the product is not yet commercially deployed, it has shown promising results in these testing phases, and we are working towards full commercial deployment in the near future. Planned Commercial Applications: Once commercially deployed, the product is expected to be used in a variety of commercial applications, including: Precision Farming: The product will be used to optimize crop yields, reduce water and fertilizer usage, and improve soil health. Agricultural Monitoring: The product will be used to monitor soil moisture, temperature, and other environmental factors to improve crop management. Irrigation Management: The product will be used to optimize irrigation schedules and reduce water waste. Crop Insurance: The product will be used to provide data-driven insights for crop insurance companies to assess risk and provide more accurate policies. These commercial applications will help to improve agricultural productivity, sustainability, and profitability, while also reducing the environmental impact of farming practices.

Product/Technology/Innovation Brief:

The "AI and IoT Based Agriculture Sensor product" is an innovative solution designed to enhance agricultural practices through the integration of advanced technologies. This product utilizes a network of IoT sensors to collect real-time data on critical agricultural parameters, such as soil moisture, temperature, humidity, and nutrient levels. The data gathered by these sensors is analyzed using Artificial Intelligence (AI) algorithms to provide actionable insights for farmers. This enables precision farming, allowing users to optimize resource usage, improve crop health, and enhance overall productivity. With features such as automated irrigation control, pest detection, and weather foreing, the product empowers farmers to make informed decisions based on accurate and timely information. Its user-friendly interface allows easy monitoring and management through a mobile or web application, making it accessible for farmers of all skill levels. Designed for scalability, the solution can be tailored to meet the specific needs of various agricultural operations, from small family farms to large commercial enterprises. Ultimately, the "AI and IoT Based Agriculture Sensor product" aims to promote sustainable farming practices and improve food security in an increasingly technology-driven agricultural landscape.



MICRO ARRAY PATCH (MAP) TECHNOLOGY

Key Facts:

Innovator's Name	Mr. Ayan Chatterjee
Name of the Institution	IIT Kharagpur
Address	Kharagpur West Bengal, 721302
Email	ayan.admn@gmail.com
Mobile No	+91 - 8420305437
Product Maturity	TRL 5
Product Discriminators	Our Micro Array Patch Technology can store vaccines at high temperature up to 40 to 45 degree centigrade for 4 months which has ben not been Offred by any of our global competitors till date . The vaccine delivery time to skin is 10 to 15 seconds as against the current system which takes up to 10 mins .
Current Commercial Applications	Microarray patches can be commercially used to deliver vaccines painlessly without the need for refrigeration.

Product/Technology/Innovation Brief:

We have developed a thermostable dissolvable solid microneedle-based vaccine delivery platform technology which is micro array patch technology (MAP). It has the potential of achieving greater and faster immunization coverage as it does not require any cold chain infrastructure and no need for trained health care professional to administer the vaccines. It eliminates the problem of vaccine loss due to multidose vials. Additionally, it does not generate sharp waste and completely removes the problem of needle misuse. Also, administering vaccines through microneedles is completely painless which is especially advantageous to children.

PIECEWISE ISOTHERMAL NUCLEIC ACID TEST (PINAT)

Key Facts:

Innovator's Name	Mr. Arijit Bera
Name of the Institution	IIT Kharagpur
Address	Kharagpur, West Bengal, 721302
Email	arijit.phyh.bera@gmail.com
Mobile No	7384144300
Product Maturity	TRL-5
Product Discriminators	a. Isothermal nucleic acid test (obviating the need of thermal cycler) b. High sensitivity and specificity as compared to the gold standard Rt-PCR test. c. Low cost (INR 150/test) d. Affordable instrument cost of 10000 rupees. e. Visual detection of test result (obviating the need of fluorescence detector) f. Being a platform technology, it can be adapted to detect wide range of pathogens.
Current Commercial Applications	

Product/Technology/Innovation Brief:

The first indigenous POC technology in the form of an ultra-low-cost portable thermal processing cum readout unit achieving sample-to-result integration for detecting MTB and respiratory viral infections. Being a platform technology, the device can be adapted to detect any pathogenic infection, simply by pre-programming the common PINAT based testing protocol in the portable thermal unit. This will emerge as a preferred substitute of common rapid tests that often compromise the detection sensitivity. This will be ideal for implementation in educational institutions and other community centres for extensive disease screening and infection management at the grassroot level.

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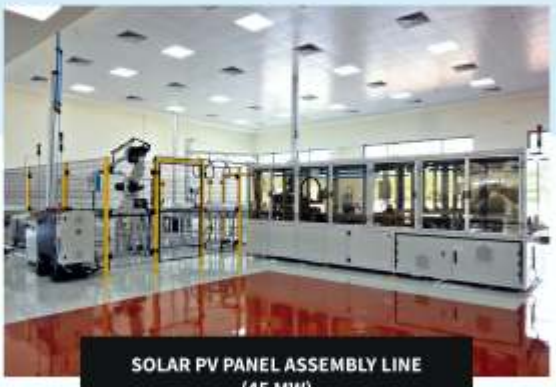
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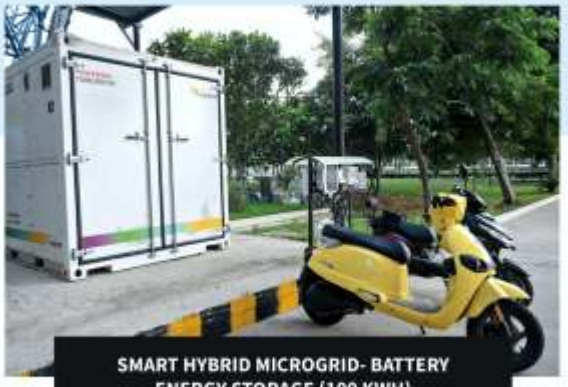
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19 DLF Industrial Area Ph. 2, 13/4
Faridabad, Haryana (121003), India

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For further details, please contact:

Mr. Sumeet Gupta
Assistant Secretary General
E: sumeet.gupta@ficci.com
T: +91-11-23487515

Ms. S. Vijaya Lakshmi
Director
E: vijayalakshmi.s@ficci.com
M: +91-9818873461

Mr. Amit Mishra
Assistant Director
E: amit.mishra@ficci.com
M: +91-9911053038

Mr. Sidharth Agrawal
Research Associate
E: sidharth.agrawal@ficci.com
M: +91-8588851034