SWAMI RAMA HIMALAYAN UNIVERSITY

Swami Rama Himalayan University

NAAC A+

CENTRE OF EXCELLENCE IN ARTIFICIAL INTELLIGENCE & DATA INSIGHTS (CE-AIDI)

REPORT

MESSAGE OF THE HON'BLE PRESIDENT
DR VIJAY DHASMANA

At SRHU, our three-decade legacy in Medicine, Science and Technology, Management, Biosciences, Yoga Sciences, and Social Outreach has laid a strong foundation for innovation. The Centre of Excellence in Artificial Intelligence and Data Insights reflects this vision—providing world-class research opportunities, fostering collaborations, and nurturing students and scholars to become leaders, innovators, and changemakers who create meaningful impact for society.

MESSAGE OF THE VICE CHANCELLOR
DR RAJENDRA DOBHAL, FNASC

With 66% of India's population under 35, the future belongs to our youth, and higher education must inspire them to innovate, research, and lead. The Artificial Intelligence and Machine Learning (AIML) Lab at SRHU is a step toward this vision—an ecosystem that nurtures curiosity, critical thinking, and real-world problem solving. In alignment with NEP 2020, the lab empowers students with cutting-edge skills, preparing them not just for careers, but to become innovators and change-makers shaping India's future on the global stage.

MESSAGE FROM THE CHAIRPERSON
(PROF. (DR.) PRAMOD KUMAR)

The AIML Lab at SRHU is a testament to our vision of integrating advanced technologies with societal needs. Equipped with state-of-the-art resources, the lab enables students and researchers to work on projects such as brain tumor and stroke detection using AI, groundwater recharge zone prediction in Uttarakhand through machine learning, and intelligent IoT-based monitoring systems. By fostering innovation and interdisciplinary research, the lab empowers our students to develop impactful solutions that address pressing challenges in healthcare, sustainability, and technology.

MESSAGE FROM THE COORDINATOR
(PROF. HARVINDER MALHOTRA)

Our AIML Lab provides a platform where creativity meets cutting-edge research. Students engage in live projects ranging from AI-driven medical imaging and cybersecurity solutions to IoT-enabled smart systems and data-driven insights for rural development. With hands-on training, collaborative research, and certification programs, the lab prepares them to become industry-ready professionals and innovators capable of addressing real-world problems with technological excellence.

ABOUT US

Centre of Excellence in Artificial Intelligence and Data Insights (CE-AIDI) at SST is a premier hub for AI, Machine Learning, and Data Science, fostering cutting-edge research, innovation, and industry-driven learning. With advanced labs, expert mentorship, and strong industry collaborations, students gain hands-on experience through internships, corporate training, and live industry projects. CE-AIDI equips graduates and post-graduates with future-ready skills, making them highly sought after in the AI and Data Science domain.

FUNCTIONAL AREAS

i. Artificial Intelligence

ii. Data Science

iii. Internet of Things (IoT)

iv. Cybersecurity

OBJECTIVES

To develop innovative AI, IoT, and cybersecurity solutions with real world applications.

Joint research initiatives with industry and academia on emerging technologies like AI, Data Science,healthcare and Cybersecurity.

Practical workshops, live projects, and certification programs in AI, DS, IoT, and Cyber Security for industry ready skills

THE COMMITTEE

S.No	Name	Designation
1	Prof. (Dr) Pramod Kumar	Chairperson
2	Prof. Harvinder Malhotra	Coordinator
3	Dr Gaurav Sharma	Member
4	Dr Deepak Srivastava	Member Secretary

RESOURCES (HARDWARE)

S. No.	Name	Details
1	Total Number of Systems	11
2	RAM Size	16 GB
3	Hard-Disk Size	1TB (SSD)
4	Processor	Core i7
5	Monitor Size	22.9" (58.2 cm)
6	Graphic Card	Nvidia RTX A2000 12 GB

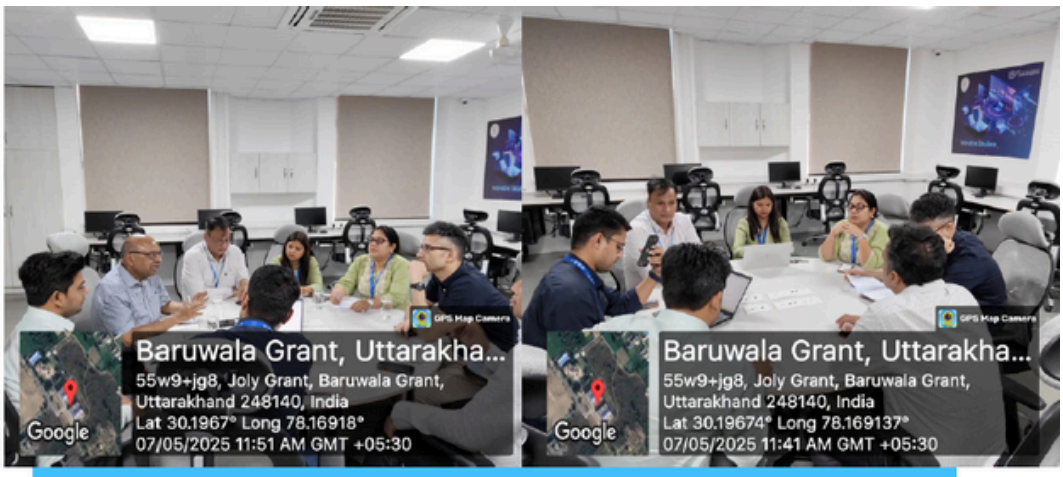
RESOURCES (SOFTWARE)

S.NO	NAME	TYPE
1	Windows 11 Pro	License
2	ESET Endpoint	License
3	Microsoft Office 2021	License
4	Microsoft Visual	Freeware
5	PyCharm Community	Freeware
6	Cisco Packet Tracer	Freeware
7	VirtualBox	Freeware
8	Python	Freeware
9	MySql Server	Freeware
10	MySql Workbench	Freeware
11	XAMPP	Freeware
12	JDK	Freeware
13	NetBeans	Freeware
14	Visual Studio Code	Freeware
15	Prolog	Freeware
16	R	Freeware
17	R Studio	Freeware
18	Wireshark	Freeware
19	Kali Linux	Freeware

COLLABORATIVE RESEARCH PROJECTS

The joint projects focus on applying cutting-edge technologies such as Artificial Intelligence and Machine Learning (AI/ML) to address region-specific issues. Notably, one of the flagship projects—Prediction of Artificial Potential Recharge Zones in Uttarakhand using AI/ML—is being undertaken in collaboration with RDI to support sustainable water management and groundwater recharge in ecologically fragile hill regions.

In partnership with the Himalayan Institute of Medical Sciences (HIMS), collaborative projects have also extended into the healthcare domain, where AI is leveraged for advanced diagnostic support. Key initiatives include the detection of brain tumors and minor strokes using AI-based imaging models, enabling early and accurate diagnosis that can significantly improve patient outcomes in underserved rural populations.



STUDENT RESEARCH PROJECTS

Students are actively engaged in developing innovative solutions in the fields of Artificial Intelligence, Internet of Things (IoT), and Cybersecurity, with a strong focus on real-world applications that address practical challenges, enhance technological advancement, and contribute to community development.

HANDS ON TRAINING

Practical workshops, live projects, and certification programs in Artificial Intelligence (AI), Data Science (DS), Internet of Things (IoT), and Cybersecurity are conducted to equip students with industry-ready skills, enabling them to gain hands-on experience, strengthen problem-solving abilities, and meet the evolving demands of the digital era.

SEED PROJECTS

Seed Project at Centre of Excellence in Artificial Intelligence & Data Insights (CE-AIDI)		
S.No	**Title of the Project**	**Principal Investigator**
1	Establishment of a centre of excellence in artificial intelligence & data insights (CE-AIDI) for institutional innovation, research & advanced skilling	Dr. Pramod Kumar
2	Deep learning for dermatology: An AI based model for skin disease detection	Dr. Anupama Mishra
3	Smart disaster response and rescue system using IoT and edge computing	Dr. Vibhor Sharma
4	AI-enhanced digital inclusion platform for social development: intelligent ICT system for rural skill empowerment, e-health & governance accessibility	Ms. Princy Tyagi
5	Sustainable smart farming: deep learning-based crop monitoring and yield prediction for climate-resilient agriculture	Dr. Deepak Srivastava

OUTCOMES

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :30/06/2025

(21) Application No.202511062053 A

(43) Publication Date : 11/07/2025

(54) Title of the invention : CREATION SYSTEM FOR EXPERIMENTATION,CREATION, AND MACHINE LEARNING

(51) International classification	:G06N0020000000, G06Q0050060000, G06N0020200000, G06Q0040030000, G16H0050700000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
The present invention provides a creation system for experimentation, creation, and machine learning. The system enables non-technical users to upload datasets in CSV or Excel formats and performs data preprocessing, feature engineering, model selection, training, hyperparameter tuning, evaluation, and model export without requiring programming skills. It includes automated handling of missing values, encoding of categorical variables, correlation analysis, and dimensionality reduction using PCA. The platform supports various classification and regression algorithms and optimizes them through grid and random search methods. Model evaluation is performed using relevant performance metrics, and trained models can be exported in Pickle format. The system is built using Streamlit and Scikit-learn for a user-friendly and efficient experience. Figure 1

No. of Pages : 28 No. of Claims : 7

12) PATENT APPLICATION PUBLICATION

19) INDIA

22) Date of filing of Application :12/02/2025

(21) Application No.202511011591 A

(43) Publication Date : 28/02/2025

54) Title of the invention : SMART BANDAGE WITH INTEGRATED BIOSENSORS AND DRUG DELIVERY SYSTEM

51) International classification	:A61F13/00, A61M35/00, G16H20/10, A61L15/44, A61K9/70, A61B5/00
86) International Application No Filing Date	:NA :NA
87) International Publication No	: NA
61) Patent of Addition to Application Number Filing Date	:NA :NA
62) Divisional to Application Number Filing Date	:NA :NA

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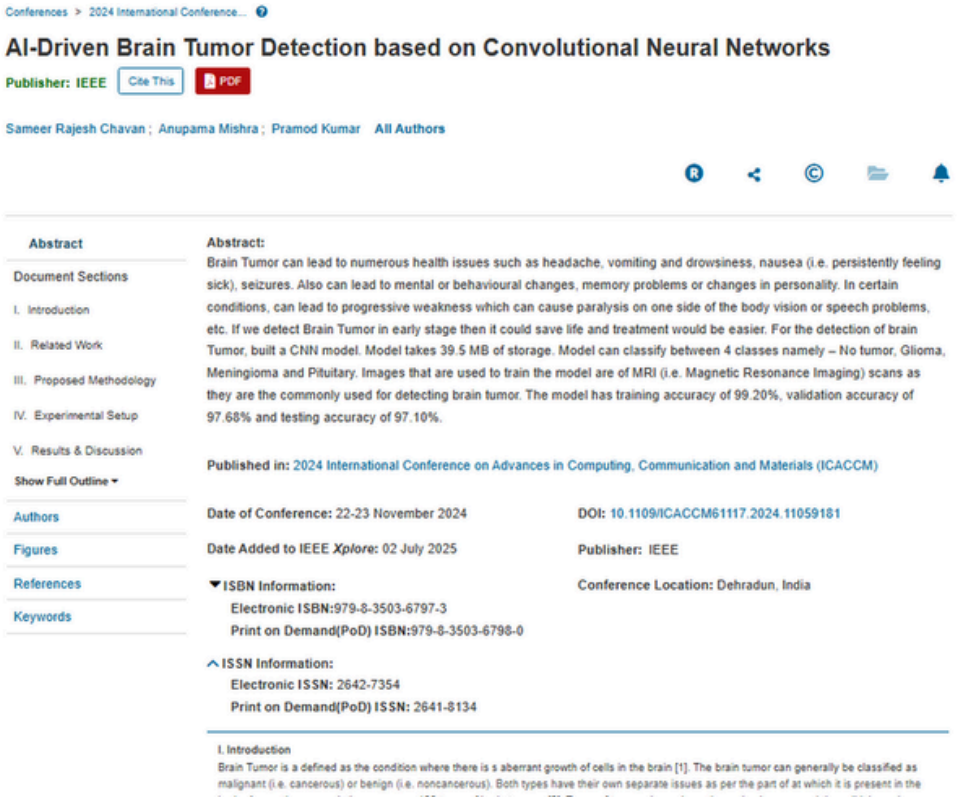
57) Abstract :
The present invention provides a smart bandage with integrated biosensors and drug delivery system. The bandage includes an outermost layer as a breathable, waterproof membrane that guards the wound from external contaminants while allowing for ideal gas exchange. Underneath this are tiny biosensors, each smaller than a grain of sand that can keep track of different wound conditions all the time. These biosensors send live data to a smart microprocessor built into the patch. This microprocessor looks at incoming data and checks it against large databases of wound healing trends to help decide on treatment plans. The smart bandage's drug delivery system has been turned on, according to the AI's research. This system has several small storage areas that hold different types of medicine, like medicines, growth factors, and pain relief drugs.

No. of Pages : 28 No. of Claims : 9

OUTCOMES



Conferences > 2024 International Conference...

AI-Driven Brain Tumor Detection based on Convolutional Neural Networks

Publisher: IEEE | Cite This | PDF

Sameer Rajesh Chavan ; Anupama Mishra ; Pramod Kumar All Authors

Abstract
Document Sections
I. Introduction
II. Related Work
III. Proposed Methodology
IV. Experimental Setup
V. Results & Discussion
Show Full Outline
Authors
Figures
References
Keywords

Abstract:
Brain Tumor can lead to numerous health issues such as headache, vomiting and drowsiness, nausea (i.e. persistently feeling sick), seizures. Also can lead to mental or behavioural changes, memory problems or changes in personality. In certain conditions, can lead to progressive weakness which can cause paralysis on one side of the body vision or speech problems, etc. If we detect Brain Tumor in early stage then it could save life and treatment would be easier. For the detection of brain Tumor, built a CNN model. Model takes 39.5 MB of storage. Model can classify between 4 classes namely – No tumor, Glioma, Meningioma and Pituitary. Images that are used to train the model are of MRI (i.e. Magnetic Resonance Imaging) scans as they are the commonly used for detecting brain tumor. The model has training accuracy of 99.20%, validation accuracy of 97.68% and testing accuracy of 97.10%.

Published in: 2024 International Conference on Advances in Computing, Communication and Materials (ICACCM)

Date of Conference: 22-23 November 2024
DOI: 10.1109/ICACCM61117.2024.11059181
Date Added to IEEE *Xplore*: 02 July 2025
Publisher: IEEE
ISBN Information:
Conference Location: Dehradun, India
Electronic ISBN:979-8-3503-6797-3
Print on Demand(PoD) ISBN:979-8-3503-6798-0
ISSN Information:
Electronic ISSN: 2642-7354
Print on Demand(PoD) ISSN: 2641-8134

I. Introduction
Brain Tumor is a defined as the condition where there is s aberrant growth of cells in the brain [1]. The brain tumor can generally be classified as malignant (i.e. cancerous) or benign (i.e. noncancerous). Both types have their own separate issues as per the part of at which it is present in the

Conferences > 2025 First International Conf...

Analysis of Smart City Solutions for Sustainable Urban Growth in India

Publisher: IEEE | Cite This | PDF

Gurmanjot Kaur ; Anupama Mishra ; Pramod Kumar ; Garima Kapoor All Authors

21 Full Text Views

Abstract
Document Sections
I. Introduction
II. Literature Review
III. Issues & Challenges
IV. Proposed Solutions & Methodology
V. Result & Discussion
Show Full Outline
Authors
Figures
References
Keywords
Metrics

Abstract:
Over the past three decades, India's cities have benefited from increased urban investment in terms of better economic conditions and infrastructure. Nonetheless, the cities are also dealing with issues of uneven and polarized growth benefits distribution. This paper proposes a multidimensional framework for monitoring and evaluation, also it expands the objective of inclusive cities beyond the confines of "pro-poor development". The article explores the need of smart city solutions to promote sustainability and efficiency in rapidly growing cities. It focuses on resource management, environmental impact, and quality of life. The paper concludes with recommendations for cities adopting these solutions, emphasizing the importance of combining new technologies with traditional methods and public engagement.

Published in: 2025 First International Conference on Advances in Computer Science, Electrical, Electronics, and Communication Technologies (CE2CT)

Date of Conference: 21-22 February 2025
DOI: 10.1109/CE2CT64011.2025.10939348
Date Added to IEEE *Xplore*: 02 April 2025
Publisher: IEEE
ISBN Information:
Conference Location: Bhimtal, Nainital, India
Electronic ISBN:979-8-3315-1857-8
Print on Demand(PoD) ISBN:979-8-3315-1858-5

I. Introduction
The cities are usually thought of as the focal points of higher efficiency and possibilities, acting as catalysts for territorial growth and prosperity. India

OUTCOMES

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :04/10/2024

(21) Application No.202411074993 A
(43) Publication Date : 18/10/2024

(54) Title of the invention : VEHICLE STATUS DETECTION SYSTEM

(51) International classification	:G01R0031392000, B60C0011240000, F16D0066020000, A61B0005000000, B60C0023040000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
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(57) Abstract :
The present invention provides a vehicle status detection system. The system includes sensors and a sensor placement that displays sensor locations and measurements; CPU that identifies issues and predicts maintenance needs, data processing module that analyzes data to generate alerts and diagnostic information user interface, and communication module; a CPU Data Flow that illustrates data flow from sensors to CPU and output. The sensors include engine sensors that monitor temperature and oil levels; tire sensors that measure tire pressure and tread wear; brake sensors that track brake pad thickness; and battery sensors that assess battery health. Figure 1

No. of Pages : 23 No. of Claims : 7

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :06/02/2025

(21) Application No.202511009722 A
(43) Publication Date : 21/02/2025

(54) Title of the invention : SMART MINING HELMET

(51) International classification	:A42B0003040000, G08B0021020000, H04N0007180000, G08B0021140000, A42B0003280000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
Mining is one of the most dangerous jobs in the world, where workers face risks like toxic gases, dust, falling objects, and lack of oxygen. The present invention provides a smart mining helmet that is designed to protect miners by detecting dangers and providing real-time alerts. The helmet is equipped with special sensors that monitor the environment and the miner's condition. It can detect harmful gases, dust levels, and lack of oxygen. If a worker falls or is injured, the helmet immediately senses the impact and sends an alert. Additionally, it has communication features that allow workers to stay connected with their team. Figure 1

No. of Pages : 22 No. of Claims : 10

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :28/12/2024

(21) Application No.202411104006 A
(43) Publication Date : 10/01/2025

(54) Title of the invention : SMART ADHERENCE AND REAL-TIME PATIENT MONITORING SYSTEM

(51) International classification	:G16H0040670000, A61B0005000000, G16H0020100000, G16H0010600000, G16H0020130000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
The present invention provides a smart adherence and real-time patient monitoring system that notifies patients about their scheduled medication or meal times using intelligent reminders tailored to their habits and routines. It emits audible and visual reminders via a buzzer and LED lights. An LCD screen also walks users through specific instructions on what medication to take and when. Patient Monitoring: The sensor able to sense the presence of the patient and the intake of the medication. The system collects critical patient interaction data, such as medication intake times, and securely stores it on a cloud-based platform. The mobile application creates a bridge for family members and healthcare providers to access the data and monitor the patient compliance with the prescribed regimen. The device can be incorporated into the current healthcare architecture, allowing for scalability and customization in varying environments. Figure 1

No. of Pages : 22 No. of Claims : 10

OUTCOMES

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :28/04/2025

(21) Application No.202511040848 A
(43) Publication Date : 16/05/2025

(54) Title of the invention : NEUROBEHAVIORAL DISORDER CLASSIFICATION SYSTEM BASED ON MULTIMODAL DATA

(51) International classification :A61B0005000000, G16H0050200000, A61B0005020500, G16H0050300000, G06N0020000000
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
The present invention discloses a neurobehavioral disorder classification system based on multimodal data utilizing hardware-enabled real-time monitoring and AI-based diagnostics. The system comprises a data acquisition unit integrated with a microphone, high-resolution camera, and physiological sensors including EEG, ECG, heart rate, and motion sensors. A processing unit with machine learning capabilities analyzes speech, facial expressions, and physiological signals to detect indicators of mental disorders. A graphical user interface on a display unit or mobile device provides personalized feedback and recommendations. The system leverages advanced natural language processing (NLP), facial emotion recognition, and federated learning for privacy-preserving diagnostics. It includes a recommendation module offering context-sensitive mental health advice and real-time alerts. Designed for clinical and remote use, the system supports culturally adaptive assessments, comorbidity profiling, and gamified or AR-based interaction to enhance mental health detection and care delivery.

No. of Pages : 24 No. of Claims : 10

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :26/12/2024

(21) Application No.202411103967 A
(43) Publication Date : 10/01/2025

(54) Title of the invention : SMART MONITORING AND ALERT SYSTEM FOR INFUSION BOTTLE MANAGEMENT

(51) International classification :G16H0040200000, G16H0040630000, A61M0005168000, G16H0040670000, A63M0005140000
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
The present invention provides a smart monitoring and alert system for infusion bottle management that is designed specifically for hospitals to enhance patient care and safety. The system focuses on tracking the liquid level in glucose drip bottles in real time. When the liquid level reaches a critical point, the system automatically generates an alert that is sent to both the medical staff and the patient's family through a dedicated mobile application. The system ensures timely replacement of the bottle, preventing interruptions in treatment and reducing the risk of complications caused by delays. By integrating advanced sensors, real-time notifications, and a user-friendly app interface, the system streamlines hospital workflows and provides peace of mind to caregivers. It's a simple yet impactful solution aimed at improving efficiency in healthcare settings, ensuring better outcomes for patients, and optimizing the responsiveness of medical staff. Figure 1

No. of Pages : 22 No. of Claims : 8