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# CMR TECHNICAL CAMPUS

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## Department of CSE [Artificial Intelligence & Machine Learning]

### FACULTY PATENTS LIST (A.Y.2024-25)

| S. No | Application Number | Title Of The Patent | Name Of The Faculty | Patent Office Journal No | Published Date | Status |
|---|---|---|---|---|---|---|
| 1 | 202441050154 | Adaptive Quantum-Inspired Resource Allocation For Dynamic Workload Balancing In Cloud Environments | Dr T V Dharmajee Rao<br>V Srinu | 27/2024 | 05/07/2024 | Published |
| 2 | 202441050155 | Ai-Enabled Hyper Personalization Through Dynamic Machine Learning Architectures | Dr S Rao Chintalapudi<br>B Swaroopa Rani<br>S Rama Chandra Reddy | 27/2024 | 05/07/2024 | Published |
| 3 | 202441050159 | Method And System For Implementing A Quantum-Cognitive Resilience Framework: Adaptable Information Systems For Achieving Unprecedented Security And Efficiency | Dr V Malsoru | 27/2024 | 05/07/2024 | Published |
| 4 | 425548-001 | Blockchain-Based Data Storage Device For Shipment Tracking | Dr. Mahesh Kotha | NA | 01/08/2024 | Granted |
| 5 | 202441054952 | A System And Method For Real-Time Image Classification Using Deep Learning Algorithms | U Saritha | 31/2024 | 02/08/2024 | Published |

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|---|---|---|---|---|---|---|
| 6 | 202441064528 | Advanced Federated Learning Architecture For Enhanced Privacy And Collaborative Data Training Across Heterogeneous Devices | Dr.Vinoda Reddy<br>Dr. S Rao Chintalpudi<br>G Parvathi Devi<br>B Swaroopa Rani | 36/2024 | 06/09/2024 | Published |
| 7 | 202441077952 | Hybrid Explainable Ai Framework For Transparent, Adaptive Decision-Making In Multi-Agent Autonomous Systems | Md Shareef<br>Bushra Tarannum | 43/2024 | 25/10/2024 | Published |
| 8 | 202441077950 | Self-Adaptative Reinforcement Learning Framework For Dynamic Machine Learning Model Enhancement | B Prashanth<br>M Lalitha | 43/2024 | 25/10/2024 | Published |
| 9 | 202441077949 | Federated Adaptive Transformer-Based System For Privacy-Enhanced And Real-Time Natural Language Processing | Neeraja<br>G Aravind | 43/2024 | 25/10/2024 | Published |
| 10 | 202441081924 | Nanomaterial-Enhanced Self-Healing Concrete Pavement System For Improved Durability | Dr D Maneiah | 44/2024 | 01/11/2024 | Published |
| 11 | 456324-001 | Machine Learning Based Color Guided Material Handling Robotic Device | Shaik Sharif | NA | 23/04/2025 | Granted |
| 12 | 202541033633 | Adaptive Transfer Learning Framework For Cross-Domain Natural Language Processing Applications | Prashanth M Desai<br>U Saritha | 18/2025 | 02/05/2025 | Published |
| 13 | 202541033645 | Self-Improving Deep Reinforcement Learning Algorithm For Autonomous Decision-Making Systems | Dr. S Rao Chintalpudi<br>S Kiran<br>K Madhu | 18/2025 | 02/05/2025 | Published |

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|---|---|---|---|---|---|---|
| 14 | 202541033647 | Interpretable Ai-Driven Clinical Decision Support System For High-Stakes Medical Diagnostics | V N V Sri Harsha<br>Ramesh Azmeera | 18/2025 | 02/05/2025 | Published |
| 15 | 202541047869 | An Optimised Method For The Classification Of Sleep Disorders Using Machine Learning Algorithms | Dr G Vinoda Reddy<br>Dr. Mahesh Kotha | 22/2025 | 30/05/2025 | Published |
| 16 | 202541047546 | Intelligent Anomaly Detection System Using Deep Learning For Iot Based Smart Healthcare | B Swaroopa Rani | 23/2025 | 06/06/2025 | Published |
| 17 | 202541052132 | Deep Learning Based Underwater Trash Detection System Using Yolov8 | Dr. Mahesh Kotha<br>N Sandeep Kumar<br>Dr G Vinoda Reddy | 24/2025 | 13/06/2025 | Published |
| 18 | 202541058781 | Cloud-Based Real-Time Machine Learning System For Environmental Hazard Detection And Alerting | Dr G Vinoda Reddy<br>K. Bhargava Triveni Nandana<br>I Kranthi Kumar<br>R. Lavanya<br>B Ravindra Naik | 26/2025 | 27/06/2025 | Published |

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(12) PATENT APPLICATION PUBLICATION

(19) INDIA

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(21) Application No.202441050154 A

(43) Publication Date : 05/07/2024

(54) Title of the invention : ADAPTIVE QUANTUM-INSPIRED RESOURCE ALLOCATION FOR DYNAMIC WORKLOAD BALANCING IN CLOUD ENVIRONMENTS

(51) International classification :G06F0009500000, H04W0072040000, G06N0020000000, H04L0043160000, G06N0007000000

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Filing Date :NA

(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :

ADAPTIVE QUANTUM-INSPIRED RESOURCE ALLOCATION FOR DYNAMIC WORKLOAD BALANCING IN CLOUD ENVIRONMENTS ABSTRACT The present invention relates to an adaptive quantum-inspired resource allocation system (100) and method for dynamic workload balancing in cloud environments. The system comprises a quantum-inspired computing module (108) configured to generate resource allocation solutions by leveraging quantum algorithms and real-time dynamic workload information. A workload monitoring module (110) continuously observes and analyzes the cloud environment's workload characteristics. An adaptive control module (112) receives the quantum-inspired resource allocation solutions and dynamically adjusts resource allocations based on real-time workload changes. These adjustments are made in an adaptive manner to optimize both resource utilization and workload balancing. The method involves generating quantum-inspired resource allocation solutions based on quantum algorithms and workload characteristics, monitoring dynamic workload changes, and dynamically adjusting resource allocations in real-time to achieve optimal workload balancing and resource utilization in cloud environments. The proposed system and method provide an innovative approach to address the challenges of resource allocation in dynamic cloud environments, combining quantum-inspired computing principles with real-time adaptive control for enhanced efficiency and responsiveness.

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(19) INDIA
(22) Date of filing of Application :01/07/2024

(21) Application No.202441050155 A
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(54) Title of the invention : AI-ENABLED HYPERPERSONALIZATION THROUGH DYNAMIC MACHINE LEARNING ARCHITECTURES

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| (51) International classification | :G06N0020000000, G06Q0030020000, G06F0009451000, A63F0013670000, G06Q0010100000 |
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| (62) Divisional to Application Number<br>Filing Date | :NA<br>:NA |

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(57) Abstract :
AI-ENABLED HYPERPERSONALIZATION THROUGH DYNAMIC MACHINE LEARNING ARCHITECTURES ABSTRACT The present invention, embodied in a system (100) and method, introduces AI-Enabled Hyperpersonalization through Dynamic Machine Learning Architectures. The system includes a data input module (108) for gathering user data and contextual information, a dynamic machine learning model (110) that evolves with user interactions, and an AI-driven hyperpersonalization engine (112) analyzing the model for generating personalized recommendations. The method involves collecting user data (a), training a dynamic machine learning model (b), continuously updating user profiles (c), and utilizing an AI-driven engine for personalized content generation (d). This innovative approach leverages dynamic machine learning (110) to adapt in real-time, ensuring accurate and evolving user profiles. The hyperpersonalization engine (112) further refines recommendations, fostering a tailored user experience across diverse contexts and preferences. The invention enhances personalization accuracy by dynamically adjusting to changing user behaviors, providing a more refined and context-aware hyperpersonalization experience.

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(12) PATENT APPLICATION PUBLICATION

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(22) Date of filing of Application :01/07/2024

(21) Application No.202441050159 A

(43) Publication Date : 05/07/2024

(54) Title of the invention : METHOD AND SYSTEM FOR IMPLEMENTING A QUANTUM-COGNITIVE RESILIENCE FRAMEWORK: ADAPTABLE INFORMATION SYSTEMS FOR ACHIEVING UNPRECEDENTED SECURITY AND EFFICIENCY

| | |
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| (51) International classification | :G06N0010000000, G06N0020000000, B82Y0010000000, G06N0005020000, G06Q0010060000 |
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| (87) International Publication No | : NA |
| (61) Patent of Addition to Application Number<br>Filing Date | :NA<br>:NA |
| (62) Divisional to Application Number<br>Filing Date | :NA<br>:NA |

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(57) Abstract :

METHOD AND SYSTEM FOR IMPLEMENTING A QUANTUM-COGNITIVE RESILIENCE FRAMEWORK: ADAPTABLE INFORMATION SYSTEMS FOR ACHIEVING UNPRECEDENTED SECURITY AND EFFICIENCY ABSTRACT The invention discloses a Quantum-Cognitive Resilience Framework for information systems, comprising a method and system. The method involves utilizing quantum computing techniques, represented by quantum processing units (108), to enhance the resilience of information systems. Additionally, cognitive computing capabilities, embodied by cognitive computing modules (110), are integrated to adaptively respond to dynamic security challenges. The method ensures adaptability through an adaptable information system architecture (112), achieving unprecedented levels of security and efficiency. The system (100) includes quantum processing units (108) configured for resilient computations, cognitive computing modules (110) for adaptive security responses, and an adaptable information system architecture (112). The architecture facilitates enhanced security and efficiency. Quantum-Cognitive Resilience Framework, with reference numerals 108, 110, and 112, provides a holistic solution to fortify information systems against evolving security threats, showcasing the synergy of quantum and cognitive computing technologies.

No. of Pages : 22 No. of Claims : 9

INTELLECTUAL PROPERTY INDIA

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# पेटेंट कार्यालय, भारत सरकार The Patent Office, Government Of India

## डिजाइन के पंजीकरण का प्रमाण पत्र | Certificate of Registration of Design

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|---|---|---|
| डिजाइन सं. / Design No. | : | 425548-001 |
| तारीख / Date | : | 01/08/2024 |
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प्रमाणित किया जाता है कि संलग्न प्रति में वर्णित डिजाइन जो *BLOCKCHAIN-BASED DATA STORAGE DEVICE FOR SHIPMENT TRACKING* से संबंधित है, का पंजीकरण, श्रेणी 14-02 में 1.Svsv Prasad Sanaboina 2. J Prasanna Babu 3.Sanjana S Nazare 4.Rakshita Okali 5.G Pavan Kumar 6.Bhagyashree B Kothergasti 7.Marri Sireesha 8.Dr. Mahesh Kotha 9.Dr. Voruganti Naresh Kumar के नाम में उपर्युक्त संख्या और तारीख में कर लिया गया है।

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-02 in respect of the application of such design to *BLOCKCHAIN-BASED DATA STORAGE DEVICE FOR SHIPMENT TRACKING* in the name of 1.Svsv Prasad Sanaboina 2. J Prasanna Babu 3.Sanjana S Nazare 4.Rakshita Okali 5.G Pavan Kumar 6.Bhagyashree B Kothergasti 7.Marri Sireesha 8.Dr. Mahesh Kotha 9.Dr. Voruganti Naresh Kumar.

डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्यधीन प्रावधानों के अनुसरण में।
In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

जारी करने की तिथि :
Date of Issue : 20/09/2024

महानियंत्रक पेटेंट, डिजाइन और व्यापार चिह्न
Controller General of Patents, Designs and Trade Marks

*पारस्परिकता तारीख (यदि कोई हो) जिसकी अनुमति दी गई है तथा देश का नाम। डिजाइन का स्वत्वाधिकार पंजीकरण की तारीख से दस वर्षों के लिए होगा जिसका विस्तार, अधिनियम एवं नियम के निबंधनों के अधीन, पाँच वर्षों की अतिरिक्त अवधि के लिए किया जा सकेगा। इस प्रमाण पत्र का उपयोग विधिक कार्यवाहियों अथवा विदेश में पंजीकरण प्राप्त करने के लिए नहीं हो सकता है।

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(12) PATENT APPLICATION PUBLICATION

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(21) Application No.202441054952 A

(43) Publication Date : 02/08/2024

(54) Title of the invention : A SYSTEM AND METHOD FOR REAL-TIME IMAGE CLASSIFICATION USING DEEP LEARNING ALGORITHMS

(51) International classification :G06N0003080000, G06K0009620000, G06N0003040000, G06T0005000000, H04N0007180000

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Filing Date :NA

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(57) Abstract :
The present invention provides a system and method for real-time image classification using deep learning algorithms. The system comprises an image acquisition module, a preprocessing module, a deep learning-based classification module, and an output module. The image acquisition module captures real-time images from cameras or other image sensors. The preprocessing module enhances these images through operations such as noise reduction, contrast adjustment, normalization, and resizing. The deep learning-based classification module employs a convolutional neural network (CNN) to classify the preprocessed images accurately. The output module then displays the classification results or triggers actions based on these results, ensuring real-time responsiveness. This invention significantly improves the accuracy and speed of image classification, making it suitable for various real-time applications such as security monitoring, healthcare diagnostics, and autonomous vehicles. Accompanied Drawing [FIGS. 1-2]

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(22) Date of filing of Application :27/08/2024

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(43) Publication Date : 06/09/2024

(54) Title of the invention : ADVANCED FEDERATED LEARNING ARCHITECTURE FOR ENHANCED PRIVACY AND COLLABORATIVE DATA TRAINING ACROSS HETEROGENEOUS DEVICES

| | |
|---|---|
| (51) International classification | :G06N3/098, G06F21/60, H04L9/00 |
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(57) Abstract :
ADVANCED FEDERATED LEARNING ARCHITECTURE FOR ENHANCED PRIVACY AND COLLABORATIVE DATA TRAINING ACROSS HETEROGENEOUS DEVICES ABSTRACT The advanced federated learning architecture (100) provides a robust framework for privacy-preserving collaborative data training across heterogeneous devices (102). This architecture features a central server (104) that coordinates the federated learning process and aggregates updates from the devices. A privacy-preserving mechanism (106) ensures the confidentiality of local data and model updates through encryption. The system includes a collaborative data training module (108) to facilitate the secure exchange of model updates while maintaining data confidentiality. An aggregation engine (110) on the central server (104) combines these updates to enhance overall model performance while preserving individual data privacy. The communication protocol (112) supports secure and efficient data transfer between devices (102) and the central server (104), utilizing end-to-end encryption and secure authentication to safeguard data integrity throughout the process. This architecture addresses the need for secure, privacy-preserving collaborative machine learning across diverse devices. FIG.1

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(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application.:15/10/2024

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(43) Publication Date : 25/10/2024

(54) Title of the invention : HYBRID EXPLAINABLE AI FRAMEWORK FOR TRANSPARENT, ADAPTIVE DECISION-MAKING IN MULTI-AGENT AUTONOMOUS SYSTEMS

| | |
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| (51) International classification | :G06N0005045000, G06N0020000000, G06N0003045000, G06N0003080000, G06N0005040000 |
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(57) Abstract :
HYBRID EXPLAINABLE AI FRAMEWORK FOR TRANSPARENT, ADAPTIVE DECISION-MAKING IN MULTI-AGENT AUTONOMOUS SYSTEMS ABSTRACT A hybrid explainable AI system (100) for transparent and adaptive decision-making in multi-agent autonomous systems is disclosed. The system (100) comprises a multi-agent control module (110) that manages interactions between autonomous agents, an adaptive decision-making engine (112) that adjusts decisions in real-time based on environmental feedback, and an explainable AI module (114) that generates human-understandable explanations. The hybrid model combines rule-based reasoning with deep learning techniques to provide interpretable insights. A transparency interface (116) delivers real-time graphical and textual explanations with confidence scores, enabling operators to understand the rationale behind each decision. The system (100) further includes a communication network (118) that facilitates real-time data exchange between components. The hybrid explainable AI system (100) enhances collaboration between autonomous agents and human users through transparent, interpretable, and adaptive decision-making processes, improving operational efficiency and user trust in complex, dynamic environments. FIG. 1

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(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :15/10/2024

(21) Application No.202441077950 A

(43) Publication Date : 25/10/2024

(54) Title of the invention : Self-Adaptative Reinforcement Learning Framework for Dynamic Machine Learning Model Enhancement

(51) International classification :G06N0020000000, G06N0003006000, G06N0003080000, G06N0003045000, G06F0009480000

(86) International Application No :NA
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(61) Patent of Addition to Application Number :NA
Filing Date :NA

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Filing Date :NA

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(57) Abstract :
Self-Adaptative Reinforcement Learning Framework for Dynamic Machine Learning Model Enhancement ABSTRACT The present invention provides a self-adaptive reinforcement learning framework (100) for dynamic enhancement of machine learning models. The framework includes a reinforcement learning agent (110) that interacts with an environment and gathers feedback based on performance metrics. This feedback is utilized by a dynamic model enhancement module (112) to adjust the machine learning model's parameters and configurations. An adaptive learning scheduler (114) determines the timing and scope of model updates based on feedback and performance trends. The data integration module (116) ensures the input data is compatible and preprocessed for use in the model, while the performance evaluation unit (118) assesses the effectiveness of model enhancements and updates the reinforcement learning agent (110) with new feedback. This framework enables continuous, adaptive improvements to machine learning models, enhancing their performance dynamically.

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(21) Application No.202441077949 A
(43) Publication Date : 25/10/2024

(54) Title of the invention : Federated Adaptive Transformer-Based System for Privacy-Enhanced and Real-Time Natural Language Processing

| | |
|---|---|
| (51) International classification | :H04L0009000000, G06F0021620000, G06N0003045000, G06N0003080000, G06N0020000000 |
| (86) International Application No<br>Filing Date | :NA<br>:NA |
| (87) International Publication No | : NA |
| (61) Patent of Addition to Application Number<br>Filing Date | :NA<br>:NA |
| (62) Divisional to Application Number<br>Filing Date | :NA<br>:NA |

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(57) Abstract :
FEDERATED ADAPTIVE TRANSFORMER-BASED SYSTEM FOR PRIVACY-ENHANCED AND REAL-TIME NATURAL LANGUAGE PROCESSING
ABSTRACT A federated adaptive transformer-based system (100) for privacy-enhanced and real-time natural language processing is disclosed. The system (100) comprises a plurality of distributed client devices (110) that locally process natural language data without transmitting raw data to a centralized server. A federated learning module (112) coordinates the training of a transformer-based deep learning model across the client devices (110), transmitting only model updates to a central server. An adaptive transformer model (114) dynamically updates based on language variations and contextual data. A privacy-preserving mechanism (116), integrated with the federated learning module (112), secures local model updates using differential privacy or homomorphic encryption. The system (100) also includes a real-time inference engine (118), which processes natural language queries and delivers privacy-compliant responses. This architecture continuously optimizes model performance while ensuring data privacy across the distributed network, providing scalable, real-time, and privacy-enhanced natural language processing. FIG. 1

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(19) INDIA
(22) Date of filing of Application :27/10/2024

(21) Application No.202441081924 A
(43) Publication Date : 01/11/2024

(54) Title of the invention : NANOMATERIAL-ENHANCED SELF-HEALING CONCRETE PAVEMENT SYSTEM FOR IMPROVED DURABILITY

| | |
|---|---|
| (51) International classification | :G01N0029040000, C04B0111720000, E01C0011220000, C04B0014020000, E01C0011000000 |
| (86) International Application No<br>Filing Date | :NA<br>:NA |
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(57) Abstract :
NANOMATERIAL-ENHANCED SELF-HEALING CONCRETE PAVEMENT SYSTEM FOR IMPROVED DURABILITY ABSTRACT The present invention relates to a self-healing concrete pavement system utilizing nanomaterials to enhance durability and extend the lifespan of concrete structures. The system comprises a concrete matrix embedded with nanomaterials such as carbon nanotubes and graphene, which detect and respond to microcracks. An integrated sensor network continuously monitors the pavement's structural integrity, identifying microcrack formation. Upon detection, an autonomous healing agent release mechanism, controlled by a central module, dispenses a nanomaterial-infused agent that interacts with the cracks, initiating repair. The system also includes machine learning algorithms to predict areas of high stress and optimize the healing process. This innovative approach significantly improves resistance to environmental wear, reduces the need for frequent repairs, and enhances the overall performance of concrete pavements. The method involves embedding nanomaterials, detecting microcracks, and releasing healing agents, providing an efficient, durable solution for concrete infrastructure.

No. of Pages : 17 No. of Claims : 10

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

ORIGINAL

क्रम सं/ Serial No. : 207412

# पेटेंट कार्यालय, भारत सरकार | The Patent Office, Government Of India

## डिजाइन के पंजीकरण का प्रमाण पत्र | Certificate of Registration of Design

डिजाइन सं. / Design No. : 456324-001

तारीख / Date : 23/04/2025

पारस्परिकता तारीख / Reciprocity Date* :

देश / Country :

प्रमाणित किया जाता है कि संलग्न प्रति में वर्णित डिजाइन जो *MACHINE LEARNING BASED COLOUR GUIDED MATERIAL HANDLING ROBOTIC DEVICE* से संबंधित है, का पंजीकरण, श्रेणी 12-05 में 1.MR R OHMSAKTHI VEL 2. DR VIJAYKUMAR KONDEPOGU 3.DR VIJENDRA KUMAR 4.DR THORAM SARAN KUMAR 5.MR I RAMA SATYA NAGESWARA RAO 6.SHAIK SHARIF के नाम में उपर्युक्त संख्या और तारीख में कर लिया गया है।

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 12-05 in respect of the application of such design to *MACHINE LEARNING BASED COLOUR GUIDED MATERIAL HANDLING ROBOTIC DEVICE* in the name of 1.MR R OHMSAKTHI VEL 2. DR VIJAYKUMAR KONDEPOGU 3.DR VIJENDRA KUMAR 4.DR THORAM SARAN KUMAR 5.MR I RAMA SATYA NAGESWARA RAO 6.SHAIK SHARIF.

डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्यधीन प्रावधानों के अनुसरण में।

In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

उमा शंकर पांडेय

महानियंत्रक पेटेंट, डिजाइन और व्यापार चिह्न
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जारी करने की तिथि / Date of Issue : 21/08/2025

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(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :06/04/2025

(21) Application No.202541033633 A
(43) Publication Date : 02/05/2025

(54) Title of the invention : Adaptive Transfer Learning Framework for Cross-Domain Natural Language Processing Applications

| | |
|---|---|
| (51) International classification | :G06N 3/02, G06F 40/00, G06F 40/30 |
| (86) International Application No | :NA |
| Filing Date | :NA |
| (87) International Publication No | : NA |
| (61) Patent of Addition to Application Number | :NA |
| Filing Date | :NA |
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(57) Abstract :
ADAPTIVE TRANSFER LEARNING FRAMEWORK FOR CROSS-DOMAIN NATURAL LANGUAGE PROCESSING APPLICATIONS ABSTRACT The present invention relates to a system (100) for adaptive transfer learning in cross-domain natural language processing (NLP) applications. The system (100) comprises a source model training module (102) configured to pre-train a neural network using a labeled dataset from a source domain. A domain adaptation module (104) refines the pre-trained model by minimizing distributional discrepancies between the source and target domains. A feature extraction module (106) extracts domain-invariant representations to improve generalization across multiple domains. A target model fine-tuning module (108) adapts the refined model using a limited set of labeled or unlabeled target domain data. A performance optimization module (110) dynamically adjusts model parameters based on domain-specific feedback. The domain adaptation module (104) employs adversarial training, while the feature extraction module (106) incorporates self-supervised learning. The target model fine-tuning module (108) applies meta-learning, and the performance optimization module (110) leverages reinforcement learning for enhanced model adaptation and efficiency. FIG. 1

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(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :06/04/2025

(21) Application No.202541033645 A
(43) Publication Date : 02/05/2025

(54) Title of the invention : SELF-IMPROVING DEEP REINFORCEMENT LEARNING ALGORITHM FOR AUTONOMOUS DECISION-MAKING SYSTEMS

| | |
|---|---|
| (51) International classification | :G06N 3/045, G06N 7/01, G06N 3/02 |
| (86) International Application No | :NA |
| Filing Date | :NA |
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| (61) Patent of Addition to Application Number | :NA |
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(57) Abstract :
SELF-OPTIMIZING DEEP REINFORCEMENT LEARNING FRAMEWORK FOR AUTONOMOUS SYSTEMS ABSTRACT A self-optimizing deep reinforcement learning system (100) for autonomous decision-making is disclosed. The system (100) comprises a state observation module (102) configured to receive and process real-time environmental data using multimodal sensors. A policy learning engine (104) integrates a deep reinforcement learning model with a self-optimizing mechanism that dynamically adjusts hyperparameters based on performance feedback. A meta-learning module (106) analyzes past learning experiences to optimize decision-making strategies across varying environments. A reward shaping unit (108) continuously refines reward functions using historical performance metrics to accelerate learning convergence. An adaptive neural network architecture (110) restructures layers and optimizes parameters in real time based on task complexity, enhancing robustness in non-stationary environments. The system (100) employs a multi-objective optimization technique, gradient-based meta-learning, adversarial reward recalibration, and a modular deep learning framework to improve decision accuracy, efficiency, and scalability. This invention enhances learning adaptability, stability, and computational efficiency in autonomous systems.

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(22) Date of filing of Application :06/04/2025

(21) Application No.202541033647 A
(43) Publication Date : 02/05/2025

(54) Title of the invention : Interpretable AI-Driven Clinical Decision Support System for High-Stakes Medical Diagnostics

(51) International classification :G16H10050200000, G16H0010600000, G16H10050700000, G06N0005045000, A61B00005000000
(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 :
INTERPRETABLE AI-DRIVEN CLINICAL DECISION SUPPORT SYSTEM FOR HIGH-STAKES MEDICAL DIAGNOSTICS ABSTRACT The present invention relates to a clinical decision support system (100) for high-stakes medical diagnostics, incorporating an interpretable AI-driven approach to enhance transparency and reliability in automated diagnosis. The system (100) comprises a data acquisition module (102) configured to collect and preprocess patient data from electronic health records (EHRs), medical imaging, laboratory results, and physiological monitoring devices. An AI-driven inference engine (104) analyzes the patient data, applying machine learning models integrated with interpretable AI techniques to generate transparent diagnostic insights. An explainability module (106) provides human-understandable justifications using feature attribution, counterfactual reasoning, and attention-based visualization. A risk stratification module (108) classifies cases based on the confidence and uncertainty of AI-generated diagnoses. A clinician interface (110) presents diagnostic insights, risk assessments, and interpretability visualizations, enabling healthcare professionals to validate and refine recommendations. The system (100) enhances trust, mitigates bias, and improves decision-making in critical medical diagnostics. FIG. 1

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(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :17/05/2025

(21) Application No.202541047869 A

(43) Publication Date : 30/05/2025

(54) Title of the invention : 1. AN OPTIMISED METHOD FOR THE CLASSIFICATION OF SLEEP DISORDERS USING MACHINE LEARNING ALGORITHMS

(51) International classification :G06N0003045000, A61B0005000000, G06N0003080000, G06N0003044000, A61B0005024000

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Filing Date :NA

(87) International Publication No : NA

(61) Patent of Addition to Application Number :NA
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(57) Abstract :
The present invention discloses an optimized method for classifying sleep disorders using artificial neural networks (ANN). The method integrates multi-modal data sources, including electroencephalogram (EEG) signals, heart rate variability (HRV), and respiratory patterns, to enhance diagnostic accuracy. A hybrid ANN architecture, comprising feedforward neural networks (FNNs), convolutional neural networks (CNNs), and recurrent neural networks (RNNs), is employed to improve classification performance. The method further incorporates feature engineering techniques, transfer learning, and model interpretability mechanisms such as attention layers and SHapley Additive exPlanations (SHAP) values. The proposed system enables real-time sleep disorder classification through cloud-based and edge-computing frameworks, making it suitable for clinical diagnostics and remote healthcare applications. This invention significantly enhances classification accuracy, reduces computational complexity, and ensures scalability across diverse datasets, providing an efficient and explainable AI-driven approach for sleep disorder detection.

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(54) Title of the invention : INTELLIGENT ANOMALY DETECTION SYSTEM USING DEEP LEARNING FOR IOT-BASED SMART HEALTHCARE NETWORKS

(51) International classification :A61B0005000000, A61B0005021000, G16H0050200000, G16H0010600000, G16H0040670000
(86) International Application No :NA
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(57) Abstract :
[037] The invention provides an intelligent anomaly detection system and method for IoT-based smart healthcare networks, leveraging advanced deep learning algorithms to monitor and analyze real-time physiological data from IoT-enabled sensors. The system utilizes preprocessing techniques to clean and normalize sensor data, followed by the application of deep learning models such as Long Short-Term Memory (LSTM) networks to detect anomalies in patient health metrics like heart rate, blood pressure, and oxygen saturation. When an anomaly is detected, the system generates real-time alerts, providing healthcare providers with timely insights for intervention. The system is adaptive, continuously improving through clinician feedback, and integrates seamlessly with existing healthcare infrastructure. Its scalable design allows it to be used across various healthcare environments, enhancing patient safety, reducing false alarms, and enabling proactive healthcare management. Accompanied Drawing [FIGS. 1-2]

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(12) PATENT APPLICATION PUBLICATION
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(22) Date of filing of Application :29/05/2025

(21) Application No.202541052132 A
(43) Publication Date : 13/06/2025

(54) Title of the invention : Deep Learning Based Underwater Trash Detection System Using YOLOv8

(51) International classification :B63G0008000000, G06V0010820000, G06N0003080000, G01V0001380000, G01S0015890000
(86) International Application No :NA
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(57) Abstract :
The present invention relates to an advanced system and method for real-time detection and classification of underwater trash using a deep learning model, specifically the YOLOv8 architecture. The system leverages high-resolution underwater imagery captured through remotely operated vehicles (ROVs) or autonomous underwater vehicles (AUVs), preprocessed and analyzed using a trained YOLOv8 model to identify and classify various types of marine debris, including plastics, metals, rubber, and textiles. The proposed invention aims to significantly improve the efficiency of underwater cleanup missions and marine conservation efforts.

No. of Pages : 16 No. of Claims : 7

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

(21) Application No.202541058781 A
(43) Publication Date : 27/06/2025

(54) Title of the invention : Cloud-Based Real-Time Machine Learning System for Environmental Hazard Detection and Alerting

(51) International classification :G06N0020000000, H04L0009400000, G06N0003045000, G06N0003084000, G06N0020200000
(86) International Application No :NA
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(57) Abstract :
Utilizing machine learning algorithms and real-time data ingestion, this cloud-based system can identify environmental dangers like chemical spills, wildfires, gas leaks, and air pollution. The system employs trained models for anomaly detection, uses scalable cloud infrastructure to process heterogeneous sensor inputs, and produces automated warnings for emergency reaction. The system is well-suited for implementation in industrial, urban, and rural settings since it facilitates multi-source data fusion, adaptive model training, and geospatial analysis.

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