

SIH ML and AI Problem Statements.

SIH1524 Indian Space Research Organisation (ISRO)

Topic : Domain Name Server (DNS) Filtering Service using Threat Intelligence feeds and AI/ML Techniques

Description :

Software DNS Filtering service helps block malicious domains and prevent malware from communicating with Command-and-control servers. It also aids in blocking phishing attacks, playing a crucial role in enhancing security and ensuring appropriate content access. The solution should provide a secure DNS resolver that blocks resolution of malicious domain names. It should be capable of detecting and filtering malicious domains using blacklists, threat intelligence feeds with support for STIX/TAXII protocol, and leveraging AI/ML for identifying malicious domains generated using domain generation algorithms or any other techniques employed by botnets. The solution should also be able to detect attempts at DNS tunnelling employed by malwares. It should allow the resolution of non-malicious domain names while blocking the resolution of malicious domains. Furthermore, the solution should support DNS over UDP, DNS over DTLS and DNS over HTTPS for DNS resolution. It should be scalable to handle a large volume of DNS queries and maintain an average DNS lookup time within 100 milliseconds. Additionally, the solution should support DNS caching for faster resolution. The solution should be capable of conducting both active analysis of DNS queries to filter malicious domains and passive analysis of DNS data provided in PCAP format or Zeek TSV format for the detection of malicious domains. It should also provide a web interface for monitoring statistics on malicious domains identified in DNS queries, as well as source IP addresses that generated those queries.

SIH1521

Topic : Development of Explainable AI (XAI) based model for prediction of heavy /high impact rain events using satellite data

Space Technology

Software

Description :

Nowcasting of heavy precipitation rainfall events with an understanding of the most important predictors and also an idea as to why a certain model can fail. Desired Outcome- The developed system shall provide the following: 1. AI based model to predict particular rain episodes of greater impact using satellite data (INSAT-3D/3DR) . 2. An explainable module into the AI model (XAI) 3. The final output should be in terms of a web application, with associated accuracy of the models worked on and an explainable component of the outputs.

SIH1516

Topics : Suggest an AI-based solution to enable ease of grievance lodging and tracking for citizens across multiple departments

Smart Automation

Software

Descriptiopl :

A robust grievance redressal mechanism is a crucial component of any administration. An efficient and effective procedure for addressing grievances demonstrates an administration's accountability responsiveness, and user-friendliness. However, the ease of lodging a complaint or grievance by citizens is often lacking in many Indian cities. Given the large migratory population in Indian cities, consisting of individuals who may not be familiar with English, Hindi, or the local regional language, citizens face challenges in lodging their grievances. Moreover, the process of lodging a grievance is not always straightforward. Some department websites are inaccessible, and locating the correct website for a specific department can be difficult. Introducing an AI-based chatbot that allows citizens to dictate their grievances in their local language and lodge them, would greatly assist citizens. This tool should be able to understand and process complaints effectively, assign them to the relevant department, and provide citizens with a unique complaint number. Real-time updates on the status of the complaint should be sent to citizens, enabling one-on-one conversations throughout the grievance lifecycle. The primary objective of this solution should be to provide citizens with an easy-to-use chatbot that facilitates efficient lodging and tracking of grievances. This would not only save citizens' time in searching for the appropriate department or category but also enable the administration to receive targeted grievances and enhance overall service delivery.

Ministry of Housing and Urban Affairs

SIH1454

Topic :

Create an intelligent system using AI/ML to detect phishing domains which imitate look and feel of genuine domains

Blockchain & Cybersecurity Software

Description :

Phishing attack is the most prevalent attack technique to compromise users worldwide. Phishing links/websites are shared through number of mediums like email, SMS etc. to target users. These domains are at times host user login page that imitates the genuine target websites. Login attempts on such pages can lead to compromise of user credentials and may also download malicious payload in user computers. The objective of the problem is to identify such phishing domains from the newly registered websites based on open source databases (Example WHOIS Database). Such databases provide list of newly registered domains. The tool should be automated and harness power of AI/ML to identify phishing domains from genuine domains. It may use the following techniques: (a) Backend code / content similarity in web pages. (b) Web page image analysis (i.e. analysis between genuine and phishing site web page images; more the similarity better is the probability score of being a lookalike phishing site). The evaluation would be based on the tool's ability with regard to the following: (e) Probability scores of phishing domains on how close they are to the genuine domain. (f) Ability to detect new phishing domains in reasonable time. (g) Ease of use and flexibility in output formats.

National Technical Research Organisation,(NTRO)

SIH1451

Develop a AI/ML tool to detect whether a system / firewall /router / network is compromised. The technique should not rely only on IoCs (Indicators of Compromises) detection.

Blockchain & Cybersecurity Software

Early detection of a compromise of any compute device is critical for security of critical information infrastructure. While most of infections on ICT are detected using IoCs (Indicators of Compromises), the objective of this problem is to explore techniques for

detection of compromise on devices using AI / ML models when the IoC of the compromise is not known. The developer should employ innovative models for non-IoCs based detection of compromise on devices. The evaluation of the solution will be based on the following: (a) Innovation and ruggedness of the method of detection of compromise. (b) Utility of the method developed over various types of devices including system / firewall / router / network. (c) Ease of deployment and method of reporting of detected compromise. (d) Ability to minimize false alarms of compromise.

National Technical Research Organisation,(NTRO)

SIH1417

AI-ML based intelligent de-smoking/de-hazing algorithm

Disaster Management Software

Design and Development of AI-ML based intelligent de- smoking/de-hazing algorithm for reproducing the real time video of the area under fire specifically for indoor fire hazards to aid the rescue operation.

Ministry of Defence

SIH1416

AI based Automatic alarm generation and dropping of payload at a particular object through a Drone.

Disaster Management Software

Drones are currently being widely utilized in civilian applications and military uses too. In severe earthquake and flood situations, the Drones with artificial intelligence based automatic object recognition capability can help rescue teams a lot through automatic alarm generation and dropping of payloads like food, clothes, rescue tools near detected human being. Challenge here is to detect human being from around 50-100 m above the ground at a slanted angle and then drop a payload (say flower for demonstration purposes) near him/ her. Technologies needed will be Drone, Cameras, Processor Board (Raspberry Pi or Intel NUC), Artificial Neural Network or AI hardware and Software, Payload dropping mechanism etc. The developed system will be highly useful in many DRDO projects and civilian applications.

Ministry of Defence

SIH1409

AI based IT training system Smart Education Software

Modern technology is changing rapidly and every individual has different level of understanding and different pace of learning things. Having same course for all personnel not only result in waste of time of departments and personnel's but also affects departments productivity. Proposed Solution: AI Based training system may be developed to real time design the course based on individual understanding and learning capacity.

Ministry of Home Affairs

SIH1343

Identification of Different Medicinal Plants/Raw materials through Image Processing Using Machine Learning Algorithms

MedTech / BioTech / HealthTech Software

India, with a rich heritage of floral diversity, is well-known for its medicinal plant wealth, but their identification is one of the major burning issues in Ayurvedic Pharmaceuticals. Several crude drugs are being sold under the same name in the market leading to confusion and their misidentification. Even the collectors and traders are not completely aware of the exact morphological appearance or differentiating attributes of the many drugs owing to seasonal and geographical availability, and similar characteristics. Moreover, the extensive consumption to meet demand-supply ratio exerts a heavy strain on the existing resources. It further leads to the practice of adulteration, substitution, and disbelief in the curative capability of the system eventually. Thus, software capable of identifying different medicinal plants/ raw materials through Image Processing Using Different Machine Learning Algorithms will be of immense use. It will be helpful at every level viz. wholesaler, distributor, etc. of the supply chain of raw material being utilized in the system.

Ministry of AYUSH

SIH1299

Developing an AI-powered energy management system for industrial commercial facilities to optimize energy consumption.

Energy consumption in industrial and commercial facilities is a major expense for businesses and contributes significantly to environmental pollution. The lack of visibility and control over energy usage makes it difficult for businesses to manage their energy costs and reduce their carbon footprint. conventional energy management systems have limitations in terms of accuracy and scalability and often require manual intervention to operate effectively. To address these challenges, an AI-powered energy management system can be developed that uses machine learning algorithms and data analytics to optimize energy consumption in industrial and commercial facilities. The system will collect real-time energy data from various sources, such as sensors and meters, and use this data to predict energy usage patterns and identify opportunities for energy savings. The system will also provide recommendations for energy-efficient practices and automate the control of energy-consuming devices, such as lighting and HVAC systems, to optimize energy consumption. The AI-powered energy management system will be designed to be scalable and adaptable to different types of industrial and commercial facilities. it will also be user-friendly, providing an intuitive interface for facility managers and building owners to monitor and control energy usage. The system will be designed to integrate with existing building automation systems and will be able to operate autonomously with minimal human intervention, The goal of developing an AI-powered energy management system is to help businesses reduce their energy costs, improve their operational efficiency, and reduce their environmental impact by optimizing their energy consumption. Desired Outcome: The desired outcome of developing an AI-powered energy management system for industrial and commercial facilities to optimize energy consumption is to provide businesses with a cost-effective and environmentally sustainable solution to manage their energy usage. The system will offer several benefits, including: 1. Cost savings: By optimizing energy consumption, the system will help businesses reduce their energy bills and save money. The AI-powered system will continuously analyze energy usage patterns and provide recommendations for energy-efficient practices that can help reduce energy waste and costs. 2. Improved energy efficiency: The system will enable businesses to monitor and control their energy consumption in real-time, allowing them to identify areas of inefficiency and implement solutions to improve energy efficiency. The system will also provide automated control of energy-consuming devices, such as lighting and HVAC systems, to further optimize energy consumption. 3. Reduced carbon footprint: By reducing energy waste, the system will help businesses reduce their carbon footprint and contribute to a more sustainable future. This will help businesses meet their environmental targets and obligations, such as carbon reduction commitments. 4. Scalability: The AI-powered energy

management system will be designed to be scalable and adaptable to different types of industrial and commercial facilities. This will allow businesses to implement the system across multiple sites and improve their overall energy management practices.

5. User-friendliness: The system will be designed with a user-friendly interface, making it easy for facility managers and building owners to monitor and control energy usage. The system will also be able to operate autonomously with minimal human intervention, reducing the workload on facility managers. Overall, the desired outcome of developing an AI-powered energy management system for industrial and commercial facilities to optimize energy consumption is to provide businesses with a cost-effective and sustainable solution to manage their energy usage, reduce costs, and improve their environmental impact.

Ministry of power