Table 1: Description of searching string

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| --- | --- | --- | --- | --- |
| **Aspect** | | **Description** | | |
| Date of search | | 19-April-2024 | | |
| Search string | | ("AI" **OR** "Artificial intelligence") **AND** ("IoT" **OR** "Internet of Things") **AND** ("Review" OR "Survey") | | |
| **Sr. No** | **Databases** | | **Number of Records** | **Link** |
| 1 | Scopus | | 363 | [Scopus](https://www.scopus.com/results/results.uri?sort=plf-f&src=s&st1=%22AI%22+OR+%22Artificial+intelligence%22&sid=9d6edf71016a402b25d1d2cb3804329e&sot=b&sdt=b&sl=48&s=%28TITLE%28%22AI%22+OR+%22Artificial+intelligence%22%29+AND+TITLE%28%22IoT%22+OR+%22Internet+of+Things%22%29+AND+TITLE-ABS-KEY%28%22Review%22+OR+%22Survey%22%29%29&origin=searchbasic&editSaveSearch=&sessionSearchId=9d6edf71016a402b25d1d2cb3804329e&limit=10&yearFrom=2019&yearTo=2024&cluster=scosubtype%2C%22re%22%2Ct%2Bscolang%2C%22English%22%2Ct) |
| 2 | IEEE-Xplore | | 88 | [IEEE-Xplore](https://ieeexplore.ieee.org/search/searchresult.jsp?action=search&matchBoolean=true&queryText=((%22Document%20Title%22:%22AI%22%20OR%20%22Document%20Title%22:%22Artificial%20intelligence%22)%20AND%20(%22Document%20Title%22:%22IoT%22%20OR%20%22Document%20Title%22:%22Internet%20of%20Things%22)%20AND%20(%22Abstract%22:%22Review%22%20OR%20%22Abstract%22:%22survey%22%20OR%20%22Document%20Title%22:%22Review%22%20OR%20%22Document%20Title%22:%22survey%22%20OR%20%22Index%20Terms%22:%22Review%22%20OR%20%22Index%20Terms%22:%22Survey%22))&highlight=true&returnFacets=ALL&returnType=SEARCH&matchPubs=true&refinements=ContentType:Journals) |
| 3 | ACM digital library | | 5 | [ACM](https://dl.acm.org/action/doSearch?fillQuickSearch=false&target=advanced&ConceptID=118230&expand=dl&AfterMonth=1&AfterYear=2019&BeforeMonth=4&BeforeYear=2024&AllField=Title%3A%28%28%22AI%22+OR+%22Artificial+intelligence%22%29%29+AND+Title%3A%28%28%22IoT%22+OR+%22Internet+of+Things%22%29%29+AND+AllField%3A%28%22review%22+OR+%22Surveys%22%29) |
| 4 | Wiley Online Library | | 8 | [Wiley](https://onlinelibrary.wiley.com/action/doSearch?AfterMonth=1&AfterYear=2019&BeforeMonth=4&BeforeYear=2024&Ppub=&field1=Title&field2=Title&field3=Title&field4=AllField&publication=&text1=%22AI%22+OR+%22Artificial+intelligence%22&text2=%22IoT%22+OR+%22Internet+of+Things%22&text3=%22Review%22+OR+%22Survey%22&text4=%22Review%22+OR+%22Survey%22&startPage=&PubType=journal) |

**Note:**

1. **Scopus:** In the scopus we search with in ***Article title*** for ("AI" OR "Artificial intelligence") AND ("IoT" OR "Internet of Things") while for ("Review" OR "Survey") we search with in ***Article title, Abstract, keywords***.
2. **IEEE-Xplore:** In the IEEE-Xplore we search with in ***Document Title*** for ("AI" OR "Artificial intelligence") AND ("IoT" OR "Internet of Things") while for ("Review" OR "Survey") we search with in ***Abstract, Document Title, Index Terms***.
3. **ACM:** In the ACM we search with in ***Title*** for ("AI" OR "Artificial intelligence") AND ("IoT" OR "Internet of Things") while for ("Review" OR "Survey") we search with in ***anywhere***.
4. **Wiley: I**n the Wiley we search with in ***Title*** for ("AI" OR "Artificial intelligence") AND ("IoT" OR "Internet of Things") while for ("Review" OR "Survey") we search with in ***Title and anywhere***.

**Selection Criteria for the papers:**

1. **Inclusion Criteria:** Only include the following papers.
   1. Paper published between 2019 to March 2024.
   2. Published (peer-reviewed) journal papers.
   3. Document type is Review or Systematic literature review or survey.
   4. Paper describes the role of AI in IoT systems.
2. **Exclusion Criteria:** The following papers are excluded.
   1. Paper not written in English Language.
   2. Papers whose full text was not available.
   3. Conference papers, magazines, and newsletters.

A diagram of a computer program

Description automatically generated with medium confidence

**Figure 1. Updated results from new research string**

The IC (1.4) is about the role of AI in IoT’s that will be analyze in all the papers in next step and update the values if IC (1.4) in the Figure 1.

A diagram of a process flow

Description automatically generated

**Figure 2. PRISMA Flow Diagram**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr. No** | **Paper** | **Year** | **Role of AI** | **AI Task** | **Application Domain** | **Specific focus** |
|  | AI for UAV-Assisted IoT Applications: A Comprehensive Review | **2023** | * **Path planning:**   + AI enhances the path planning process by optimizing routes for UAVs, ensuring that they follow the most efficient paths. * **Decision Making:**   + AI algorithms can be leveraged for flight control, data processing, and decision-making processes in UAVs, resulting in accelerated data processing and instantaneous decision-making. | * **Decision Making and Acting**   + Planning (path planning for UAVs)   + Control (flight control) | * Agriculture and farming * Disaster and emergency response * Public Safety * Military | Unmanned Aerial Vehicles (UAV) |
|  | Integration of IoT-Enabled Technologies and Artificial Intelligence (AI) for Smart City Scenario: Recent Advancements and Future Trends | **2023** | * **Predictions:**   + AI is used for prediction from the data that is generated by IoT devices in the smart cities. * **Identified:**   + AI is used to identify the trends and patterns that are more complex for human. * **Decision Support:**   + AI analyze the vast amounts of data generated by IoT devices with accuracy and precision to aid decision-making. * **Optimize Energy Consumption:**   + AI is used to manage energy consumption in smart city buildings by automatically adjusting settings like lighting and temperature based on occupancy patterns. | * **Prediction** * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection * **Decision-support**   + Operational decisions * **Decision Making and Acting**   + Control (lighting and temperature) | * Vehicles and transportation * Governance (not in our list!) * Education * Industry and manufacturing * Agriculture and farming * Health * Environment * Buildings and homes | Smart Cities |
|  | At the Confluence of Artificial Intelligence and Edge Computing in IoT-Based Applications: A Review and New Perspectives | **2023** | * **Data Preprocessing:**   + AI is used for data cleaning and normalization (filter the noise and irrelevant data, intelligently filling the missing data) and make data suitable for further analysis. * **Automated Decision Making:**   + AI can automate decision-making by providing actionable insights based on data analytics, critical for autonomous systems in smart cities. * **Data Analytics:**   + AI is used for extracting meaningful insights from big data, which are crucial for decision-making processes. * **Prediction:**   + AI can use historical data to make predictions about future events. * **Classification:**   + AI can classify data into predefined categories, useful in applications such as smart healthcare systems where patient data might be classified based on diagnostic criteria. * **Identifying key patterns:**   + AI is used for the visualization of IoT data by identifying key patterns and insights that are visually represented for easier human interpretation. * **Recourse Allocation:**   + In edge computing, the role of AI is to optimize the performance, usage of energy and optimize the Task scheduling and Load balancing. * **Recognize Events:**   + Collect the data from sensors and interpret that data intelligently at the source and recognize the complex events from the raw sensor outputs. | * **Data Pre-processing/Management**   + Reducing noise   + Remove irrelevant or sensitive data.   + Filling in missing data * **Decision-making and Acting**   + Resource Allocation * **Prediction** * **Pattern Recognition/Classification**   + Event/Activity Recognition | * Agriculture and farming * Environment * Healthcare * Industry and manufacturing * Education * Vehicles and transportation | Edge Computing |
|  | Artificial Intelligence powered Internet of Things and smart public service | **2019** | * **Data Management:**   + AI is used for data cleaning, collection, and storage, as IoT devices generate vast amount of data continuously and need to be managed efficiently. * **Data Analysis:**   + AI is used to analyze the data gathered from IoT devices. This analysis is vital to extract meaningful insights from the vast pools of data generated, which can be complex and voluminous. * **Decision-Support:**   + AI aids in making intelligent decisions by leveraging the analyzed data. | * **Data pre-processing / management**   + Reducing noise * **Decision-support**    + Operational decisions | * Public Safety * Healthcare * Vehicles and transportation * Energy | Public Service |
|  | A Comprehensive Review of the COVID-19 Pandemic and the Role of IoT, Drones, AI, Blockchain, and 5G in Managing its Impact | **2023** | * **Data Analysis and Decision Making:**    + AI processes vast amounts of data collected by IoT devices to provide actionable insights, predictive analytics, and decision-making support. * **Automation and Control:**   + AI enhances the automation capabilities of IoT systems, enabling more sophisticated control mechanisms for devices such as drones and robots used in disinfection, delivery of medical supplies. * **Resources Optimization:** * AI optimize the resource allocation like ventilators, hospital beds, and medical supplies, which are critical in handling the pandemic. * **Enhancing IoT Security:**   + AI algorithms are used to improve the security of IoT networks, ensuring the integrity and confidentiality of health data transmitted across these networks. | * **Data pre-processing / management**   + Reducing noise * **Decision-making and acting**   + Resource allocation   + Control * **Pattern recognition / Classification / Identification**   + Authentication | * Healthcare | Covid-19 Pandemic |
|  | Explainable Artificial Intelligence (XAI) for Internet of Things: A Survey | **2023** | * **Real-Time Decision Making:**    + XAI algorithms can use data from IoT devices to make real-time decisions, providing transparency and accountability needed to build trust in AI. * **Resource Management:**   + XAI helps to optimize resource usage by identifying the most important features in decision-making processes. * **Enhanced Security:**   + XAI algorithms can monitor IoT devices for potential security threats, detect anomalies in real time, and respond appropriately. This improves the security of IoT systems. | * **Decision-making and acting**   + Resource allocation * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Robotics * Energy * Healthcare * Environment * Industry and manufacturing * Agriculture | Explainable AI |
|  | Artificial Intelligence and IoT in Elderly Fall Prevention: A Review | **2024** | * **Predictive Analytics:**   + AI is used to analyze data from IoT devices, predicting potential falls by identifying patterns and anomalies. * **Real-Time Monitoring:**   + Enabling continuous monitoring of health and activity data, providing timely alerts for immediate risks. * **Decision Making:**   + Improving decision-making processes within IoT systems by analyzing collected data and making intelligent adjustments to monitoring parameters. | * **Prediction** * **Decision-support**   + Strategic decisions * **Decision-making and acting**   + Control | * Healthcare | Fall Prevention |
|  | The role of artificial intelligence and IoT in prediction of earthquakes: Review | **2024** | * **Prediction of earthquakes:**   + Improve earthquake prediction methodologies, making them more accurate and timely, which could ultimately help in mitigating the impacts of such disasters.   + Pattern Recognition: AI analyzing seismic waveforms, historical earthquake data, and other geophysical indicators that may precede an earthquake.   + Data Analysis: AI can analyze vast amounts of data from various sources, such as seismic sensors, satellite data, and IoT devices.   + Real-Time Processing: AI technologies facilitate the real-time processing of data collected from sensors, allowing for quicker response and potentially providing early warnings to at-risk areas. | * **Prediction** | * Disaster and emergency response | Prediction of earthquakes |
|  | Research on Artificial Intelligence Enhancing Internet of Things Security: A Survey | **2020** | * **Device Authentication:**   + AI is used to verify the device identities within IoT network, which ensure only authorized device can interact and access the network. * **Intrusion Detection:**   + AI is used to monitor the security breaches or unauthorized access, that ensure the integrity of the network and data leaks. * **Malware Detection:**   + AI is used to identify and neutralize the malware on IoT devices and networks, that makes protection against software threats. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection   + Authentication | * General | IoT security |
|  | IoT-Equipped and AI-Enabled Next Generation Smart Agriculture: A Critical Review, Current Challenges and Future Trends | **2022** | * **Prediction:**   + AI is used to make prediction about future agriculture conditions based on the historical data, like crop diseases and weather patterns. * **Decision Support:**   + AI can analyze the data that is collected from various sources and support decisions related to irrigation, use and other farming practices. * **Resource Management:**   + AI is used to increase the crop productivity by optimizing various processed and operation in the farming, like minimize the water requirement and toxic pesticides. | * **Prediction** * **Decision-support**   + Operational decisions | * Agriculture and farming | Agriculture |
|  | Integrating Artificial Intelligence Internet of Things and 5G for Next-Generation Smart grid: A Survey of Trends Challenges and Prospect | **2022** | * **Autonomous Decision Making:**   + In smart grid AI enable components make decision independently, improving response time and efficiency. * **Data Analysis and Management:**   + AI can process large amount of data generated by grid to provide insights, support maintenance and planning, and enhance forecasting accuracy. * **Fault Detection and Response:**    + AI algorithms are used to detect and diagnose faults in the grid automatically, significantly reducing downtime and the need for manual inspections. | * **Decision-making and acting**   + Recourse Allocation * **Data pre-processing / management**   + Reducing Noise * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Energy | Smart grid |
|  | Explainable AI Over the Internet of Things (IoT): Overview, State-of-the-Art and Future Directions | **2022** | * **Decision Making:**   + AI can enhancing the transparency, interpretability, and trustworthiness of decisions made by Internet of Things (IoT) systems.   + The role of AI in IoT decision-making is multi-faceted, involving the collection and initial processing of data, improving IoT services through anomaly detection and analysis, and supervising AI elements to ensure reliable and transparent decision-making. | * **Decision-support**    + Operational decisions | * Healthcare * Industry and manufacturing | Explainable AI |
|  | Artificial Intelligence and Internet of Things (AI-IoT) Technologies in Response to COVID-19 Pandemic: A Systematic Review | **2022** | * **Resources Allocation:**   + AI helps in modelling and simulating various scenarios to optimize resources like hospital beds, ventilators, and vaccines. * **Decision Making:**   + AI enhances the capabilities of IoT devices in the context of pandemic response, leading to more effective monitoring, control, and decision-making processes in public health. | * **Decision-making and acting**   + Resource allocation   + Control | * Healthcare | Covid-19 pandemic |
|  | Sustainable aquaculture development: a review on the roles of cloud computing, internet of things and artificial intelligence (CIA) | **2021** | * **Data analysis and Prediction:**   + AI can process large amount of data that is collected through different sensors and devices. This analysis support the disease detection, growth prediction and environmental monitoring for better management and decision making in aquaculture. * **Intelligent Monitoring:**   + AI is used for real-time monitoring of water quality, fish health and feeding patterns with the combined to IoT devices. * **Optimize Feeding:**   + AI can optimize the feeding practices like reducing waste and improving fish growth rate. Automated feeding systems can adjust feeding schedules based on real-time data on fish behavior and water conditions. | * **Prediction** * **Decision-making and acting (autonomous)**   + Control * **Decision-support**   + Strategic decisions | * Agriculture and farming | Aquaculture |
|  | A Comprehensive Review on Artificial Intelligence/Machine Learning Algorithms for Empowering the Future IoT Toward 6G Era | **2022** | * **Optimizing Resource Allocation:**   + AI can be used to optimize the resource allocation and reduce energy consumption. * **Enhance IoT Network Security:**   + AI is used to enhance the IoT network security including detection and mitigating cyber threats and secure data transmission. | * **Decision-making and acting**   + Resource allocation * **Pattern recognition / Classification / Identification**   + Authentication | * Agriculture and farming * Healthcare * Vehicles and transportation * Industry and manufacturing | IoT networks: energy efficient, secured and effective operations and services |
|  | IoT, Big Data, and Artificial Intelligence in Agriculture and Food Industry | **2022** | * **Data Preprocessing:**   + AI is used to process the large amount of data generated by IoT devices and transform this raw data into actionable insights. * **Decision Making:**   + AI is used to improve the performance of agriculture and food industry processes by real-time analytics and automated decision-making. * **Food Quality and Safety:**   + AI aids in assessing food composition, detect contaminants and maintaining high standards of food authenticity. | * **Data pre-processing / management**   + Reducing noise   + Filling in missing data * **Decision-support**   + Operational decisions | * Agriculture and farming | Agriculture and Food Industry |
|  | Artificial Intelligence-Based Sensors for Next Generation IoT Applications: A Review | **2021** | * **Data Preprocessing:**   + AI is used to analyze and process the data collected by IoT sensors and convert the raw data into meaningful information. * **Decision Support:**   + AI enables IoT devices to make smart decisions based on the data collected. | * **Data pre-processing / management**   + Remove irrelevant or sensitive data.   + Filling in missing data * **Decision-support**   + Operational decisions | * Energy * Transportation * Healthcare * Industry * Agriculture | Smart sensors |
|  | A Survey on Integrating Edge Computing With AI and Blockchain in Maritime Domain, Aerial Systems, IoT, and Industry 4.0 | **2024** | * **Decision Making:**   + AI with edge computing to enable the real time data collection, processing, and decision making at edge. * **Optimize Energy:**   + In Edge computing AI can be used to reduce the energy consumption by optimizing computational tasks and resource usage. * **Real time Monitoring:**   + AI with edge computing provide the real time monitoring like environmental monitoring and disaster response. AI processes data at the edge to provide timely alerts and responses. | * **Decision-making and acting**   + Resource allocation * **Decision-support**   + Operational decisions | * Agriculture and farming * Industry and manufacturing | Maritime, aerial systems and Industry 4.0? |
|  | AI-Empowered Fog/Edge Resource Management for IoT Applications: A Comprehensive Review, Research Challenges, and Future Perspectives | **2024** | * **Optimize Resource Management:**   + Can optimize resource provisioning, task offloading, resource scheduling, service placement, and load balancing. * **Decision Making:**   + AI can enhance decision making processes through predictive analytic and intelligent algorithms. | * **Decision-making and acting**   + Resource allocation | * General | Fog/Edge Resource Management |
|  | The Impact of AI Applications on Smart Decision-Making in Smart Cities as Mediated by the Internet of Things and Smart Governance | **2023** | * **Enhance Decision Making:** * AI is used here to improve the decision-making process by integrating with the systems that can analyze the large data and make efficient decisions. | * **Decision-support** * Operational decisions | * Health * Governence * Energy | Smart Cities |
|  | Behavioral Biometrics for Continuous Authentication in the Internet-of-Things Era: An Artificial Intelligence Perspective | **2020** | * **Data Preprocessing:**   + AI is used for the preprocessing of biometric data to remove the noise data and extract the relevant features. * **Anomaly Detection:**   + AI is used to detect anomalies and enhance the robustness against cyberattacks. | * **Data pre-processing / management**   + Reducing noise   + Filling in missing data * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * General | IoT security: Behavioral Biometrics for Authentication |
|  | Reliable and Resilient AI and IoT-Based Personalised Healthcare Services: A Survey | **2022** | * **Data Preprocessing and Analysis:**   + AI is used to process and analyze the vast amount of data from IoT devices, which helps in diagnosing accurate medical conditions and predicting disease progression. * **Prediction:** * **Decision Making:**   + AI is used to detect patterns and anomalies from health data and make decisions based on that data. * **Enhance Security:**   + AI with blockchain can enhance the reliability, security, and integrity of health services. | * **Data pre-processing / management**   + Remove irrelevant or sensitive data. * **Prediction** * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection   + Authentication | * Healthcare | Personalised Healthcare Services |
|  | Systematic Review for the Construction of an Architecture With Emerging IoT Technologies, Artificial Intelligence Techniques, Monitoring and Storage of Malicious Traffic | **2022** | * **Real-time Monitoring and Response:**   + AI is used to monitor the network traffic continuously and allowing for real-time detection of malicious. * **Enhance Security:**   + AI can improve the security, efficiency, and effectiveness of the cybersecurity systems. | * **Decision-support**   + Operational decisions * **Pattern recognition / Classification / Identification**    + Authentication | * General | IoT security: Malicious network traffic |
|  | Artificial Intelligence in Visible Light Positioning for Indoor IoT: A Methodological Review | **2023** | * **Improve position estimation accuracy:**   + AI is used to improve position estimation accuracy, handle environmental factors, and optimize system parameters. | * **Pattern recognition / Classification / Identification**   + Estimation | * Industry and manufacturing | Indoor positioning |
|  | Security Threats and Artificial Intelligence Based Countermeasures for Internet of Things Networks: A Comprehensive Survey | **2021** | * **Threat Detection:**   + AI is used for security threat detection, like anomaly detection, pattern recognition and peritectic analytic helping in identifying the potential attacks. * **Enhance Security:**   + AI is used to improve traditional security mechanism by providing advance solutions. | * **Pattern recognition / Classification / Identification**   + Diagnosis   + Authentication | * Environment * Healthcare * Industry and manufacturing * Vehicles and transportation | IoT security: threat detection |
|  | A Comprehensive Survey of the Internet of Things (IoT) and AI-Based Smart Healthcare | **2021** | * **Prediction:**   + AI is used to analyze the large volume of data generated by IoT devices, extract the relevant features and timely prediction. * **Decision Making:**   + AI is used to detect patterns and anomalies from health data and make decisions based on that data. * **Enhance Security:**   + AI can enhance the reliability, security, and integrity of health services. AI is also used to protect sensitive health information breaches and unauthorize access. | * **Prediction** * **Pattern recognition / Classification / Identification**   + Diagnosis   + Authentication | * Healthcare | Healthcare |
|  | Recent Advances in Artificial Intelligence for Wireless Internet of Things and Cyber–Physical Systems: A Comprehensive Survey | **2022** | * **Data-analysis Predictions:**   + AI is used for accurate data analysis and prediction for IoT system, where data is collected from different sensors and properly analyzed and fused for accurate decision making. | * **Prediction** * **Decision-making and acting** * Resource allocation (networks) * **Pattern recognition / Classification / Identification**   Event/activity recognition/detection | * Buildings and homes * Energy * Health * Military | Wireless networks |
|  | Securing the Internet of Things in Artificial Intelligence Era: A Comprehensive Survey | **2024** | * **Threat Detection and Prevention:**   + AI is used to enhance the security of IoT systems through detecting and preventing cyberattacks and authentication. * **Secure Communication and Authentication:**   + AI is used to strengthening the security posture of IoT systems by ensuring the confidentiality, integrity, and authenticity of data transmissions and interactions within the interconnected IoT ecosystem * **Predictive Security Analytics:**   + AI can identify and mitigate security ricks assessment and threat intelligence. | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection   + Authentication | * General | IoT Security |
|  | Pervasive AI for IoT Applications: A Survey  on Resource-Efficient Distributed  Artificial Intelligence | **2022** | * **Resource Optimization:**   + AI is used to manage the limited power and memory resources of the edge devices. * **Enhance Data Privacy:**   + AI can enhance the privacy by discarding sensitive information before data transfer. * **Enhance Efficiency:** | * **Decision-making and acting**   + Resource allocation | * Buildings and homes * Energy * Logistics and supply chain management * Vehicles and transportation * Waste management | Resource efficiency |
|  | A proposed collaborative framework by using artificial intelligence-internet of things (AI-IoT) in COVID-19 pandemic situation for healthcare workers | **2020** | * **Predictive Analytics:**   + AI is used for predictive analytics to forecast viruses spread, and it is used to optimize the allocation of healthcare resources. * **Real-time Monitoring and Surveillance:**   + AI with IoT devices can facilitate the real-time monitoring and surveillance of patients and healthcare environment, which can reduce the time and workload of healthcare workers. | * **Prediction** * **Decision-support**   + Operational decisions | * Healthcare | Covid-19 pandemic |
|  | Survey on IoT security: Challenges and solution using machine learning, artificial intelligence and blockchain technology | **2020** | * **Improve Decision Making:**   + AI is used to improve the decision-making process and computational tasks with IoT systems. * **Enhance Security:**   + AI can enhance the reliability, security, and integrity of health services. AI is also used to identify unauthorized IoT devices, detect DDoS attacks and perform authentication. | * **Decision-support**   + Operational decisions * **Pattern recognition / Classification / Identification**   + Authentication | * Buildings and Home * Healthcarel * Smart City * Vehicles and Transportation * Energy * Logistics and Supply Chain * Smart Retails * Agriculture | IoT security |
|  | Industrial Needs in the Fields of Artificial Intelligence, Internet of Things and Edge Computing | **2022** | * **Data Analysis and Decision Support:**   + AI is used for data analysis and supporting human employees in decision making process. It helps in ensuring product quality through continuous real time monitoring and automated inspection using intelligent cameras. * **Energy Optimization:**   + AI is used for intelligent energy efficiency management and optimize energy consumption. | * **Decision-support**   + Strategic decisions | * Industry and manufacturing | Industrial needs |
|  | On using artificial intelligence and the internet of things for crop disease detection: A contemporary survey | **2022** | * **Crop Disease Detection:**   + AI is used for crop disease detection by making it more assessable, cost effective, and scalable there by helping to increase the productivity in agriculture and reduce losses due to diseases. | * **Pattern recognition / Classification / Identification**   + Object recognition/detection | * Agriculture and farming | crop disease detection |
|  | Strategic decision making in smart home ecosystems: A review on the use of artificial intelligence and Internet of things | **2023** | * **Strategic Decision Support:**   + AI is used to enhance the strategic decision making by providing data driven insights, analysis of trends and analyze the large datasets to reveal patterns and make prediction. | * **Decision-support**   + Strategic decisions | * Buildings and homes | Strategic decision making for smart homes |
|  | AI-enabled IoT penetration testing: state-of-the-art and research challenges | **2023** | * **Enhance Penetration Testing:**   + AI enhancing the effectiveness and efficiency of IoT penetration testing by automating processes, adapting to various environments, and improving the accuracy of vulnerability detection. | * **Pattern recognition / Classification / Identification**   + Object recognition/detection   + Diagnosis | * Healthcare * Buildings and homes * Industry and manufacturing | IoT security: penetration testing |
|  | IoT Solutions and AI-Based Frameworks for Masked-Face and Face Recognition to Fight the COVID-19 Pandemic | **2023** | * **Facial and Masked-Face Recognition:**   + AI is used to recognize the face individual even when they are wearing mask. | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Healthcare | Covid-19 pandemic |
|  | A Review on the Adoption of AI, BC, and IoT in Sustainability Research | **2022** | * **Prediction:**   + AI is used for scheduling, prediction and monitoring tasks within smart city and energy system. * **Energy Optimization:**   + AI is used to forecast energy demand and supply, thereby aiding in efficient energy distribution and reducing consumption. | * **Prediction** * **Decision-support**    + Operational decisions | * Energy * Logistics and supply chain management * Buildings and homes | Sustainability |
|  | A review of smart sensors coupled with Internet of Things and Artificial Intelligence approach for heart failure monitoring | **2021** | * **Prediction:**   + AI is used to develop algorithms that predict heart failure by analyzing large, complex datasets derived from various sources, including clinical measurements, observations, biological data, wearable devices**.** | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * Healthcare | heart failure monitoring |
|  | Applications of artificial intelligence, machine learning, big data and the internet of things to the COVID-19 pandemic: A scientometric review using text mining | **2021** | * **Disease Prediction:**   + AI is used to analyze and manage the COVID-19 pandemic by disease prediction, aid in drug and vaccine development and improving diagnostic through intelligent data analysis. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * Healthcare | Covid-19 pandemic |
|  | Applications of new technologies for monitoring and predicting grains quality stored: Sensors, Internet of Things, and Artificial Intelligence | **2022** | * **Real-time Monitoring and Decision Making:**    + AI is used in conjunction with sensors and IoT devices to enable real-time monitoring of grain storage conditions. AI is also used in data collection and analysis, facilitating timely decision-making to prevent grain deterioration and loss. | * **Decision-support**   + Operational decisions | * Agriculture and farming | Grain quality |
|  | Convergence of Distributed Ledger Technologies with Digital Twins, IoT, and AI for fresh food logistics: Challenges and opportunities | **2023** | * **Decision Support:**   + AI is used to collect data during the logistic stages to generate important information for decision making, and ensuring better quality products.   + AI is used to enhancing decision-making, optimizing logistics processes, maintaining food quality, and integrating with other technologies like IoT and Digital Twins to improve fresh food logistic. | * **Decision-support**    + Operational decisions | * Logistics and supply chain management | Fresh food logistics |
|  | AI-Enabled Learning Architecture Using Network Traffic Traces over IoT Network: A Comprehensive Review | **2023** | * **Traffic Classification and Prediction:**   + AI is used for classification and prediction of network traffic based on traffic trace from the IoT devices. AI is used to identifying and prediction of traffic patterns to manage and optimize network resources effectively. * **Intrusion Detection:**   + AI is used to identify unusual patterns that may indicate security breaches or malicious activities. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection   + Object recognition/detection | * Industry and manufacturing | IoT Network traffic analysis |
|  | Review of urban computing in air quality management as smart city service: An integrated IoT, AI, and cloud technology perspective | **2021** | * **Enhance Prediction Accuracy:**   + AI is used in urban air quality management by integrating diverse data sources, improving prediction accuracy, and also enable the real time decision making. | * **Prediction** * **Decision-support**   + Operational decisions   + Strategic decisions | * Environment | Air quality |
|  | Intrusion detection system and mitigation of threats in IoT networks using AI techniques | **2023** | * **Enhance the efficiency of Intrusion Detection:**   + AI can enhance the efficiency of intrusion detection in IoT network. AI techniques like ML and DL can be used to detect and mitigate various types of cyber threats in IoT environment. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * General | IoT security: threat detection |
|  | Integrating cutting-edge technologies: AI, IoT, blockchain and nanotechnology for enhanced diagnosis and treatment of colorectal cancer - A review | **2024** | * **Data Analysis and Prediction:**   + AI can analyze the large amount of data like imaging, genomic and electronic patient record to extract valuable insights that helps in identifying patterns and making prediction about the medical outcomes, thus aiding in clinical decision making. * **Early Detection:**   + AI can improve the efficacy and accuracy of CRC screening and analyzing endoscopic imaging dataset and electronic medical records. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * Healthcare | Diagnosis and Treatment Of Colorectal Cancer |
|  | Uav-enabled mobile edge-computing for iot based on ai: A comprehensive review | **2021** | * **Task offloading and Resource Allocation:**   + AI techniques such as Genetic Algorithm and Reinforcement Learning are used to address the challenges in task offloading, energy management and resource allocation. AI techniques optimize the process of offloading computational tasks from IoT devices to UAVs thereby reducing energy consumption, processing time and latency. * **Energy Optimization:**   + AI is used to manage the energy consumption of UAVs by predicting energy requirements and optimizing transmission and control parameters. | * **Decision-making and acting**   + Resource allocation * **Decision-support**    + Operational decisions | * Agriculture and farming * Industry and manufacturing * Disaster and emergency response * Environment * Healthcare * Vehicles and Transportation * Buildings and homes | UAV |
|  | Disruptive technologies for environment and health research: An overview of artificial intelligence, blockchain, and internet of things | **2019** | * **Data Analysis and Pattern Recognition:**   + AI is used to analyze the vast amount of data collected from the IoT devices and detect the patterns and anomalies from the data. * **Improve Monitoring:**   + AI is used to enhance the monitoring, analysis and decision-making process in environmental and health research. AI techniques are used to detect the patterns in large datasets and improve the accuracy of environmental monitoring. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection * **Decision-support**   + Operational decisions | * Healthcare * Environment | environment and health |
|  | A Survey on COVID-19 Data Analysis Using AI, IoT,  and Social Media | **2023** | * **Early Detection and Forecasting:**   + AI is used to detect COVID-19 at early stages using real-time symptomatic data. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * Healthcare | Covid-19 pandemic |
|  | Making food systems more resilient to food safety risks by including artificial intelligence, big data, and internet of things into food safety early warning and emerging risk identification tools | **2024** | * **Data Integration and Processing:**   + AI is used to process the data from various sources, such as RFID tags, and other network sensors that allow for real time data collection related to food safety and quality in primary production environment. * **Prediction:**   + AI is used to process the IoT devices data to predict and identify food safety risk in early, providing situational awareness and facilitating automated real-time monitoring and alerts. | * **Data pre-processing / management**   + Remove irrelevant or sensitive data. * **Prediction** | * Agriculture and farming | Food safety |
|  | Benefits of Information Technology in Healthcare: Artificial Intelligence, Internet of Things, and Personal Health Records | **2023** | * **Real-time Patient Monitoring:**   + AI is used for real-time patient monitoring and detection abnormal patient behavior form the data that is generated by IoT devices to provide insights and timely alters to healthcare providers. * **Resource Management:**   + AI with IoT improves the management of healthcare resources like tracking medical supplies and optimizing the logistic with in hospitals for better organizational management and cost reductions. | * **Decision-support**   + Strategic decisions | * Healthcare | Healthcare |
|  | Artificial intelligence techniques for cognitive sensing in future IoT: State-of-the-Art, potentials, and challenges | **2020** | * **Data Collection:**   + AI is used to facilitate smart, secure, and efficient data collection process. * **Energy Management:**   + AI is used for battery optimization of energy in IoT devices to help for minimize the energy consumption and improve efficiency. * **Prediction:**   + AI is used for event occurrences, energy consumption and availability as well as application loads, improving overall system efficiency. | * **Data pre-processing / management**   + Remove irrelevant or sensitive data. * **Decision-support**    + Operational decisions * **Prediction** | * Energy | “cognitive sensing” |
|  | Detecting Cybersecurity Attacks in Internet of Things Using Artificial Intelligence Methods: A Systematic Literature Review | **2022** | * **Enhance Intrusion Detection:**   + AI is used to identify unusual patterns and anomalies in vast amount of data generated by IoT devices. * **Prediction:**   + AI is used for classifying different types of cyberattacks and other malware attacks and predict potential threats. * **Real-time Monitoring and Response:**   + AI is used for real-time monitoring of IoT network, allowing for immediate detection and response to cybersecurity threats. * **Improve Accuracy and Efficiency:**   + AI can improve the accuracy and efficiency of cybersecurity solutions by continuously learning from new data and adapting to emerging threats. | * **Decision-support**   + Operational decisions * **Prediction** | * General | IoT security: attack detection |
|  | Artificial intelligence and IoT driven technologies for environmental pollution monitoring and management | **2024** | * **Real-time Data Analysis and Monitoring:**   + AI driven sensor systems integrated with IoT can effectively monitor environmental pollutants such as water, air and soil toxins. * **Prediction and Early Warning:**   + AI can analyze historical data and sensor readings to predict pollution levels and potential hazardous material releases. | * **Decision-support**   + Strategic decisions * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Environment * Public Safety | environmental pollution monitoring and management |
|  | Artificial intelligence-based decision-making algorithms, internet of things sensing networks, and deep learning-assisted smart process management in cyber-physical production systems | **2021** | * **Decision-Making**   + AI can analyze the large volume of data generated by IoT devices and make decisions to enhance productivity and efficiency. * **Real-time Monitoring:**   + AI is used in CPPs framework can analysed to monitor and optimize manufacturing process continuously. | * **Decision-support**   + Operational decisions | * Industry and manufacturing | process management in cyber-physical production systems |
|  | A Survey on Artificial Intelligence Aided Internet-of-Things Technologies in Emerging Smart Libraries | **2022** | * **Data Analysis and Management:**   + AI is used to process and analyze large volume of data collected by IoT devices and transform it into actionable insights. That enables libraries to make data-driven decisions and improving overall management and operations. * **Enhance Efficiency of Library:**   + AI enhance the efficiency of library services through automation and intelligent system. AI can assist in navigation and locating books, while natural language processing enables smart interaction between users and library system. | * **Decision-support**   + Strategic decisions * **Interaction with humans**   + Natural language understanding   + Speech synthesis | * Building and Homes | Libraries |
|  | AI-Enabled Sensing and Decision-Making for IoT Systems | **2021** | * **Decision Making:**   + AI is used to make autonomous decision making based on the data collected by IoT devices from various sensors. * **Recourse optimization:**   + Ai is used to optimize the performance of IoT system by efficiently managing resources and reducing waste. | * **Decision-making and acting**   + Resource allocation | * Healthcare | sensing and decision-making |
|  | A comprehensive survey on IoT and AI based applications in different pre-harvest, during-harvest and post-harvest activities of smart agriculture | **2024** | * **Enhance Data Analytics and Decision Making:**   + AI can analyze vast amount of data collected by IoT devices and make decisions. * **Intelligent Monitoring:**   + AI is used for intelligent monitoring of farm conditions which include crop growth, soil health and environmental conditions using various sensors and cameras. * **Optimize Resources:**   + AI helps in optimization of resources such as water, fertilizers and pesticides and recommend the precise amount of resources needed. | * **Decision-making and acting**   + Resource allocation * **Decision-support**   + Operational decisions | * Agriculture and farming | Harvesting |
|  | A Survey on Industrial Internet of Things Security: Requirements, Attacks, AI-Based Solutions, and Edge Computing Opportunities | **2023** | * **Intrusion Detection:**   + AI is used to identify and prevent unauthorized access and malicious activities in IoT network. AI analyze the vast amount of traffic network data in real-time for detecting anomalies and potential threats with high accuracy. | * **Pattern recognition / Classification / Identification**    + Diagnosis | * Industry and manufacturing * Vehicles and transportation | Industrial IoT security |
|  | Present and Future of AI-IoT-Based Healthcare Services for Senior Citizens in Local Communities | **2024** | * **Data Collection and Analysis:**   + AI is used to collect and analyze the vast amount of data from various IoT devices like glucometers, smart brands and blood pressure meters for continuous monitoring and real-time health assessment. * **Enhance User Experience:**   + AI is used to improve the user experience and user interface of health apps and make them more accessible and user friendly for the senior citizens. | * **Decision-support**   + Strategic decisions | * Healthcare | Healthcare Services for Senior Citizens |
|  | Survey on the AI and Spectrum Management for Cache-Enabled Internet of Things in Smart Cities | **2021** | * **Optimize Resources:**   + AI help to optimize system resources such as power allocation and bandwidth in IoT network it also improves the efficiency and performance of communication network. | * **Decision-making and acting**   + Resource allocation | * General (Smart cities) | Network management for Smart cities |
|  | Development of Advanced Artificial Intelligence and IoT Automation in the Crisis of COVID-19 Detection | **2022** | * **Enhance Monitoring and Data Collection:**   + AI with the help of IoT sensors that can collect the real-time data on various health metrics such as body temperature, cough patterns and body temperature. This data helps in early detection and monitoring of COVID-19 symptoms. * **Data-Driven Decision Making:**   + AI process data that is generated by IoT devices and provide actionable insights and support decision making in healthcare management. | * **Decision-support**   + Operational decisions | * Healthcare | Covid-19 pandemic |
|  | Analysis of IoT Security Challenges and Its Solutions Using Artificial Intelligence | **2023** | * **Anomaly Detection:**   + AI is used to detect unusual behaviors in IoT devices and identifying the patterns of attacks in the vast amount of data generated by IoT devices. * **Enhance Data Privacy and Integrity:**   + AI help in maintaining the integrity and data privacy by identifying and mitigating risks associated with data breaches and unauthorized access. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * Healthcare | IoT Security |
|  | IoT and artificial intelligence implementations for remote healthcare monitoring systems: A survey | **2021** | * **Data Collection and Analysis:**   + AI is used to collect and analyze the vast amount of data from various IoT devices like glucometers, smart brands and blood pressure meters for continuous monitoring and real-time health assessment. * **Analogy Detection:**   + AI is used to detect unusual behaviors in IoT devices and identifying the patterns of attacks in the vast amount of data generated by IoT devices. * **Improve Healthcare Service:**   + AI with IoT-driven healthcare system aim to improve the overall quality of healthcare services. | * **Data pre-processing / management**   + Remove irrelevant or sensitive data. * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Healthcare | remote healthcare monitoring systems |
|  | Artificial intelligence Internet of Things: A new paradigm of distributed sensor networks | **2022** | * **Energy Optimization:**   + AI is used to optimize the energy consumption and enhance the sustainability of IoT devices. * **Enhance Security:**   + AI is used to ensure data privacy and built trust within IoT ecosystem. | * **Decision-support**    + Operational decisions | * Agriculture and farming * Energy * Vehicles and transportation * Environment | Sensor networks |
|  | AI techniques for IoT-based DDoS attack detection: Taxonomies, comprehensive review and research challenges | **2024** | * **Attack Detection:**   + AI is used to analyze network traffic patterns and identify anomalous behavior indicative of DDoS attacks. * **Prediction:**   + AI is used to classify network traffic into malicious categories, aiding in the early detection of potential threats and predict complex attack patterns in real-time. | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * General | IoT security: DDoS attack detection |
|  | Distributed energy resources and the application of ai, iot, and blockchain in smart grids | **2020** | * **Enhance Decision Making:**   + AI is used to analyze real-time data from IoT devices, enabling predictive maintenance, optimizing energy distribution, and ensuring grid stability. * **Energy Optimization:**   + AI is used to optimize the usage of energy by integrating renewable energy sources and managing energy storage system efficiently. | * **Decision-support**    + Operational decisions | * Energy * Buildings and homes * Vehicles and transportation | energy management |
|  | Methods and applications for Artificial Intelligence, Big Data, Internet of Things, and Blockchain in smart energy management | **2023** | * **Enhance Smart Energy Management:**   + AI is used to enhance the smart energy management by enabling efficient monitoring, forecasting, and optimization of energy resources. * **Energy Theft Detection:**   + AI is used to identify the potential theft and irregularities in energy consumption, protecting resources and reducing losses. | * **Decision-support**    + Operational decisions * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Energy | energy management |
|  | Leveraging the power of internet of things and artificial intelligence in forest fire prevention, detection, and restoration: A comprehensive survey | **2024** | * **Prediction:**   + AI is used predict the likelihood of forest fire occurrences by analyzing various factors such weather condition, fuel availability and historical fire data. * **Early Detection:**   + AI with the help of ML and DL are used to detect fire at early stage. * **Resource Allocation:**    + AI helps in optimizations the resource allocation by analyzing the severity and spread of fires. This ensures that resources are used efficiently and directed to the area where they are most needed. | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection * **Prediction** * **Decision-making and acting**    + Resource allocation | * Disaster and emergency response | Forest fires |
|  | Machine learning techniques for IoT security: Current research and future vision with generative AI and large language models | **2024** | * **Anomaly Detection:**   + AI is used to detect anomaly in IoT network. AI is used for early detection of cyberattacks like DDoS or malware infection, preventing substantial damage. * **Real-time Monitoring:**   + AI helps in continuously monitor network traffic and device behavior in real-time to identify and respond to security breaches swiftly. * **Data Analysis and Resource allocation:** | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection * **Decision-support**   + Operational decisions | * General | IoT security |
|  | Building Resilience against COVID-19 Pandemic Using Artificial Intelligence, Machine Learning, and IoT: A Survey of Recent Progress | **2020** | * **Enhance Efficiency and Decision Making:**   + AI us used to enhance the efficiency and effectiveness of IoT systems in combating the COVID-19 pandemic. AI analyze the data collected by IoT devices to detect the abnormal health patterns and predict disease. | * **Decision-support**   + Operational decisions | * Healthcare | Covid-19 pandemic |
|  | Horizontally Distributed Inference of Deep Neural Networks for AI-Enabled IoT | **2023** | * **Enhance Efficiency:**   + AI is used to enhance the efficiency and capabilities of IoT systems, it also improve performance, reduce latency and optimize resource utilization. | * **Decision-support**   + Operational decisions | * General | Distributed neural networks |
|  | Progress in wearable electronics/photonics—Moving toward the era of artificial intelligence and internet of things | **2020** | * **Data Preprocess and Prediction:**   + AI enhance the ability of wearable sensors to process complex and diverse signals and improve the prediction accuracy. | * **Data pre-processing / management**   + Reducing noise | * Healthcare | Wearable devices |
|  | Internet of things, digital biomarker, and artificial intelligence in spine: Current and future perspectives | **2019** | * **Disease Diagnosis and Prediction:**   + AI is used to diagnosis diseases and predict treatment outcomes using clinical and genomic data. * **Real-time Monitoring:**   + AI is used for real-time monitoring of patients integrated with IoT devices. It analyzes the sensor data and provide meaningful feedback to the medical staff. | * **Decision-support**   + Operational decisions * **Prediction** | * Healthcare | Spine injuries |
|  | Enhancing water sustainability index assessment through risk management, iot, and artificial intelligence in water operation: a review | **2023** | * **Enhance the Accuracy and Efficiency:**   + AI is used to enhance the accuracy and efficiency of water sustainability assessment and operation. It is used to improve the risk management by analyzing data from IoT sensors, predicting water demand, optimize the water treatment process and identifying leaks in the water distribution network. | * **Decision-support**   + Operational decisions | * Environment | Water management |
|  | Environmentally sustainable smart cities and their converging AI, IoT, and big data technologies and solutions: an integrated approach to an extensive literature review | **2023** | * **Data Collection:**   + AI is used for data collection more efficiently, which is critical for real-time analysis and decision making in urban environment. * **Decision Making Support:**   + AI is sued to support and potentially automate decision making process, thereby optimizing the use of natural resources and improving the efficiency. | * **Decision-support**   + Operational decisions | * Energy * Environment | Smart cities: environmental sustainability |
|  | Evolution from ancient medication to human-centered Healthcare 4.0: A review on health care recommender systems | **2023** | * **Data Preprocessing and Decision Making:**   + AI is used to analyze the vast amount of data and convert them into meaningful decision through analysis. * **Disease Detection and Treatment:**   + AI is used for disease detection and classification, AI based advisory system ca assist in heart failure treatment and used for abnormality detection and cancer diagnosis. | * **Decision-support**   + Operational decisions * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Healthcare | Health Care Recommender Systems |
|  | Anomaly detection in autonomous electric vehicles using AI techniques: A comprehensive survey | **2022** | * **Anomaly Detection:**   + AI is used to identify deviations from normal behavior in AEVs. These anomalies could be indicative of security breaches or any other abnormal conditions. * **Enhance Security:**   + AI is used to detect and mitigate various security threats that AEV might face in the IoV ecosystem. | * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Energy * Vehicles and transportation * Environment | IoT security: Anomaly detection in autonomous vehicles |
|  | Emergency management systems using mobile cloud computing: A survey | **2023** | * **Enhance Decision Making Capabilities:**   + AI is used to enhance the decision-making capabilities of Emergency management system. Ai is used for advance data analysis and decision-making support, enabling the system to make accurate prediction and offer timely responses during the emergencies. * **Early Detection:**   + AI with IoT facilitates early detection and efficient management of emergencies, thus saving lives, reducing economic loss and protecting the environment. | * **Decision-support**   + Operational decisions * **Pattern recognition / Classification / Identification**    + Event/activity recognition/detection | * Disaster and emergency response | Emergency management |
|  | A systematic review of IoT communication strategies for an efficient smart environment | **2022** | * **Data Analysis and Processing:**   + AI is used to analyze and process the vast amount of data generated by IoT devices. This includes data filtering, classification and real-time analysis to ensure that relevant information extracted and utilized efficiently. * **Enhance efficiency and security:**   + AI is used to enhance the security and privacy of IoT communication, that helps in detecting and mitigating security threats and ensure the integrity of data transmitted across the network. | * **Data pre-processing / management**   + Reducing noise   + Filling in missing data * **Pattern recognition / Classification / Identification**   + Authentication | * Environment * Healthcare * Industry and manufacturing | Networking: communication strategies |
|  | Review of security issues in Internet of Things and artificial intelligence-driven solutions | **2023** | * **Enhance Security and Privacy:**   + AI is used to enhance the security and privacy of IoT systems by providing intelligent, automated solutions to handle and mitigate various cyber threats. * **Real-Time Threat Detection:**   + AI is used for real time thread detection. | * **Pattern recognition / Classification / Identification**   + Diagnosis   + Authentication | * Buildings and homes * Industry and manufacturing * Healthcare | IoT security |
|  | Artificial intelligence empowered threat detection in the Internet of Things: A systematic review | **2021** | * **Improve Detection Accuracy:**   + AI is used to improve the detection accuracy and enable real-time threat response by analyzing system calls, network traffic and behavioral patterns. | * **Pattern recognition / Classification / Identification**   + Event/activity recognition/detection | * General | IoT security: threat detection |