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REAL TIME AWSS INTEGRATION WITH CENTRALISED MILITARY CLOUD DATABASE AND ML

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ABSTRACT

This paper explores the integration of automatic weapons systems (AWSs) with military cloud computing, databases, and machine learning (ML). Cloud-based ML offers advantages for AWS by enabling faster data processing, improved target recognition, and real-time decision-making. However, the integration presents challenges in communication, data security, and ethical considerations. The paper investigates these challenges and proposes solutions for secure, reliable, and responsible implementation. By examining the technical aspects and ethical implications, this research aims to inform the development of a robust framework for integrating AWS with military cloud and ML technologies. This framework can ensure the effectiveness of AWS while maintaining ethical principles and mitigating safety risks.

Keywords - Log Automatic Weapons Systems (AWSs), Machine Learning (ML), Cloud Computing.

[1] INTRODUCTION

1. **Enhanced decision-making:** Cloud-based data storage and processing can provide AWS with access to vast amounts of real-time information, enabling them to make faster and more accurate decisions.
2. **Improved target recognition:** Machine learning algorithms can be trained on extensive datasets to improve target identification and classification, reducing the risk of civilian casualties.

3. **Increased operational efficiency:** Cloud computing can streamline communication and data sharing between AWS and human commanders, leading to more efficient operations. However, there are also significant challenges associated with this integration.
4. **Communication security:** Ensuring secure communication channels between AWS and the cloud is critical to prevent hacking and manipulation.
5. **Data security:** Protecting sensitive military data stored in the cloud is essential to national security.
6. **Ethical considerations:** The use of automatic weapons raises ethical concerns about accountability, proportionality, and the potential for unintended harm.
7. **Machine Learning algorithms**: These will play a vital role to reduce complexity and minimizes manual efforts in these major IT operations. Also, we can leverage Machine Learning algorithms for better system health monitoring, to reduce operations cost, to reduce mean Time to detect (MTTD).

[2] TECHNICAL ASPECTS

Architecture for Integrated Systems:

Integrated systems will be a system of various smaller systems, which will further consist of various sub systems.

[1] Automatic Weapon System:

Automatic Weapon System is a system having various sub systems like sensors, communication module, processing unit, weapon(s) system. These together forms an automatic weapon that can detect, execute attack orders, pass on information and in case needed work autonomously.

- **Sensors:** These are eyes, ear, and nose of a weapon system. Sensors help weapon to be aware of surroundings eg. Temperature, enemy position, wind speed, elevation, terrain, obstacles, system analyser etc.
  Different weapon system will have different set of sensors depending on need to need basis.
- **Communication System:** This sub system helps exchange data and communicate within network securely. It houses visual range (VR) and beyond visual range (BVR) communication equipment.
- **Processing System:** As the name suggests this sub system is responsible for all the processing be it data from sensors, operational tasks execution or managing communication with network.
- **Weapon Effectors:** These are the physical weapon systems like gun missile launcher, grenade launcher, howitzers etc.

[2] Military Cloud Infrastructure:

Military cloud infrastructure provides technology to collect process and share data across military network.

- **Data Storage:** It consists of storage units that houses a vast amount of real-time operational data and training data for ml algorithms. Any authorised device in network is able to access data storage.
- **Processing power:** It provides computational resources for real time data processing and machine learning tasks. Also, this enables use of AI in operational tasks.
- **Security Measures:** Safety and security of stored data are equally important so it consists of firewalls, encryption, and intrusion detection system to safeguard data and processes

[3] Machine Learning (ML):

- **Algorithms:** Trained on labelled datasets to perform tasks like target recognition, threat assessment, and decision support.
- **Training Data**: Historical data on targets, environments, and past operations.
- **Real-time Updates**: Continuously refines ML models with new data from the field.

[4] Communication Links:

- **Secure Channels:** Encrypted communication between AWS, cloud, and human operators to prevent unauthorized access.
- **Protocols:** Standardized formats for data exchange to ensure system interoperability.

[5] Human-Machine Interface (HMI):

- **Command and Control Centre:** Provides human oversight and control over AWS operations. Human commander has the final authority to order for lethal action.
- **Real-time Monitoring:** Enables operators to monitor the battlefield situation and AWS actions in real time, increasing situational awareness and provide a strategic advantage over the enemy.
- **Final Decision-Making Authority:** Humans have the ultimate control over weapon engagement. A set of command orders is mandatory for ordering lethal actions. Uses humans in loop system (HITS) for ensuring utmost safety.

[3] CONCLUSION:

In this paper, we analyse the integration of automatic weapons systems (AWS) with military cloud computing, databases, and machine learning (ML). Cloud-based ML offers advantages for AWS in decision-making, target recognition, and operational efficiency. However, security concerns and ethical issues necessitate a cautious approach.

The proposed architecture integrates AWS hardware and software with secure cloud storage, processing power, and communication channels. Machine learning algorithms analyze data and provide decision support, but human operators maintain ultimate control through a Human-Machine Interface (HMI).

Security measures like encryption and intrusion detection protect against cyberattacks and data breaches. Rigorous testing and ethical guidelines are crucial to mitigate bias in ML algorithms and ensure responsible use.

This framework prioritizes human oversight and adheres to international law. Further research is needed to address the legal and social implications of autonomous weapons in warfare. By prioritizing responsible innovation, this integration has the potential to enhance military capabilities while upholding ethical principles.

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