

ROBOTICS IN DEFENCE

Members:

Caeden Kwang, Yu Simu, Jonathan Wirawan
(NUS High School of Mathematics and Science)
Chistine Lee Lin Shan, Grace Julianne Hartawan,
Dhurga Dharshini Rajagopal
(Raffles Girls' School)

Introduction to robotics:

A field combining engineering, computer science and technology

- Create autonomous machines
- Mimic human actions, can work in hazardous environments
- Manufacturing, healthcare, exploration, household chores

Integration of AI helps the robot to adapt to new tasks, improving efficiency, precision and safety

Motivation for using robotics in defence:

- Enhances safety of human soldiers
- Improve operational efficiency and consistent precision
- Force multipliers -> extend capabilities of military units
- Enhanced battlefield intelligence and situational awareness

Over time, robotics can be cost-effective and provide a technological edge over adversaries, ensuring better preparedness and responsiveness in combat scenarios

Requirements of robots for military use:

- Durability of robots in harsh environments
- Advanced autonomy for minimal human intervention
- Sophisticated AI for decision-making and data analysis
- Consistent performance
- Cost-effectiveness and ease of maintenance

Roles that robots play in the military:

- Reconnaissance
- Direct combat

Potential issues and ways to address them:

Potential issue	Solution
Lack of human judgement → unintended consequences	Incorporate human oversight to allow human intervention
Potential cyberattacks	Deploy cybersecurity measures
Ethical concerns & accountability	Implement strict guidelines and adhere to humanitarian laws

Examples of military robots:

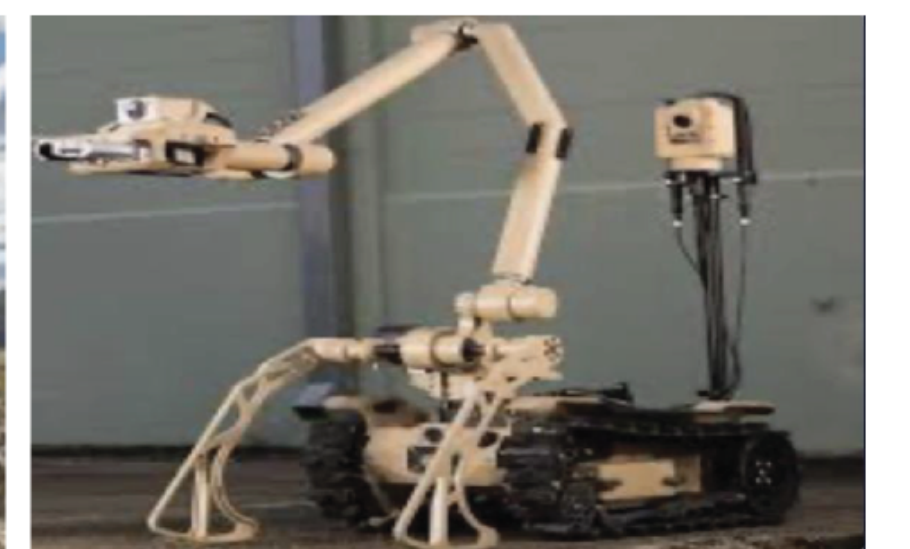
Unmanned Ground Vehicles (UGV)



Transport



Combat

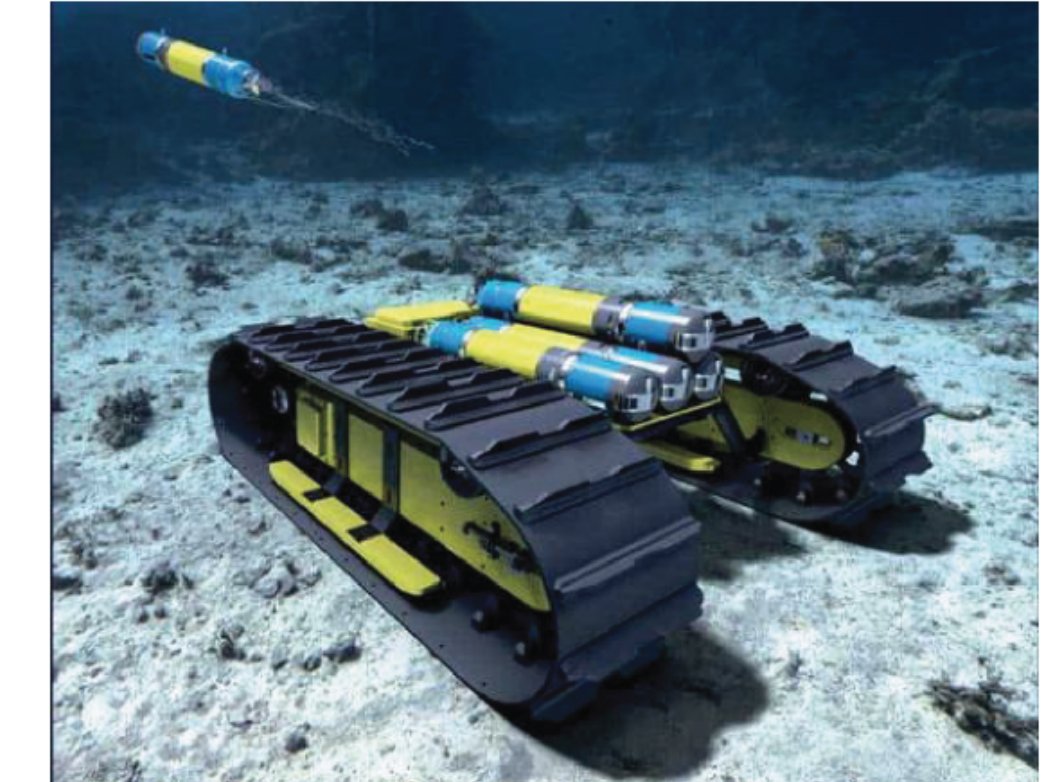


Explosive Defusal

Autonomous Underwater Vehicles (AUV)



Reconnaissance AUVs



Search and Rescue Robots

Unmanned Aerial Vehicles (UAV)



Surveillance Drones



Attack Drones

Image credits:

https://www.realcleardefense.com/2021/01/05/army_seeks_robots_to_transport_wounded_troops_655295.html
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<https://www.nytimes.com/2024/12/09/technology/google-quantum-computing.html>

Future possibilities of robotics for military use:

Nanotechnology



Combat Robots



Hypersonic Vehicles



Quantum Computing/Cryptography

