

ROBOTICS

ALGORITHM

**Welcome
to the
Presentation !!!**





Robots & Computers in Defense.

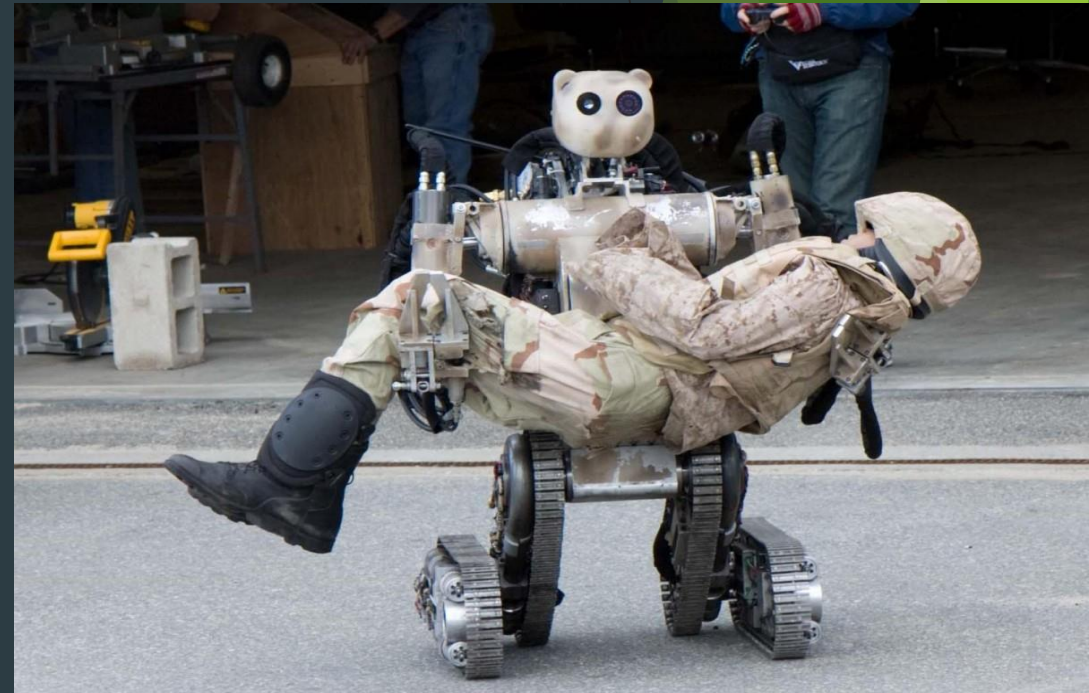
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Importance

With the World evolving the Governments are also on a mission to evolve their defense capabilities. They are investing billions into robotics and AI because of its potential to reduce

- Costs.
- Boost capabilities.
- Save lives.



Types of Military Robots

These are the some examples of how technology being used in defense

- ▶ UAVs.
- ▶ UGVs.
- ▶ Humanoid Robot Soldiers.
- ▶ Armed Soldier Exoskeletons.
- ▶ Autonomous Ships.
- ▶ Autonomous Submarines.



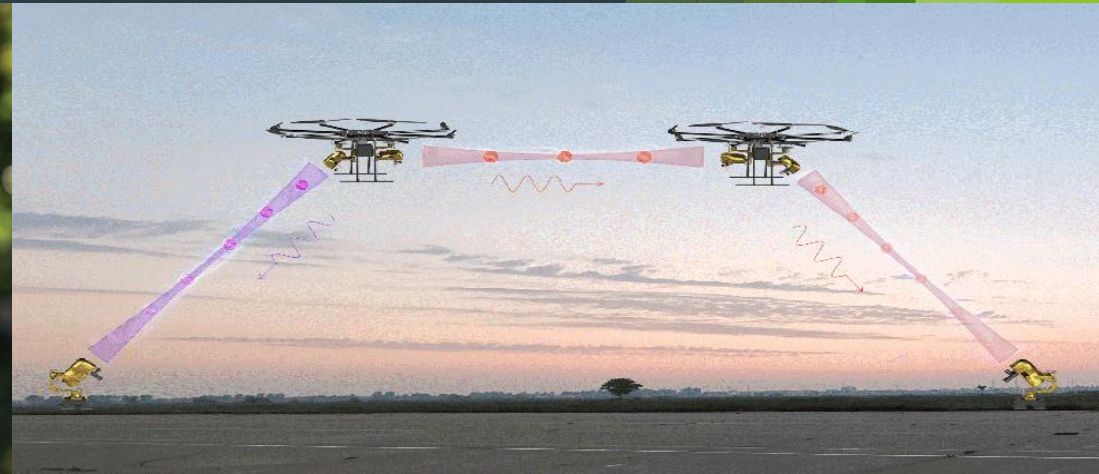
Unmanned Aerial Vehicles

- ▶ These are commonly called drones.
- ▶ They can be operated without pilots.
- ▶ These are remotely controlled.
- ▶ They are fitted with high precise cameras.
- ▶ They are more efficient than manned aircrafts.
- ▶ They can be simple or advanced.



Importance of UAVs

- ▶ They are used for observation.
- ▶ It helps to make a plan.
- ▶ It helps to complete dangerous tasks.
- ▶ It captured the disasters sites.
- ▶ It helps in communication.
- ▶ It can help save lives.



Examples

- ▶ Israeli-US Hunter.
- ▶ The UK Watchkeeper.
- ▶ US Boeing Eagle Eye.
- ▶ GIDS HUMA .
- ▶ GIDS Shahpar.
- ▶ Falco.



Unmanned Ground Vehicles

- ▶ An unmanned ground vehicle (UGV) is a vehicle that operates while in contact with the ground and without an onboard human presence.
- ▶ the vehicle will have a set of sensors to observe the environment.
- ▶ will either autonomously make decisions about its behavior or pass the information to a human operator at a different location who will control the vehicle through teleoperation.



Importance of UGVs.

- ▶ they can additionally avail in logistics operations.
- ▶ Predominantly these vehicles are used to replace humans in hazardous situations.
- ▶ UGVs are used in many emergency situations including Urban search and rescue.
- ▶ UGV use by the military has saved many lives.
- ▶ They can detect land mines.
- ▶ They are used to transferring goods.
- ▶ UGVs can be used to traverse and map mine tunnels.



Examples

- ▶ SARGE.
- ▶ X-2.
- ▶ Big Dog.
- ▶ Platform-M UGV.
- ▶ Autonomous Solutions.
- ▶ Clearpath Robotics.
- ▶ DRDO Daksh.
- ▶ Foster-Miller TALON.



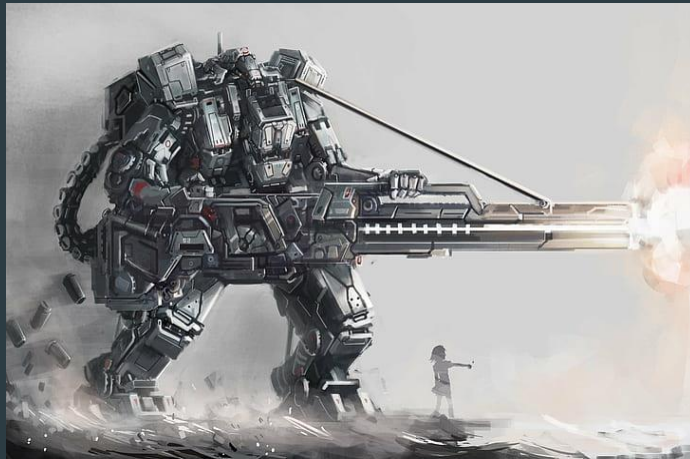
Humanoid Robots.

- ▶ It is a robot resembling the human body in shape.
- ▶ Robots are being made to replace human soldiers.
- ▶ They are equipped with weapons.
- ▶ They have the ability to make decisions.
- ▶ The design may be for functional purposes.
- ▶ humanoid robots have a torso, a head, two arms, and two legs.



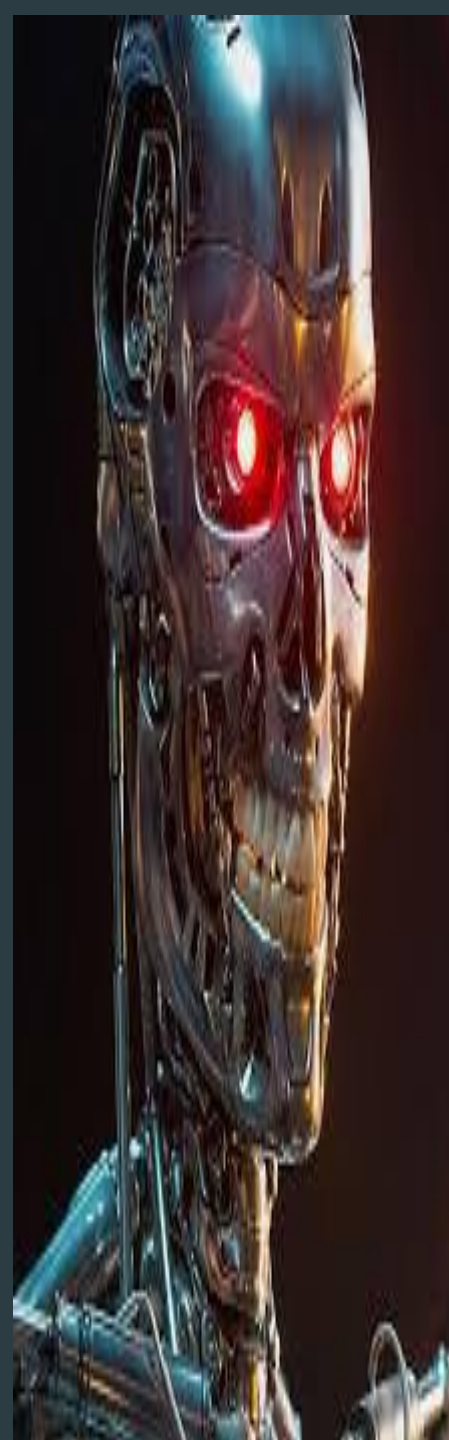
Importance

- ▶ perform any task a human being can.
- ▶ Humanoid Robots can be used in everyday life where they can do the jobs that the people wouldn't want to do.
- ▶ They will do cheaply & easily many tasks that the human workers do now.
- ▶ they can be used as ultimate helpers in man-made & natural disasters.
- ▶ has been trained to shoot from both hands.



Examples

- ▶ AVATAR III.
- ▶ DOGO.
- ▶ SAFFiR.
- ▶ MUTT.
- ▶ Guardbot.
- ▶ Gladiator.
- ▶ FEDOR.



Exoskeleton

- ▶ A real life power suit.
- ▶ Battery powered suit.
- ▶ High quality sensors.
- ▶ A helmet with a digital vision.
- ▶ Supports and protects an animal's body.
- ▶ a wearable mobile machine that is powered by a system of electric motors.



Importance

- ▶ Enhances strength and endurance to carry taxing loads over distance
- ▶ Enables better handling and support for heavy weapons
- ▶ Reduces metabolic cost of transport to improve endurance and reduce fatigue
- ▶ Increases ability to traverse stairs, inclines, and rough terrain, especially with load
- ▶ Reduces stress on leg muscles
- ▶ Guides orthopedic alignment to help evenly distribute weight and maintain skeletal system alignment to avoid overstress and pressure injuries.
- ▶ Provides Bomb protection in attacks.



Examples

- ▶ Marine Mojo by 20KTS+
- ▶ Terra Mojo by 20KTS+
- ▶ Operations Exoskeleton by DSTO (Australia's Defense Science and Technology Organization).
- ▶ TALSO.
- ▶ ONYX.



Unmanned Surface Vehicles.

- ▶ Maritime autonomous surface ships (MASS).
- ▶ They can transport either containers or bulk cargo over navigable waters with little or no human interaction.
- ▶ They can be monitored through near by manned ship and through AI.
- ▶ USVs operate with various levels of autonomy, from simple remote control,¹ to autonomous COLREGs compliant navigation.
- ▶ Uncrewed Surface Vessels.



Importance.

- ▶ The USV are usually resistant, stable, stealthy, fast and highly maneuverable.
- ▶ normally its main military application is act as maritime mobile target for military training and for tests of defense systems.
- ▶ It used as a protection forces, anti-piracy forces, anti-terrorism forces.
- ▶ It use in surveillance and reconnaissance, electronic warfare and mining.
- ▶ It can be equipped with stabilized weapons systems.
- ▶ It has electro optical tracking systems capable of monitoring both day and night by using infrared vision.



Examples.

- ▶ British RNMB Harrier in 2020, autonomous USV of the Atlas Elektronik ARCIMS mine warfare system.
- ▶ A passenger USV demonstration at Hampton, Virginia, USA in January 2009.
- ▶ USV used in oceanographic research, June 2011.
- ▶ A saildrone in Dutch Harbor, Alaska, after the 2019 NOAA Arctic missions.
- ▶ Sea Hunter.
- ▶ ALBATROS-T.
- ▶ ALBATROS-K.
- ▶ ULAQ.



Unmanned underwater vehicles

- ▶ In short it is called UUVs.
- ▶ sometimes known as underwater drones.
- ▶ **submersible vehicles that can operate underwater without a human occupant.**
- ▶ ROUVs are remotely controlled by a human operator.
- ▶ AUVs are automated and operate independently of direct human input.



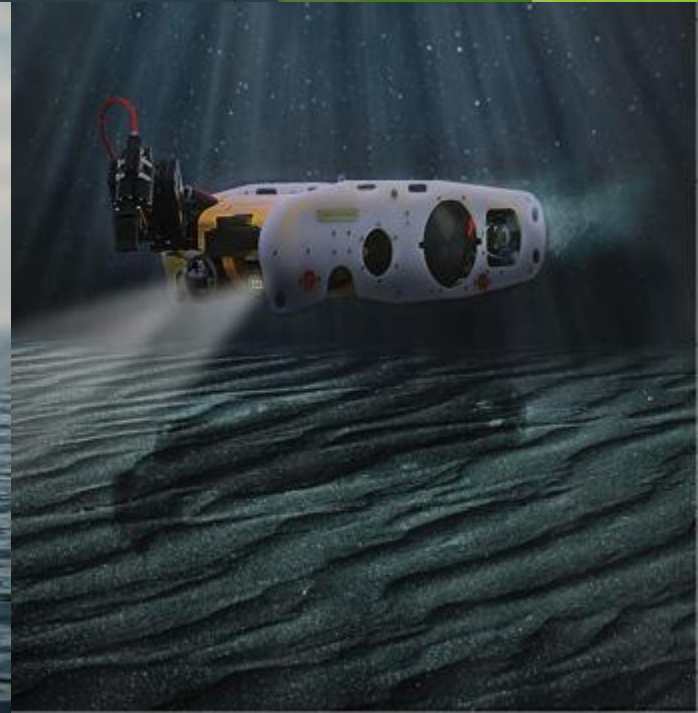
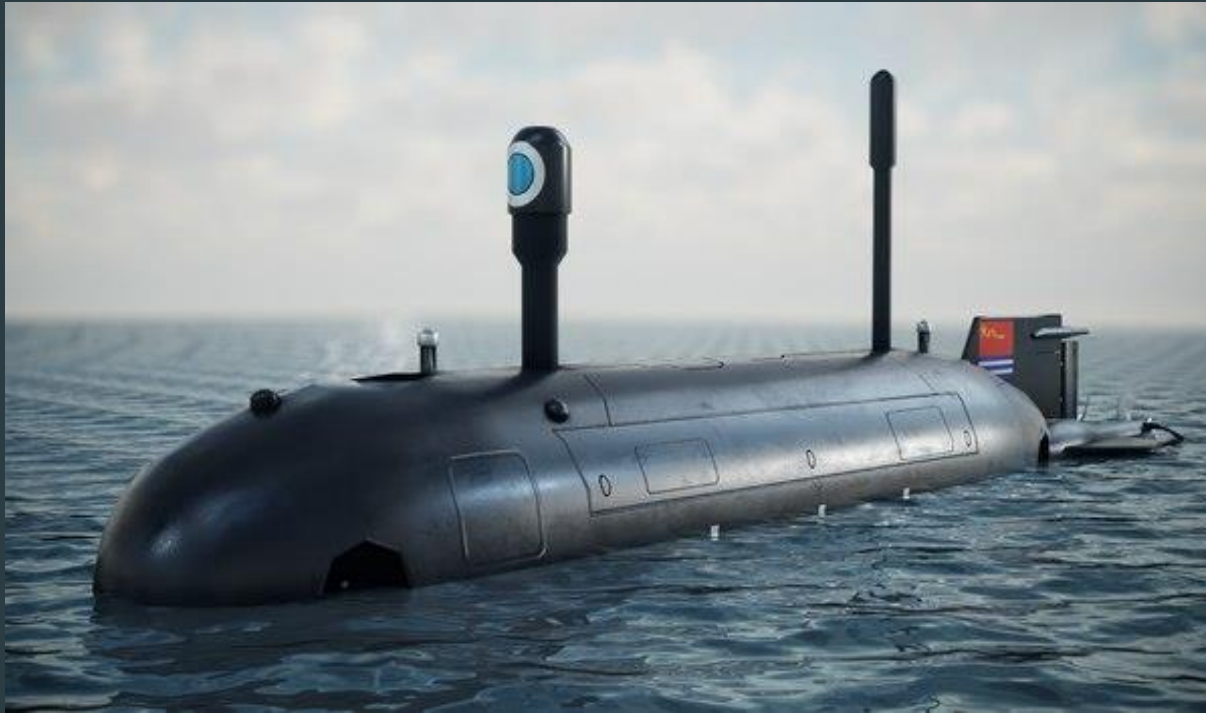
Importance.

- ▶ Starting in 1957, the first unmanned underwater vehicle (UUV) was classified as an autonomous underwater vehicle (AUV).
- ▶ With the development of a propulsion unit that does not require oxygen or hydrogen.
- ▶ the ability for the UUV to stay continuously underwater increases drastically.
- ▶ **Lithium and water power source.**
- ▶ The US Navy began using UUVs in the 1990s to detect and disable underwater mines.
- ▶ The Chinese military uses UUVs for mostly data collection and reconnaissance purposes.
- ▶ It is used for Deep-sea exploration and research.



Example.

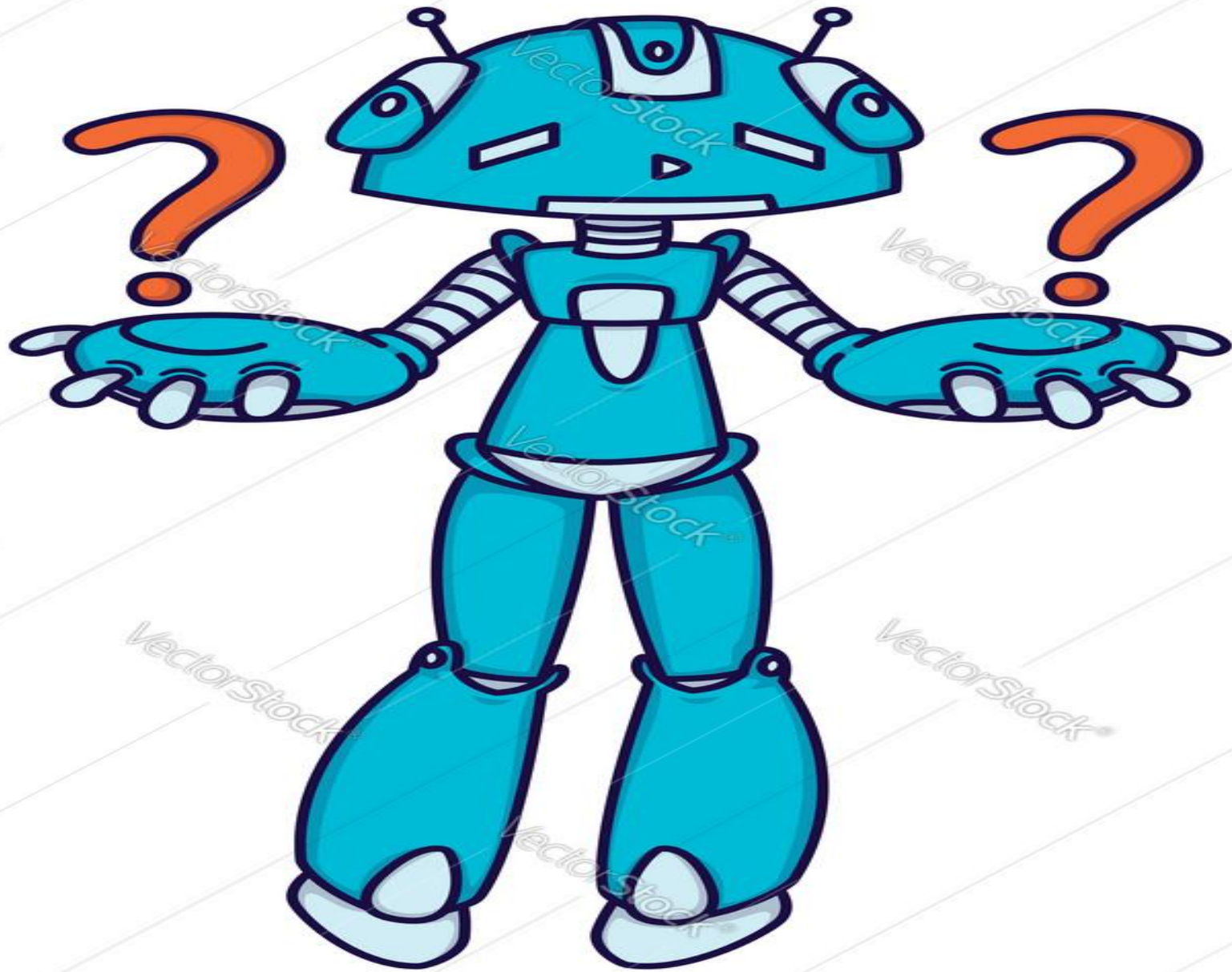
- ▶ REMUS.
- ▶ Saab's Sea Wasp.
- ▶ Gavia AUV underwater surveying ocean floor.
- ▶ Saab's AUV62-AT.



Advantages of AI in Military.

- ▶ Lesser casualties.
- ▶ Robots can reach places too dangerous for humans.
- ▶ Better vision and decision-making abilities.
- ▶ Robots don't express stress.
- ▶ They don't get tired





THANKS

