RECENT DEVELOPMENT IN ROBOTICS

MODULE 6

HUMANOID SOCIAL ROBOTS

ASIMO

ASIMO (**Advanced Step in Innovative Mobility**) is a humanoid robot created by Honda.

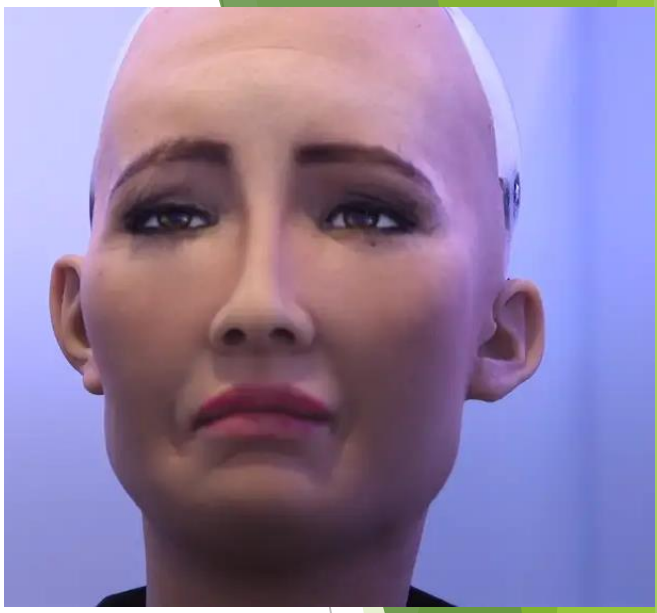
ASIMO has the ability to recognize moving objects, postures, gestures, its surrounding environment, sounds and faces, which enables it to interact with humans. The robot can detect the movements of multiple objects by using visual information captured by two camera "eyes" in its head and also determine distance and direction allowing it to follow or face a person when approached. The robot interprets voice commands and human gestures, enabling it to recognize and respond when a handshake is offered.

PEPPER

Pepper Robot, Softbank Robotics

Pepper is the world's first robot that is capable of recognizing human emotions. Pepper is social, capable of having conversations with people, giving them directions and even dancing with them

SOPHIA



Sophia is a realistic humanoid robot capable of displaying humanlike expressions and interacting with people. It's designed for research, education, and entertainment, and helps promote public discussion about AI ethics and the future of robotics.

Sophia became a Saudi Arabian citizen, the first robot to receive citizenship of any country.

Vyommitra

Female spacefaring humanoid robot being developed by the Indian Space Research Organisation to function on-board the *Gaganyaan*, a crewed orbital spacecraft. Vyommitra was first unveiled on 22 January 2020 at the *Human Spaceflight and Exploration symposium* in Bengaluru.

It will accompany Indian astronauts in space missions and will also be a part of uncrewed experimental *Gaganyaan* missions prior to the crewed spaceflight missions.

NON-HUMANOID SOCIAL ROBOTS:

PARO

Paro Robot Seal

Paro is a therapeutic baby seal robot, intended to be cute in order to have a calming effect on patients in hospitals and nursing homes.Paro works in a similar way to animal-assisted therapy and has been found to calm people, especially with diseases such as dementia. But without the difficulties or risks associated with live animals.

BUDDY

Buddy has been developed by Blue Frog Robotics and is designed as a emotional companion robot to be used in the home. Buddy connects, interacts and even protects people in the home.

Buddy is designed to be your personal assistant, watch over your home while you're away and even entertain children with games and other interactivities.

MEDICAL ROBOTS

The da Vinci single-port surgical system, from Intuitive Surgical

Robotic surgery represents one of the most important medical innovations in recent years. More robotic platforms are emerging, although how widespread their availability and use will be will depend on factors such as cost.

The California-based company Intuitive Surgical, maker of the da Vinci platform, is a pioneer and a global market leader in the field of surgical robotics, and continues to push the boundaries.

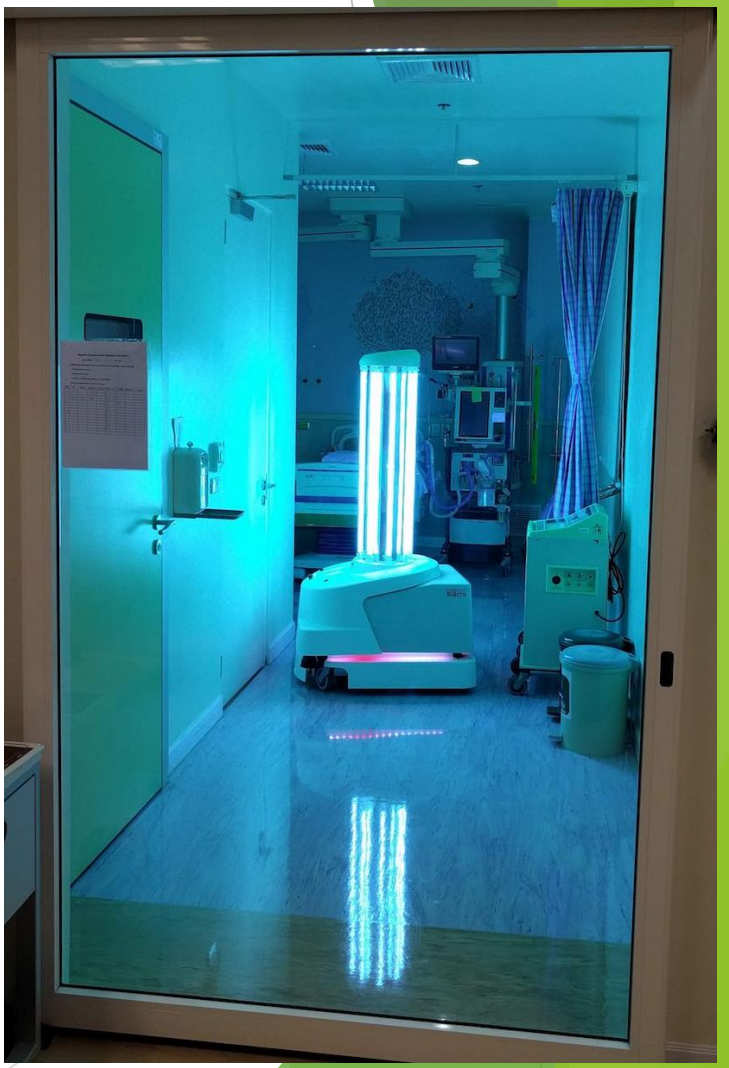
The company recently launched its da Vinci single-port system. Through a 2.5-centimetre cannula and small incision, the surgeon can control three fully articulated – as with wrists and elbows – instruments, combined with an endoscope and treat deep-seated damaged or diseased tissues or organs.

Covid-19

The robots have been dispatched to fight covid-19 through out china.

UVD Robots is a Danish company making robots that are able to disinfect patient rooms and operating theaters in hospitals. They're able to disinfect pretty much anything you point them at—each robot is a mobile array of powerful short wavelength ultraviolet-C (UVC) lights that emit enough energy to literally shred the DNA or RNA of any microorganisms that have the misfortune of being exposed to them.

The robot consists of a mobile base equipped with multiple lidar sensors and an array of UV lamps mounted on top. To deploy a robot, you drive it around once using a computer. The robot scans the environment using its lidars and creates a digital map. You then annotate the map indicating all the rooms and points the robot should stop to perform disinfecting tasks.



INDUSTRIAL ROBOTS:

VALKYRIE ROBOT

Developed in collaboration with NASA and the University of Edinburgh, Valkyrie is one of the most advanced humanoid robots in the world. Valkyrie has been designed with the ability to one day assist the setup of habitats on mars prior to human arrival.

Valkyrie is designed to work in environments too hazardous for astronauts which would allow for the building of safer habitats and colonies on mars.

ATLAS

Atlas is a bipedal humanoid robot primarily developed by the American robotics company Boston Dynamics. Atlas is equipped with two vision systems and has hands with fine motor skill capabilities. Its limbs possess a total of 28 degrees of freedom.On February 23, 2016, Boston Dynamics, released video of a new version Atlas robot that is designed to operate both outdoors and inside buildings. It is very adept at walking over a wide range of terrain, including snow, and can do back flips and cartwheels. It is electrically powered and hydraulically actuated. It uses sensors in its body and legs to balance, and it uses LIDAR and stereo sensors in its head to avoid obstacle.

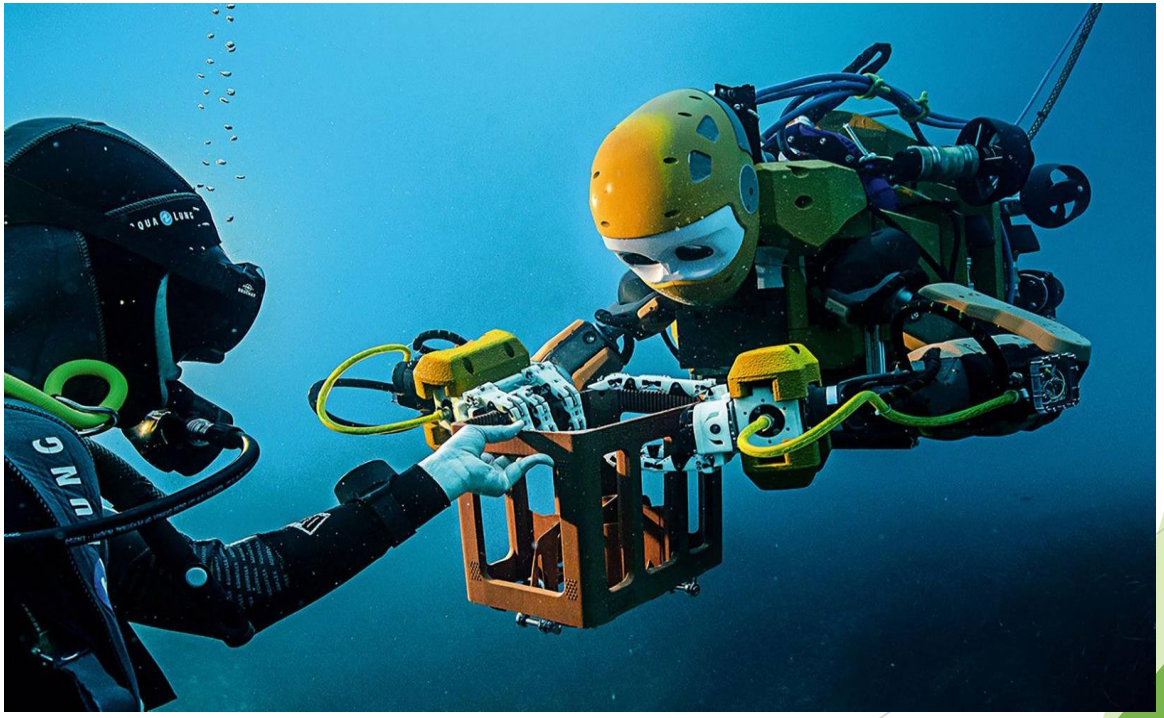
SMART SPEAKERS

A smart speaker is a type of speaker and voice command device with an integrated virtual assistant that offers interactive actions and hands-free activation with the help of one "hot word" (or several "hot words"). Some smart speakers can also act as a smart device that utilizes Wi-Fi, Bluetooth and other protocol standards to extend usage beyond audio playback, such as to control home automation devices. This can include, but is not limited to, features such as compatibility across a number of services and platforms, peer-to-peer connection through mesh networking, virtual assistants, and others. Each can have its own designated interface and features in-house, usually launched or controlled via application or home automation software. Some smart speakers also include a screen to show the user a visual response

OCEANONE

Stanford engineers have built a robot scuba diver that will pick your way through a coral reef or a decaying shipwreck. Named OceanOne, the robot commands some of the most human like qualities of any remote-controlled machine designed to withstand ocean pressures at depths of hundreds of meters.

OceanOne is roughly person-sized, has binocular vision in a head that looks like Mega Man's, and trawls the deep with the use of two arms and hands that send back haptic data to its operator.



EMILY

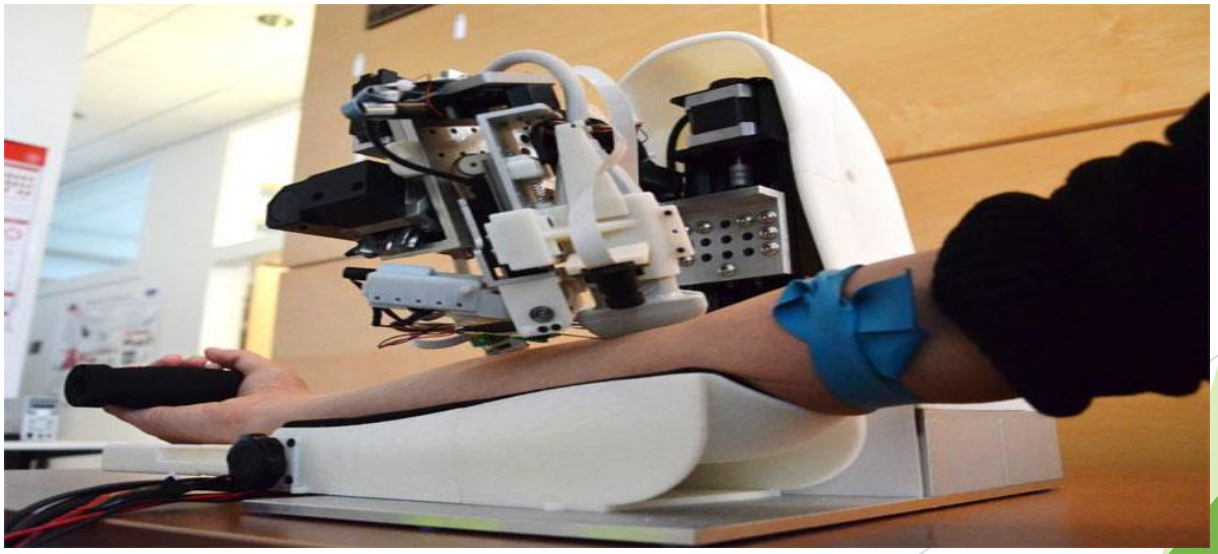
E.M.I.L.Y(acronym for **Emergency Integrated Lifesaving Lanyard**) is a robotic device used by lifeguards for rescuing swimmers. It operates on battery power and is operated by remote control after being dropped into the water from shore, a boat or pier, or helicopter. Using an impeller motor to travel through water, it is able to reach victims much faster than a human lifeguard can by swimming. Once it reaches the victims its foam core allows it to function as a flotation device for up to 4-6 people holding onto side ropes or handles.

EMILY assisted the Red Cross and other lifeguard organizations to help 250+ syrian refugees safely come ashore on Lesvos.

Robot to draw blood

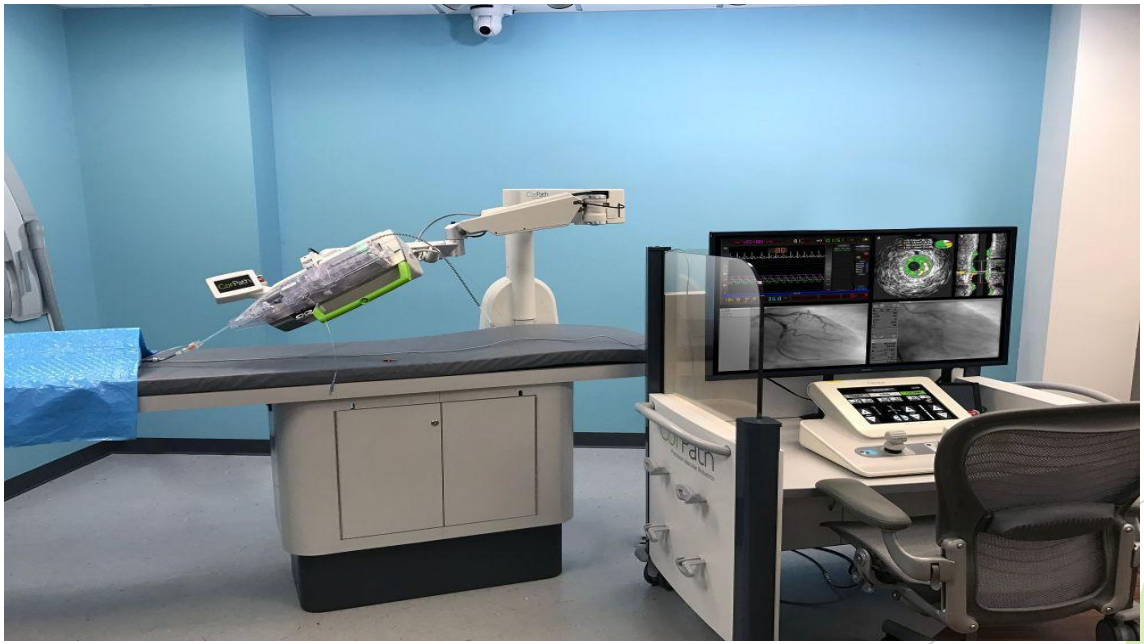
Rutgers University engineers have created a tabletop device that combines a robot, **artificial intelligence**, and near-infrared and ultrasound imaging to draw blood or insert catheters to deliver fluids and drugs.

The device can accurately steer needles and catheters into tiny blood vessels with minimal supervision. It can perform complex visual tasks, including identifying the blood vessels from the surrounding tissue, classifying them, and estimating their depth, followed by motion tracking. Robotic cannulation is driven by predictions from a series of deep convolutional neural networks that encode spatiotemporal information from multimodal image sequences to guide real-time motion control of the robot.



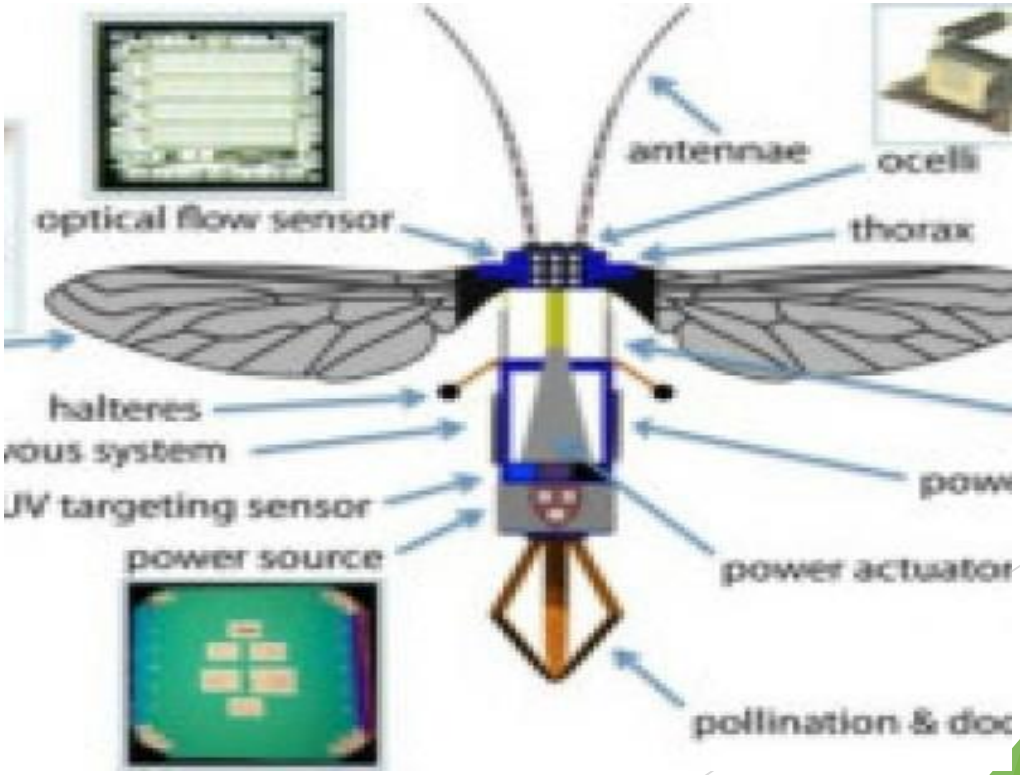
ROBOTS FOR TREATING BRAIN ANEURYSMS

LOS ANGELES -Robotic technology is used in surgery and cardiology, but not for brain vascular procedures. Researchers have found that using a robot to treat brain aneurysms is feasible and could allow for improved precision when placing stents, coils and other devices. They used a robotic system specifically adapted for neurovascular procedures. Software and hardware adaptations enable it to accommodate microcatheters, guidewires and the other devices used for endovascular procedures in the brain. These modifications also provide the operator with additional precise fine-motor control compared to previous system models.



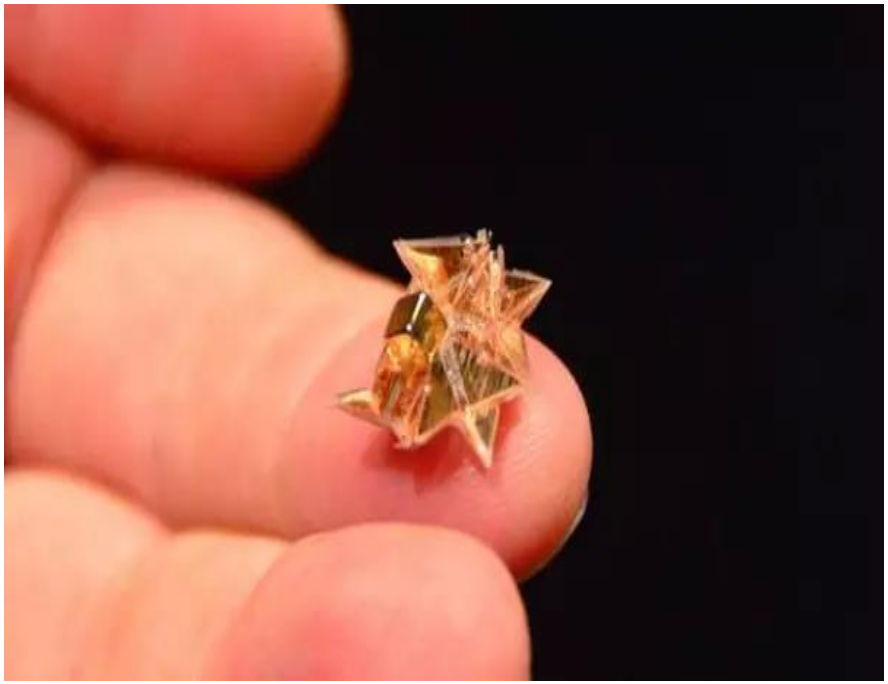
RoboBee

RoboBee is a tiny robot capable of partially untethered flight, developed by a research robotics team at Harvard University. The goal of the RoboBee project is to make a fully autonomous swarm of flying robots for applications such as search and rescue, surveillance and artificial pollination.RoboBee's wingspan is 3 centimeters (1.2 in), which is believed to be the smallest man-made wingspan to achieve flight. The wings can flap 120 times per second and be controlled remotely in real time. Each RoboBee weighs 80 milligrams (0.0028 oz).



Tiny Origami Robots

A pill-sized origami robot, which will help motor the unwanted plastic and other non-dissoluble objects safely out of the digestive system.The ‘ingestible’ robot can fold up inside a pill that is to be swallowed. Once it goes down the throat and reaches the stomach, it will unfold itself, following which it can be navigated around to clear the patch wounds or anomalies by doctors from outside by external magnetic fields.



Domino’s Delivery Robot

- The Domino’s Robotic Unit (DRU) is a ground drone that is able to navigate to the customer’s doorstep with the help of sophisticated on-board sensors. And here’s the best part it keeps the food piping hot by warming it in its on-board oven along the way. Domino’s created the robot with the help of Marathon Robotics. The design was based on a military drone and its cargo hold is PIN-code protected . DRU is undergoing early testing in Australia, which will hopefully lead to these things being deployed further a field. After all, drone deliveries are almost a thing.