

# Robotics: Survey of its Various Possible Applications

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**Abstract**— Robot is a mechanical system which performs automated actual tasks, either according in order to direct human supervision, a pre-defined program, or maybe a set of general guidelines using artificial intelligence tactics. In this article, firstly a brief introduction on robotics and its applications are discussed. This article is an outcome of the study oriented project and consist the basic information of Robotics and its possible applications in all fields of our modern world. The article consist a brief detail regarding the laws of robotics, their types and basic information about their origin and invention.

**Index Terms**— Robotics, Applications of Robots, Survey

## 1 INTRODUCTION

In practical usage, any Robot is a mechanical system which performs automated actual tasks, either according in order to direct human supervision, a pre-defined program, or maybe a set of general guidelines using artificial intelligence tactics. Robots are typically i did so the tasks that are far too dirty, dangerous, difficult and insistent or dull for humanity. This usually takes the sort of industrial robots used in manufacturing lines. Other purposes include toxic waste killing, underwater and space exploration, mining, search and rescue, and mine finding. Of late however, robots are showing up in the consumer market having uses in entertainment, vacuuming, and lawn mowing. A robot may include a opinions-driven connection between perception and action, not nether direct human control, even though it may have a man override function. The action may take the way of electro-magnetic motors or perhaps actuators (also called effectors) that move an equip, open and close holds, or propel the robot. The step by stage control and feedback will be provided by a programme run on either or embedded computer or a microcontroller. By this definition, some sort of robot may include nearly most automated devices. Ask a number of people to describe a robot and most of them will answer they resemble a human. Interestingly some sort of robot that looks like a human is probably the most difficult robot to make. It generally is a waste of time rather than the most sensible factor to model a robot after a human getting. A robot needs to be first and foremost functional and designed along with qualities that suit its primary tasks. It is dependent upon the task at hands whether the robot is big, small, is able to move or nailed to the ground. Each and every activity means different qualities, shape and function; a robot needs to be designed with the task in mind [1, 2].

### 1.1 History of Robots

The word robot was introduced in 1920 in by Karel Capek termed R.U.R. or perhaps Rossum's Universal Robots. Robot comes from the Czech word robota, significance forced labour or donkeywork. In the play, human being-like mechanical creatures manufactured in Rossum's factory are gentle slaves. Since they are just machines, the robots are usually badly treated by humanity. One day a misguided scientist gives them emotions, and the robots uprising, kill nearly all world and take over the planet. However, because they are unable to reproduce themselves, the spiders are doomed to die. The term robotics had been coined in the 1940s by science fiction copy writer Isaac Asimov. In several stories and novels, he / she im-agine a globe in which mechanical creatures were mankind's devoted helpmates [3]. They were constrained to obey what have become known because Asimov's Laws of Robotics:

1. A robot may not injure an individual being, or, through inactiveness, allow a human being to come to cause harm to.
2. A robot must obey the instructions given it by human being be-ings except exactly where such orders would battle with the First Natural law.
3. A robot must protect its personal existence as long as such protection does not battle with the First or Second Law.

A prototype industrial robot arm named Unimate (created by George Devol and Paul Engelberger) was sold in order to General Motors in 1959. It plucked red-hot automobile parts out of an die-casting machine and quenched them in water system. The 1960s and 70s saw a revolution inch manufacturing as robots changed humans for many repeated jobs. However, these robots were not intelligent away today's standards. Typically they were programmed simply by humans training their activities, and they had little or no decision-making capabilities. There are still many robots like this kind of in factories today, even so the trend is towards additional intelligent general-purpose bots that can do not only paint a panel or even screw in a bang.

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## 2 TYPES OF ROBOTS [4,5]

### 2.1 Mobile Robots

Mobile robots are able to maneuver, usually they perform chore such as search places. A prime example may be the Mars Explorer, specifically meant to roam the mars airfoil. Mobile robots are a great help to such already folded building for survivors Mobile robots are used intended for task where people cannot go. Either because it can be too dangerous of because those cannot reach the location that is in have to be searched.

**Mobile Robots** can be broken down in the following a pair of categories: **Rolling Robots:** Rolling robots have wheels to maneuver. These are the kind of robots that can quickly along with easily search move some. However they are solely useful in flat parts, rocky terrains give these a hard time. Flat landscapes are their territory. **Walking Robots:** Robots on hip and legs are usually brought throughout when the terrain is rocky and difficult to go into with wheels. Robots have a problem shifting balance and keep them from tumbling. That is why most robots using have at least some of them, usually they have got 6 legs or a lot more. Even when they lift up one or more feet they still keep their particular balance. Development of legged robots is often sculptured after insects or spiny lobster.



Figure 1: Mars Explorer's Image [18,19].



Figure 2: Rolling Robot's Image [18,19].

### 2.2 Stationary Robots

Robots are not solely used to explore areas or imitate a human. Most robots perform repeating tasks without ever moving an inch. Most software are working in industry settings. Especially dull in addition to repeating tasks are well suited for robots. A robot never grows tired, it will perform its duty day and night without ever complaining. Just in case the tasks at mitt are done, the bots will be reprogrammed to complete other tasks.

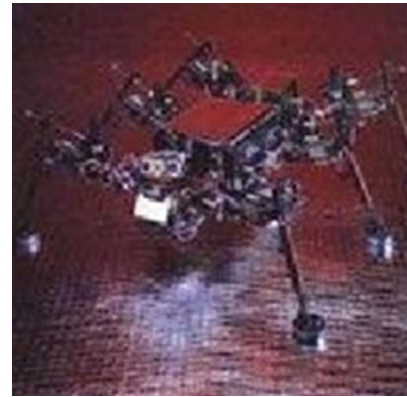


Figure 3: Crawling Robot's Image [18,19].



Figure 4: Stationary Robot's Image [18,19].

### 2.3 Autonomous Robots

Autonomous robots are self encouraging or in other phrases self contained. In an easy method they rely on his or her brains. Autonomous robots run a program that gives them the ability to decide on the actual action to perform depending on their surroundings. At multiplication these robots even find out new behavior. They commence with a short program and adapt this regimen to be more profitable at the task these people perform. The most effective routine will be recurring as such their habits is shaped. Autonomous robots can learn just to walk or avoid obstacles they find in their right smart. Think about a six legged robot, at first the thighs move at random, after having a little while the robot adjusts its program along with performs a pattern that enables it to get in a direction.

## 2.4 Remote-Control Robots

An autonomous robot is despite its autonomous not a very cagey or intelligent unit. The actual memory and brain ability is usually limited. A good autonomous robot can be compared a great insect in that deference. In case a robot needs to perform more difficult yet undetermined tasks a autonomous robot is not the veracious choice. Complicated tasks remain best performed by humanity with real brainpower. An individual may guide a robot by remote control. An individual can perform difficult and ordinarily dangerous tasks without going to the spot where the duties are performed. To detonate a bomb it will be safer to send the actual robot to the danger region.



Figure 5: Autonomous Robot's Image [18,19].



Figure 6: Remote-Controlled Robot's Image [18,19].



Figure 7: BEAM Robot's Image [18,19].

## 2.5 Virtual Robots

Virtual robots don't physically exists in real life. Virtual robots are just packages, building blocks of software system inside a computer. Any virtual robot can simulate a tangible robot or just perform some sort of repeating task. A unique kind of robot is a robot that searches the World Wide Web (www). The internet has numerous robots crawling from land site to site. These WebCrawler's collect information online on a web-site and send these details to the search applications. Another popular virtual robot is the chatterbot. Most of these robots simulate conversations with users of the internet. One of the initial chatterbots was ELIZA. There are many types of chatter bots now, inward-cluding ELVIS.

## 2.6 BEAM Robots

BEAM is short for Biology, Electronics, Aesthetics and Mechanics. BEAM robots are made by hobbyists. BEAM robots are simple and suitable for amateur engineers.

## 3 APPLICATIONS OF ROBOTICS

It is very hard to give a robot the ability to start a wide variety of duties, move around in jumbled surroundings, recognize objects in the real world and understand normal speech, along with think for itself. These are exciting areas of remedi-ent research in robotics and artificial intelligence activity. Few of the present applications of the robotics are discussed here:

### 3.1 Robotics in Space

Space robots appear in all shapes and sizes, and have absolutely lots of functions. Such as planetary flyby probes (e.g. Voyagers 1 and a couple), orbiters (e.g. Galileo, Cassini), atmospheric probes (e.g. Huygens Titan probe), landers (e.g. Mars Pathfinder), rovers (e.g. Sojourner), robot arms (e.g. space Shuttle Remote Manipulator System), and robots currently under development with the International Space Station. Nowadays, the phrase "robot" can often be placed on any device that work well automatically or by handheld control, especially a piece of equipment ("automaton") that can be developed to perform tasks normally created by people. Early last century, "robot" usually meant a manlike mechanical device ("android" or "android") efficient at performing human tasks or behaving in a human manner. What all robots have in common is that they perform tasks which might be too dull, dirty, delicate or dangerous for individuals. Space probes hurtling through the solar system may not seem like robots, but they fully merit that name by performing programmed tasks over long stretches without direct human supervision. Operating inside the vacuum of space and withstanding experience of radiation and extremes of temperature, they explore places not offered to humans. US Mars Exploration Rover: NASA All space robots are basically quite similar, therein each one has a controller, sensors, actuators, radio communications and also a power. The sensors provide information about the robot and environment. The controller processes the data from your sensors, in addition to instructions radioed from ground

control, and sends appropriate command signals towards actuators. The actuators and drive convert the command signals into actions. The long transmission times for radio waves over interplanetary distances preclude "real-time" handheld control of distant space robots from Earth, so such robots must be able to operate independently (autonomous control). Almost all of the of importance to rovers, which can be likely to encounter rocks, cliffs, craters along with other hazards since they move around. Many mobile robot ("robot") controllers utilize a layered system of control modules according to insect behaviour. In the development of the program, layers of behaviour generating modules are added one-by-one, as both versions connects sensing to action. The modules all run in parallel whenever triggered with the relevant sensors. In order to avoid conflicts arising between behaviours that is triggered while doing so, the modules are organised right "pecking order" (hierarchy). Higher-level behaviours have the chance to temporarily suppress lower-level ones, in case the larger-level behaviours are not being triggered, the low-level ones resume control.

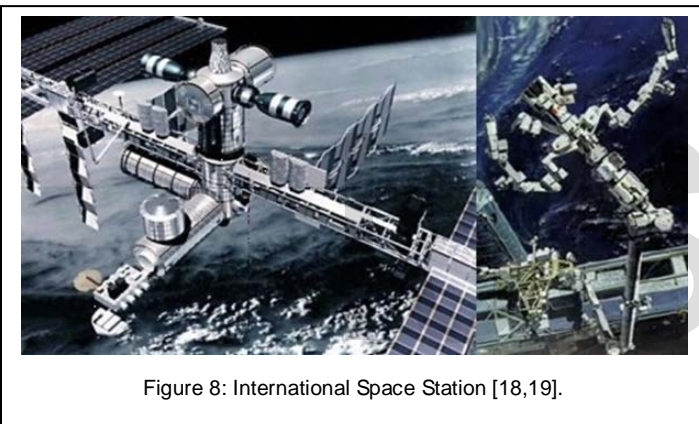


Figure 8: International Space Station [18,19].

To name some of the robots used in Space Applications are: Mars Pathfinder, The Remote Manipulator System, Deep Space 1, Cassini, Galileo, Mars Global Surveyor, Stardust, Ulysses, Voyager Interstellar Mission, etc.

### 3.2 Robotics in Hazardous Environments

Robotics scientific study has worked difficult to realize a lengthy-awaited vision: machines carrying people from burning buildings or tunnelling through collapsed rock falls to succeed in trapped miners. Researchers have many challenges in front of them but there was remarkable progress in a few areas. Hazardous environments present special challenges to the accomplishment of desired tasks depending on the nature and magnitude of the hazards. Hazards may be within the type of radiological or toxicity dangers to potential explosions. For this purpose various Robots are used as such utilized in Antarctica in deep water.

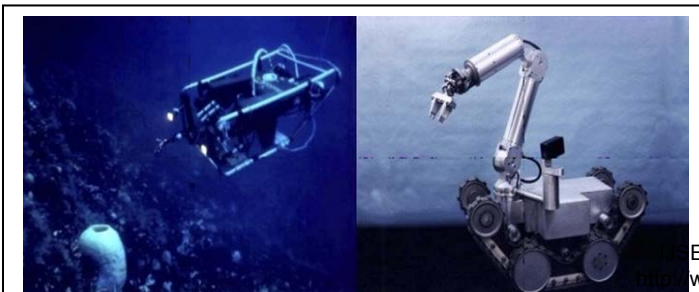


Figure 9: Robots in Hazardous Environments [18,19]

### 3.3 Robotics in Medical Use

**Surgery:** Likely the most glamorous use of robots in medicine, current high tech couples an individual surgeon with mechanisms which could perform surgery through tiny incisions, greatly reducing the risk to patients. The surgeon's ability to control the mechanism is enhanced by providing force feedback on the controls, allowing the operator undertake a sense of touch to aid control the robot. This kind of robot isn't completely independent, and it is more properly termed as tele-operated device, but uses a lot of the same technology an independent robot would employ for motion control, imaging and tactile/force feedback. The fully autonomous surgical robot that's a feature of science fiction literature and screen entertainment is not likely to look in the near future, as well as if technically possible, could be viewed with great scepticism by patients (and their lawyers).

**Diagnosis:** Robotic test instruments cover anything from exotic scanners (for instance computed axial tomography: the CAT scan) to laboratory equipment that processes and analyzes samples of blood along with other materials extracted on the body for diagnostic purposes. They offer consistency and accuracy, reducing the prospects for human error that can cause an inaccurate diagnosis. Whilst not the classic industrial robot, they are doing employ most of the same automation techniques.

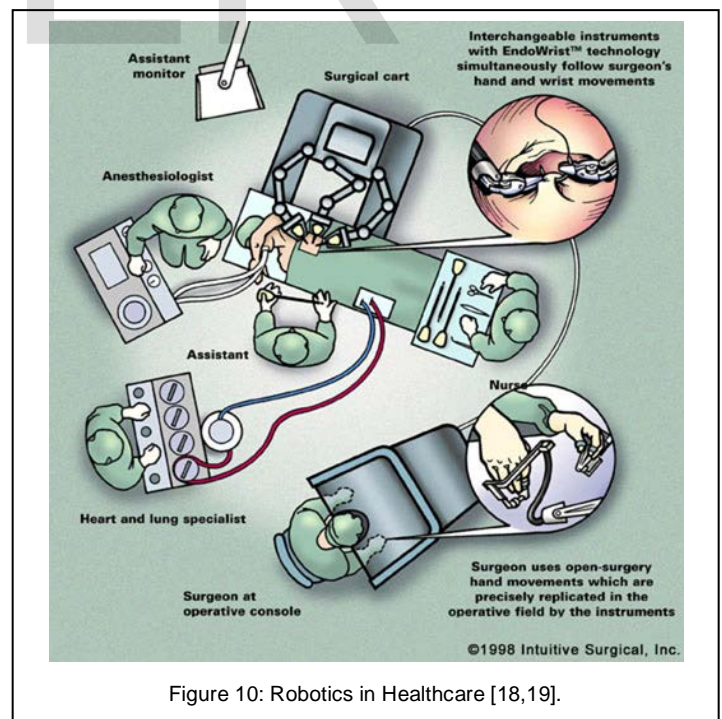


Figure 10: Robotics in Healthcare [18,19].

**Prosthetics:** Mechanical replacements for missing limbs and organs that could interact with a person's organic system can be a long-standing goal with the medical community. Re-

search into replacement hearts, limbs, eyes, ears along with other organs offers a cure for the development of effective implanted devices and replacement limbs that can function for a long time. Robotic devices can also guarantee assistance to people with severe restrictions on movement, in many cases allowing them leastways some chance to move about or nearby their homes. On the list of great challenges facing the designers of implantable devices could be avoid stimulating the conventional disease fighting capability respond to foreign objects, a response that will cause serious complications or disable the product. It is also important for it in order to survive within the biological environment with no damage chemical interactions with all the body.

**Rehabilitation:** Robots provides exercise platforms to help you restore limb function and will monitor the healthiness of patients undergoing rehabilitation through the connection between injuries, stroke or other brain or nerve damage.

**Pharmaceuticals:** Industrial robots used to manufacture drugs provide consistency and cost control in drug production which enables it to perform many process and handling steps with no risk of contamination from human operators or exposing humans to dangerous chemicals or inadvertent drug doses.

### 3.4 Robotics in Defense [4,6,7,8]

Today, virtually all the military organizations go ahead and take help of military robots to handle many risky jobs that can't be handled manually by soldier. We have also seen an incredible de-velopment in military robots when rival military robots in earlier time. At present, different military robots can be used by many military organizations. Here, in this posting we're going to discuss in regards to the current utilization of military robots as well as different kinds. Given here is a brief description around the present use of military robots:

**Daksh** - Daksh is just about the most current military robots. It is an electrically powered and rc robot that is utilized to locate, handle and destroying risky objects safely. The man role on this military robot would be to recover improvised explosive devices. In other words it's a vehicle for defusing bombs. The present by using military robots like Daksh has helped military organization in lots of ways. This robot can even climb stairs to reach risky materials. Moreover, this may also scan objects using its portable X-ray device.

**Goalkeeper** - So far as the current use of robots in military is involved, we cannot leave Goalkeeper. This military robot is usually a Dutch close-in arm that helps to defends ships from incoming missiles in addition to ballistic shells. It generally contains autocannon and advanced radar that tracks incoming fires. It is deemed an automatic system that can be be also deployed to guard airfields.

**PackBot** - PackBot is actually several military robots. The most recent base style of this robot is PackBot 510. This model utilizes a videogame-style hand controller make handier to

younger ladies and man.

**MARCBot** - This can be wedding and reception military robots that was accustomed to inspect suspicious objects. This can be a affordable robotic platform, and contains been found in Iraq for your inspec-tion of suspicious objects. This robot is an between the smallest and also the normally used military robots. It appears to be a little toy truck through an elevated mast what is the best a camera is mounted. Your camera is utilized for looking behind the doors. It offers the ability to run six hours on a list of fully charged batteries and was created with the input of soldiers in Iraq in order to meet the requirements. However, the application of military robots today has helped the soldier to detect hazardous materials and objects.

Besides mentioned military robots, there's also other sorts of military robots often utilized by the military organiza-tions. These robots include Guargium, RQ-9 Predator B, RQ-1 Predator, TALON, Samsung SGR-A1 and Gladiator Tac-tical Unmanned Ground Vehicle. The above mentioned info on the present using military robots will let you know the sorts of military robots utilised in recent era. Military robotics isn't about creating a military of humanoids but using robotics technology for fighting terror and defending the nation. Thus, military robots must not be humanoids or they certainly not should carry weapons, they're just those robots that will help the military. The opportunities provided by these technology is boundless. In addition to army research centers there are various private firms also which provide military robots for defense forces like Foster Miller, modern day Robotics, EOD Performance, Northrop Grumman, General Atomics.

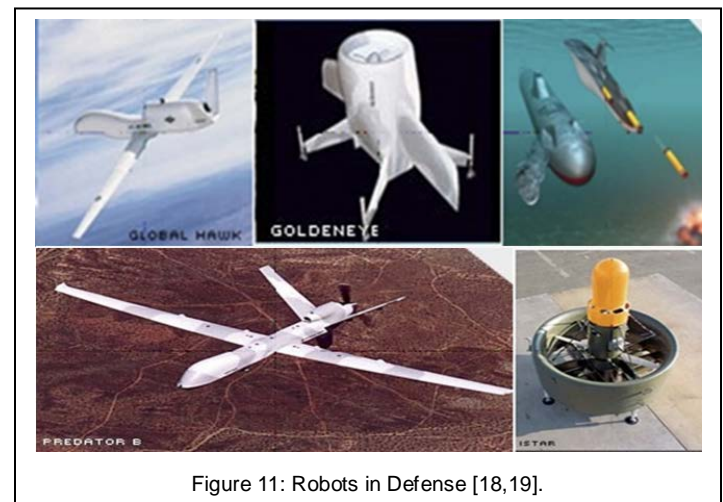


Figure 11: Robots in Defense [18,19].

### 3.5 Robots at Home [9,10,11]

Today, robotic components fill our homes. Many Robots entertain children, help with all the household, yet others even guard our houses. The function with the modern home relies completely within the help of robotics. Listed below are types of robots today. There are numerous challenges that face researchers seeking to build intelligent household robots.

Among these are:

1. It is very challenging develop a robot effective at navigating the constantly changing terrain of your house.
2. Supplying capacity to the robot can be difficult.
3. The present state of AI makes robot behavior unreliable.
4. Safety issues, robots which can be able to heavy lifting along with other tasks is usually a danger to opportunity seekers of their home.
5. Machines manufactured to overcome obstacles 1-4 could become extremely expensive and over the budget on the common consumer.

**The Hug [12]:** Robotics researchers in Pittsburgh have developed a soft, huggable, robotic pillow which utilizes sensing and wireless phone technology to provide a physical touch. The pillow, referred to as the Hug, was made following the researchers studied how robotics could improve products the ageing use each day. The Hug, which is concerning the size a throw pillow but as firm to be a seat cushion, is the same shape as an individual going to provide a hug, with two arms reaching up and out. The outdoors is roofed in velour, turning it into soft and comfortable. To send a hug, an individual would squeeze the left paw of his/her device and speak another person's name right into a microphone within the top pillow. Voice recognition software from the processor in the device identifies the name and matches it into a preset contact number corresponding for the other Hug. The face's Hug calls the other person's, which fires up and plays sounds. To just accept the hug, he/she squeezes the left paw and says hello, opening a primary voice link involving the 2 different people. The hug is ended by pressing the best paw and saying goodbye. When someone is not the place to find obtain a hug, the other person can leave a communication which includes voice and vibration patterns. The Hug can store nearly four messages. Unlike an everyday phone, is actually wrong numbers are a way of life, you don't have to fear getting a hug in error. Every person you should want to hug needs to be put into your network, just like a mobile phone is programmed with personalized rings.

**The Roomba [13]:** The Roomba is a housecleaning robot built by iRobot. It turned out the initial robot ever built that may be designed to have a home in your home, take a step useful, and stay priced for the store bought. The Roomba is built to vacuum a location without the help of an individual or any other robot. The Roomba is controlled by heuristics that map the dimensions of the room as well as the obstacles in the path. The Roomba roams about the room and lightly bumps into other household objects. As a result of Roomba's circular shape, it cannot reach corners from the room, leaving a little dirt in those corners. Also, if your couch, bed, or other piece of furniture is high enough, they have the potential of getting stuck thereunder. Following the Roomba covers the room many times, it beeps and shuts. The Roomba costs \$199, that is concerning the cost of a mid-range Hoover. It is 5lb and 10oz, has limited vision, and is also only 13.5 inches wide. You can

find hopes that particular day Roomba will work for vacuuming what dishwashers did for dishwashing.

**Automower [14]:** The Automower is manufactured by Husqvarna and is made to save your time making life easier. It might handle approximately 1,800 square meters. Once the boundaries of the lawn are set having a perimeter wire system, Automower could be trusted to wander off by itself continuously mowing rain or shine, twenty-four hours every day, 1 week per week, recharging itself as required. The Automower cuts the grass neatly and fertilizes because it mows because short clippings drops back onto the lawn. The Automower is safe to depart running around animals since it can sense the objects and animals around it. The Automower may be programmed to run continuously or during certain hours during the day. Automowers use comparable volume of electricity as a 15-watt bulb, and is particularly quieter than the typical amount of a television. The Automower weights 15.6 lbs (7.1 kg), incorporates a amount of 28 inches (710mm), includes a width of 23.6 inches (660mm), and has a height of 10.2 inches (260 mm). Automower is a bit pricey, costing \$1,500 to \$2,000. When the Automower runs for sixteen hours, it spends 50 % of this time recharging. The Automower occasionally has trouble with steep hills, but tend to usually pick itself up pretty quickly. With the Automower, not a soul should be worried about mowing the grass anymore.

**Wakamaru [15]:** The Wakamaru is the first human-size robot that may provide companionship, or be the caretaker and house sitter. The Wakamaru was made in Japan, and will be available for sale there for around a million yen (\$14,250). The Wakamaru moves around on wheels, is 3.3 feet tall, weighs 60 pounds, and recharges itself when batteries run short. The Wakamaru may be developed to call or e-mail a designated person, hospital, or security firm whether it notices an issue. It features continuous entry to the world wide web, and is equipped with voice and face recognition capabilities which allow the robot to search for and follow faces and movement. It's the opportunity to comprehend and talk with humans, and in addition has an built-in-dictionary, making it competent to recognize 10,000 words. The Wakamaru promises to become an excellent help for elderly people, those with disability, varieties which have been living independently.

**My Spoon, and also the International Robot Convention:** The robot, My Spoon, is one to help feeding disabled people. This robot helps savings around your house and is useful when you will discover disabled family members. This robot debuted inside the International Robot Exhibition in Tokyo, Japan. A few other robots included a robot that imitates a butler. It may effuse wine and talk to guests. Even another robot was the one that delivered meals to hospital patients.



### 3.6 Robotics as in Artificial Intelligence/Expert Systems

Robotics is a field within artificial intelligence. It demands mechanical, usually computer-governed, devices to perform tasks that require extreme precision or tiresome or hazardous work by people. Traditional Robotics makes use of Artificial Intelligence planning approaches to program robot behaviors and works toward robots as technical units that contain to become developed and controlled by a human engineer. The Autonomous Robotics approach points too robots could develop and also control themselves autonomously. These kind of robots will be able to accommodate both uncertain and imperfect information in change regularly environments. You could do by imitating the educational strategy of an individual natural organism or as a result of Evolutionary Robotics, which would be to apply selective reproduction about populations of robots. The item lets a simulated evolution process develop adaptive bots. The artificial intelligence idea of the "expert system" is extremely developed. This describes robot programmers capacity to anticipate situations and supply the robot using a group of "if-then" rules. For example, if encountering a stairwell, stop and seek refuge. Greater sophisticated concept provide robot the opportunity to "learn" from experience. The neural net brain equipped onto any robot enables the robot to sample its planet randomly. Basically, the robot could be given some life-type goals, and, mainly because it experimented, what producing success could well be reinforced within the brain. Artificial intelligence dramatically reduces or removes danger to humans in numerous applications. Powerful artificial intelligence software really helps to fully develop the large-precision machine capabilities regarding robots, often freeing these people from direct human command and vastly improving his or her productivity. If a robot interacts using a richly populated and varying world, it uses the idea senses to get together data and compare the sensate inputs with expectations which have been imbedded in the world model. Therefore the effectiveness with the robot is restricted through the accuracy to which its programming models real life [16].

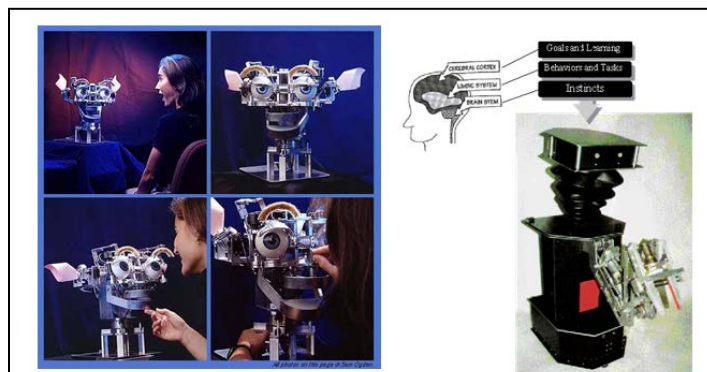


Figure 13: Robotics and AI (Expert Systems) [18,19].

### 3.7 Robots as Autonomous systems

Autonomous robots are robots that could perform having a high a higher level autonomy, which can be particularly desirable in areas like space exploration, cleaning floors, mowing lawns, and waste water treatment method. Some modern factory spiders are "autonomous" within the strict confines of the direct environment. May possibly not be that every amount of freedom exists within their surrounding environment, however the factory robot's workplace is demanding which enables it to often contain chaotic, unannounced variables. The exact orientation and position with the next object on the job and (from the more complex factories) even the kind of object and the required task must be determined. This could vary unpredictable (no less than from your robot's point of view). One important part of robotics scientific studies are allow the robot to manage its environment whether that get on land, underwater, via a flight, underground, or perhaps in space.

A completely autonomous robot is able to:

1. Gain details about the environment.
2. Work for an extended period without human entomb-vention.
3. Move sometimes all or a part of itself throughout its operat-ing environment without having human assistance.
4. Keep off situations which are damaging to people, property, or alone unless those are part of its design specifications.

A good autonomous robot could also learn or gain brand-new knowledge like adjusting for new strategies of accomplishing its task(s) or chaning to changing surroundings. Autonomous robots still require regular maintenance, similar to other machines.



Figure 14: Robots in Hazardous Environments [18,19].

### 3.8 Humanoid Robots

Humanoid robots are smart enough to work alongside humans, assisting in tasks where people could use additional aide. They choose artificial intelligence to battle humans and learn various strategy. Humanoid robots are being used being a re-search tool in many scientific areas. Personal humanoid

robots can assist stroke patients recover by delivering therapies, says new information. A personal robot could save vast amounts of dollars in elder care while letting people be in their unique homes and communities. Scientists also say a humanoid robot helps train kids with autism. The finding indicates that robots could play a vital role in responding to the "public health emergency" that has been developed by the zoom from the number of children being identified as having ASD. Now, Humanoid Robotics just isn't a properly-defined field, but a fundamental impulse driving collaborative efforts that crosscut many disciplines. Mechanical, electrical and computer engineers, roboticists, computer scientists, artificial intelligence researchers, psychologists, physicists, biologists, cognitive scientists, neurobiologists, philosophers, linguists and artists all contribute and claim for the diverse humanoid projects around the globe. Inevitably, some projects tend to emphasize the contour and mechanical function with the humanoid body. Others may concentrate on the software to animate these bodies. You will find projects involving humanoid robots to model the cognitive or physical issues with humans. Other projects tend to be more worried about developing useful applications for commercial use within service or entertainment industries. Sometimes, there are deep ideological and methodological differences. E.g., some researchers are most thinking about while using human form like a platform for machine learning an internet-based adaptation, while some declare that machine intelligence is not needed. Just how can we characterize this kind of broad range of efforts? Defining a humanoid robot is a lot like defining just what it ways to be human. More than likely, you'll know one you may notice it, and yet have trouble putting the characteristics in some recoverable format. The physical constitution with the body is clearly crucial. For example, some have chosen to define a humanoid robot just like any robot with two arms, two legs and also a human-like head. Unfortunately, a really definition says nothing about the ability on this robot to obtain information, process it and respond. Moreover, many Humanoid Robotics projects spend a lot of their efforts over a component of one's body including the head, the legs or perhaps the arms. As an alternative to distinguish humanoids by their physical construction, we elect to identify several complementary research areas that, hitherto, have stood out as distinct emphases. Eventually, a fully-fledged humanoid robot will incorporate work from all the areas below.

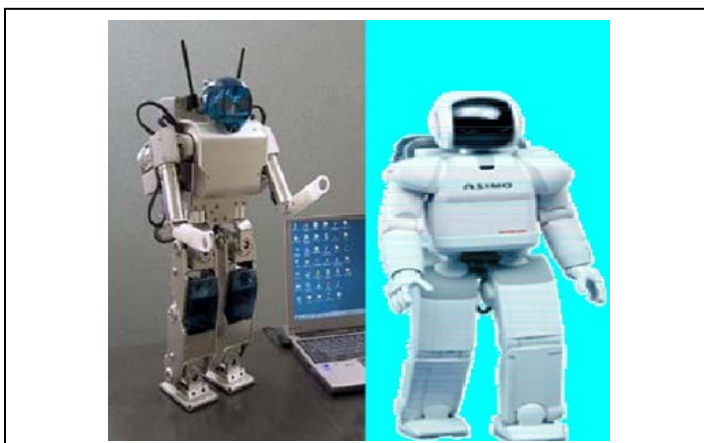
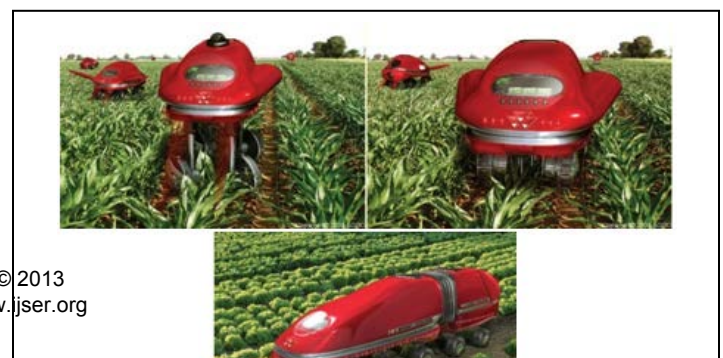


Figure 15: Humanoid Robots [18,19].

### 3.9 Robotics in Agriculture [17]

For quite a while robotic systems are actually popular for industrial production along with warehouses, when a controlled environment could be guaranteed. In agriculture and forestry, research into driverless vehicles has become a 2010 vision initiated in early 1960's with researching on projects on automatic steered systems and autonomous tractors. Recently, the introduction of robotic systems in agriculture has experienced a higher interest, which includes led many experts to research the the opportunity to develop more rational and adaptable vehicles based on a behavioural approach. A combined putting on new sensor systems, communication technologies, positioning systems (GPS) and geographical information systems (GIS) have enabled researchers in order to develop new autonomous vehicles for top quality crops from the agriculture and horticulture sector, enchanting landscape management. Several autonomous prototypes have been described for orchards and horticultural crops, such as, strawberries and tomatoes. Moreover, automated systems for site specific irrigation depending on real time climatic conditions are already described for top quality crops. For field crops additionally , there are quite a few systems, for example the Demeter system for automated harvesting designed with a camera and GPS for navigation, as well as the autonomous Christmas tree weeded along with the API platform for patch spraying. Additionally we've seen automated systems for animal production in indoor environments like automated feeding and cleaning. On view and outdoor environment, which will be the attention here, robotic and autonomous systems are definitely more complex to build up - considering of safety issues. The robots safety system would need to be reliable enough for it to use autonomously and unattended. It is relatively costly to develop safety systems if the vehicle should be completely autonomous. In theory, they are able to work at any hour however, if a robot really needs to be attended then this time is restricted by the owner. With this matter different scenarios and degrees for autonomy are investigated based on the task being performed. Concepts have been initiated to research if small autonomous machines could well be better to exchange the standard large tractors. These vehicles are able to perform useful tasks month in month out, unattended and able to behave sensibly inside a semi-habitat over a long time. Your little friend vehicles may also have less environmental impact replacing the over-use of chemicals and fertilizers, requiring lower entry to energy with better control matched to requirements, in addition to causing less soil compaction on account of lighter weight.





## 4 CONCLUSION

Robotics systems may be the collaboration of software & hardware whereby almost all of the complicity reduces, even systems size & cost also reduced. Such human creation put us spell bound that why an interest of invention is taken Robotics design. We humans are fortunate & we always inspired in the nature because it's only which is healthy friend within the universe. Robotics creation can be inspired by your body itself. The human body is, of course, a nearly perfect machine: it really is (usually) intelligent, it can lift heavy loads, it could move itself around, and possesses built-in protective mechanisms to feed itself when hungry or to back off when threatened. Robots are often modeled after humans, in any other case in form then at least in function. For decades, scientists and experimenters have experimented with duplicate the human body, to create machines with intelligence, strength, mobility, and auto-sensory mechanisms. That goal has not yet been realized, but perhaps someday it is going to. Nature supplies a striking model for robot experimenters to mimic, and it's as much as us to consider the challenge. Some, but not by a long sight all, of nature's mechanisms—human or otherwise— can be duplicated to some degree from the robot shop. Robots is usually designed with eyes to see, ears to listen to, a mouth to communicate in, and appendages and locomotion systems of just one kind or another to manipulate environmental surroundings and explore surroundings. That is fine theory; why not consider real world? Just what is really a real hobby robot? What basic parts must a unit have prior to it being given the title robot? Let's take a close try looking in this set of robotics as well as the forms of materials hobbyists use to develop them. For the health of simplicity, don't assume all robot subsystem around the world will be covered, just the components which might be generally seen in amateur and hobby robots.

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