

Keynote Address 2

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ROBOTICS: OUR FUTURE

For many decades since the inception in 1940s, robots made presence in industrial applications such as welding, cutting, assembly, and material handling. The robots at that time were expensive, difficult to maintain and operate, and limited in accuracy and repeatability. With the continuous development in electronic controls, mechanical fabrication, and computing technology, robots were getting better in capability, accuracy, speed, flexibility, user-friendliness, and affordability. Today, using robots in industries is as easy as playing a video game, or driving a car.

Robots have already moved out of industries, and into almost every sector of the society including our homes. Specific design features, controls and operations required for robot to inhabit and perform intended tasks in such diverse environments have been developed to a satisfactory level. These new robots are able to perform an "intelligent" supporting role for humans; you can buy a floor vacuum cleaning robot for US\$300, which will not only clean the room autonomously, but self-charge itself when it drains out the battery. Such robots were developed using latest sensor and control techniques. You will be able to see humanoid robots servicing in airports, hotels, and other public places in the near future. These robots know their location to a centimeter accuracy, and also can see the surrounding and identify objects and people, much like the human vision system. They use advance sensors with video to detect what is happening around, and using powerful computing hardware they decide quickly the best action in any given situation. Such actions are implemented by controlling motors and other actuators. This way, robots have been able to perform seemingly impossible tasks successfully and safely.

The robot geologist on planet Mars is driving on that planet since last July, and it will continue its experiments on Mars at least for next few months. This interplanetary robot has been developed to drill the rocks on Mars, collect and analyze soil samples to find out whether Mars had ever supported life.

In the mean time, scientists are developing robots that are able to walk like humans. Robot cars that can drive autonomously while avoiding collisions are being built using LASER, RADAR, and LiDaR sensors. Robot aircrafts are already flying while collecting ground information and on command shooting targets with clinical accuracy. The list goes on the most recent addition to the list is the telepresence robots; the remotely operable mobile robots with video and audio connectivity, and arms to perform simple tasks. These robots are operated over the Internet by a human to make his presence while being away. You will be amazed dreaming about the potential uses of these robots.

Robotics technology does not seem to slow down any time soon; in fact, it is growing faster than one would imagine. In the future, robots and robotics applications will surely become part of our lives.