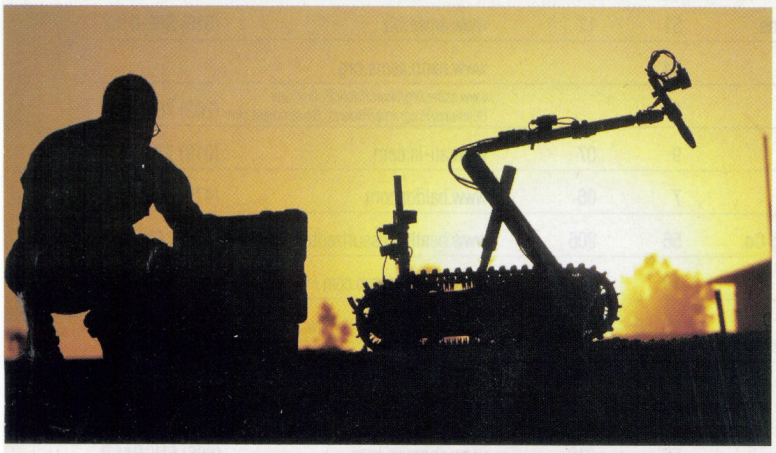
INPUTOUTPUT

Robot Population Explosion

The robots are coming. In fact, they're almost here, according to forecasts by industry groups.

Based on predictions by the statistical department of the International Federation of Robotics, by the end of 2011 the world's population of service robots could exceed the population of Chile—more than 17 million units. The Japan Robotics Association, meanwhile, predicts a $15 billion market for service robots by 2015.



▲ Service robot: QinetiQ's Talon robot is designed for dangerous duty. It can move fast enough to pace a running soldier, can cross broken terrain, and can clear mines.

Granted, some service robots will have just enough intelligence to do the simplest of jobs. An example is the popular iRobot Corp. Roomba, an autonomous vacuum cleaner. Unlike humans, who plan their work to complete it quickly, the Roomba relies on simple algorithms. It cleans in spirals and follows walls. When it bumps into furniture, it changes angles randomly. It moves slowly, but it cleans.

Led by Roomba, sales of robotic vacuum cleaners reached 3.3 million by the end of 2007, according to the IFR, which represents more than 15 trade groups around the world. Meanwhile, iRobot has introduced simple robots to scrub floors, clean pools, sweep home shops, and eject leaves from gutters. Several companies make robotic lawn mowers, whose sales totaled 110,000 units through the end of 2007. Together, robotic vacuum cleaner and lawn mower sales accounted for $1.3 billion.

More sophisticated are entertainment and leisure robots. Lego Mindstorms is a well-known example. It teaches young people fundamentals by letting them program robot behavior on powerful graphical software. This category also includes sophisticated products, like Sony Corp.'s $2,500 Aibo robotic dog, which could see, recognize commands, and learn new behaviors. Sony discontinued production after 200,000 units as a cost-cutting measure (the fate of many early Japanese entertainment robots). Still, entertainment robots had cumulative sales of two million units worth $2 billion through 2007.

There is an entirely different technology for service robots for professional use. They are much smarter and far more flexible and capable. IFR estimates total sales of professional robots through 2007 were 49,000 units worth about $7.8 billion.

Service robots for defense, rescue, and security applications account for 12,000 units, or 25 percent of the total installed base, IFR reported. Many companies compete in this category. iRobot, for example, has sold more than 2,000 PackBot robots for surveillance, identification of hazardous materials, and detecting and disarming roadside bombs. Great Britain's QinetiQ Group plc makes a similar robot, Talon, which can keep pace with a running soldier and negotiate rough terrain.

Field robots, mainly autonomous milking machines, accounted for 20 percent of the professional service market in IFR's survey. They are followed by sophisticated cleaning robots at 12 percent. An example is Skywash from Germany's Putzmeister Werke, which generates motion programs from CAD diagrams and uses sensors to position itself while cleaning aircraft.

Underwater robots, often used to build and maintain offshore oil pipelines, constitute 12 percent of the market. Smaller applications include construction and demolition robots (9 percent), medical robots (9 percent), and mobile robot platforms for general use (7.4 percent). Logistic and inspection systems accounted for the remaining 5.6 percent.

The market for handicap assistance robots is small, but IFR's members expect it to double over the next four years. IFR believes this application will grow quickly, as robotic technology grows more sophisticated and the populations of the wealthiest nations age. It foresees such key developments as assistive robots for disabled and handicapped persons, as well as robotic prostheses.

Overall, IFR projects the world will install 54,000 new professional service robots worth $9 billion between 2008 and 2011. That may not sound like a lot, especially when compared with projected sales of 12.1 million personal service robots over the same period.

Yet high-end personal robots, especially humanoid robots, are growing ever more sophisticated. While general-purpose humanoid robots capable of helping with complex tasks remain a distant goal, several well-known Japanese companies (Honda, Kawada, and Toyota among them) and a handful of Korean and Chinese businesses are developing them. Not only is the world robot population increasing, but it is moving far beyond carpet cleaning.

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