

COBOTS: Robots that Collaborate with Us

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Employment vs robotics is often a critical issue for the industrialized society. Since industrial robots were invented half a century ago, the rapid progress of manufacturing technologies has released humans from tiring tedious jobs. The global shift of labor-intensive manufacturing occurred beyond borders. And now in this new phase, new robot technology is leading to the re-shoring of manufacturing activities to the home countries. Robots do not take away jobs from human, rather new robots bring us new job opportunities with a good work-life balance.

Power suits, self-driving cars, drones, humanoids –such new robots are emerging as a result of robotic innovation. Some of them are expected to benefit the future employment scenes in elderly care, disaster response, agriculture, services, logistics, and manufacturing. In general, automation vs employment has always been a critical issue. In manufacturing, robotic innovation has changed the employment landscape toward global efficient mass production. In Japan, since the mid 1970's, robot-empowered production has promoted the miracle industrial growth. From the 1990's, high labor cost triggered the transfer of large amounts of products to offshore production in Korea, Taiwan and China. However, now, we are seriously considering not only the re-shoring but also the resurgence of our domestic production.

“Cobots”, or collaborative robots, are a new genre of robots whose collaborative capacities with humans are highly enhanced. The humanoid worker robot is an example. It is not important for a humanoid to LOOK like a person. In a humanoid robot, there are three key features. The first is its “human geometry,” meaning that the robot must have the same dimensions as a person. The second is “human functionality,” meaning that the robot must be able to function in similar ways as a person to accomplish a task. The third is “ALL in One,” so that we are able to move the robot from one place to another with ease.

Due to these features, we create certain values.

- a.** A humanoid can easily roll in where a person used to stand.
- b.** Humans and robots can alternate shifts and share a job.
- c.** A humanoid can use the same tools and peripheral devices as people.
- d.** We can teach the tasks to humanoids intuitively.

Cobots open a new paradigm of manufacturing. They are flexible, compact, and work-sharable. They do not compete with the traditional integrated robotic automation solutions for mass production. The production scheme of tomorrow must cope with a high mix, low volume and variable production, to manufacture high value products. These products may be manufactured by small/medium sized enterprises or home factories, in backyard of shops, ateliers and studios. The users could be non-technical people who have had no experience with robots before, such as elderly persons, housewives, part-timer workers, and so on.

When cobots become mainstream, a new style of manufacturing will become common. For example, a working team is composed of one human and cobots. Difficult tasks are for humans, while simple tedious jobs are for cobots. Cobots are placed among people. Employment can be adjusted through the number of cobots on duty. In case there is any trouble with the cobots, humans will step in. And thus, a human as site supervisor can find spare time for other activities in his/her life. In this way, small and medium sized enterprises can find a balanced employment system to survive in competitive business environments. On the other hand, each independent worker can get assistance from cobots to continue working in difficult situations. In fact, small and medium-sized enterprises, elderly or independent workers will become major contributors in the ecosystem of national labor.

The human robot co-worker is a key enabler for future robotic applications. Particularly in advanced mature societies, introducing cobots into the labor force will be inevitable. Due to the sharp decline in population, rapid aging of our society and accelerating trend in industrial structure change, we need cobots as our working partners. Countries that are able to introduce the social acceptance of human-robot co-working environments will gain an enormous advantage in the aging society of the future by acquiring the fruits of a novel and rewarding work style.