

Attentive Workbench: An Intelligent Production Cell Supporting Human Workers

In recent years, manufacturers are required to maintain wide variety of product lineups according to diversifying consumer trends. Instead of conventional manufacturing lines, cell production systems, in which a single human worker assembles each product from start to finish almost manually, have come into wide use in order to accommodate diversified products and production quantity. With negative and zero growth of the population and the tendency of young people avoiding manufacturing jobs, we will face a shortage of skilled workers, and hence a great difficulty in maintaining the cell production system. To meet diverse needs with fewer labor forces, we propose attentive workbench (AWB), shown in Fig.1, together with researchers in the University of Tokyo, such as Prof. Takamasu in the Dept. of Precision Engineering and Lecturer Kotani in School of Frontier Science. AWB recognizes the intention or the condition of a worker through cameras and vital signs monitors, presents the information through projectors, and supplies assembling parts to the worker using self-moving trays. This informational and physical assembly support may result in a higher yield rate and productivity. The present system has been implemented (Fig. 2), and physical support of simple product assembly using self-moving trays has been demonstrated (Fig. 3). We have proved the effectiveness of the present system through subjective experiments.

Keywords: Cell Production System, Attentive Workbench (AWB)

References

- 1) Masao Sugi, Makoto Nikaido, Yusuke Tamura, Jun Ota, Tamio Arai: "Development of Gesture-Based Interface for Deskwork Support System," Proc. 2006 IEEE/RSJ Int'l Conf. on Intelligent Robots and Systems (IROS 2006), pp.5171-5176, 2006.
- 2) Masao Sugi, Ipeei Matsumura, Yusuke Tamura, Makoto Nikaido, Jun Ota, Tamio Arai, Kiyoshi Kotani, Kiyoshi Takamasu, Hiromasa Suzuki, Akio Yamamoto, Yoichi Sato, Seiichi Shin, Fumihiko Kimura: "Quantitative Evaluation of Automatic Parts Delivery in 'Attentive Workbench' Supporting Workers in Cell Production," *Journal of Robotics and Mechatronics*, Vol. 21, No. 1, pp. 135-145, 2009.

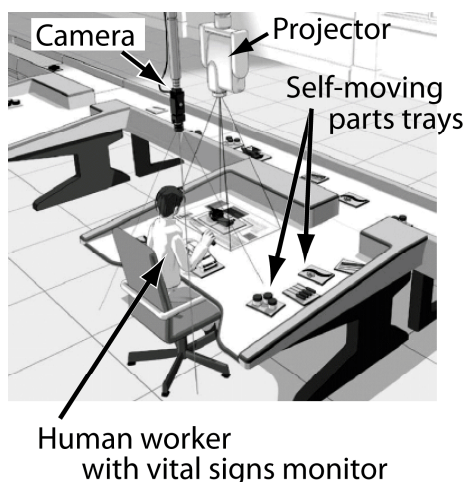


Fig. 1 Overview of Attentive Workbench

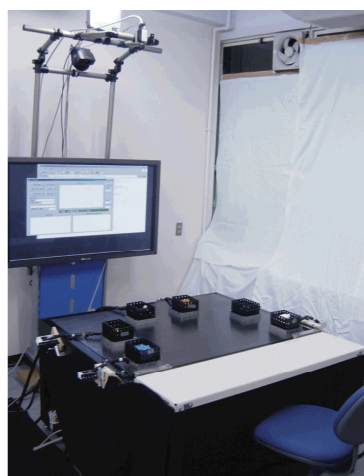
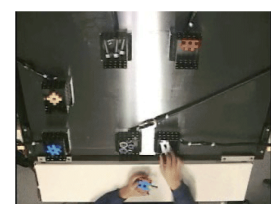


Fig. 2 Prototype Model



(a)



(b)

Fig. 3 Demonstration of Physical Assembly Support