The Japan Society for Precision Engineering

Introduction of JSPE PRIZES 2010

1. Sadayuki MATSUMIYA (Mitutoyo Corp.)

Mr. Sadayuki Matsumiya has been actively involved with the research and development of precision measuring instruments ever since he joined Mitutoyo Corporation in 1974. He has contributed to the development of various precision measuring instruments such as coordinate measuring machines (CMMs), vision measuring machines, form measuring instruments, optical measuring instruments, sensor instruments, and measuring tools to satisfy the demands of the industrial field. For example, he has developed CNC systems for CMM, vision measuring machines, and form measuring instruments to facilitate high-throughput and high-accuracy measurements. Furthermore, he has managed and contributed to a wide range of research and activities related to the development of key technologies for systems, such as new detectors for precision measuring instruments. He has been involved with the development of software realizing ease of use and establishment of systems, which have made the processing of a large amount of measured data possible; this large processing capability has in turn led to the creation of new attractive products. He has applied for many patents and has received many Good Design Awards.

The above-mentioned precision measuring instruments have contributed significantly to the enhancement of productivity, quality, and reliability of industrial products. He has been conferred the title of Fellow by the Japan Society of Precision Engineering (JSPE), and his achievements have been highly appreciated.

Mr. Sadayuki Matsumiya has made significant contributions to the field of precision metrology and measurement.

2. Satoshi KIYONO (Tohoku University)

Dr. Satoshi Kiyono has been involved with the field of precision measurements for a long time. He has played an important role in the improvement of the accuracy of measurement standards, which is an important research topic related to the basis of measurement. He has been instrumental in the development of a new research field called intelligent measurement. His achievements have been highly appreciated by academic societies and industries. He has helped improve the accuracy of measurement standards by introducing the use of software, which is essential for the further development of ultra-precision technology. He has made significant contributions to the development of systems for in-process precision measurement, on-machine precision measurement, and precision machining through his efforts to transfer intelligent precision measurement technology to production lines. His ability to carry out research on new topics and develop new ideas has significantly influenced young researchers in this field. He was honored with the JSPE Award in 1994 and 1998 for having developed an optical stylus with optical skid and an in-situ self-calibration system for displacement sensors, respectively. He was conferred the JSPE Takagi Award in 1997 for his achievements related to software datum. He also received the JSPE Award in 2000 and 2004 for developing multi-degree-of-freedom encoders that involve the use of angle information.

Dr. Kiyono Satoshi has made contributions to the JSPE in different capacities, as the vice-president, a fellow, etc. Since his retirement from Tohoku University, he has been working as a consultant to

Fig. 1 Awarding of JSPE PRIZE

Fig. 2 JSPE PRIZE winner speech

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the precision industry.
As described above, he has made significant contributions to the field of precision measurement.

Introduction of JSPE Technology Awards 2010

1. TFT Array Tester for 10th-Generation

Naoki YOSHIOKA, Taketoshi NOJI, Masamichi NAGAI, Jun MATSUHASHI, Daisuke IMAI (SHIMADZU Corporation)

The popularity of large-scale liquid crystal TVs is rapidly increasing, leading to an increase in their production. Consequently, the amount of investment in the inspection and repair equipment that is used in the Thin Film Transistor (TFT) panel manufacturing process is increasing.

Generally, if the yield improves, the inspection equipment might be said that it is unnecessary. However, the inspection equipment is necessary because the TFT panel manufacturers are constantly developing new panel technologies and increasing production. The inspection equipment used in the TFT panel manufacturing process can involve the use of many methods.

We successfully developed a TFT array inspection system for 10th-Generation. The inspection system is an electric system, and it is not necessary for it to be in contact with the TFT array. This system has a large vacuum chamber that has a size capable of 10th-Generation, and can inspect a substrate with a size as large as about the 3 meters-square with the aid of an electron beam.

Owing to high-speed image processing and precise stage structures, the TFT array inspection system shows high detection performance and is capable of accurately locating defects. As a result, it is possible to contribute to the productivity enhancement and the yield improvement of the TFT array for 10th-Generation.

Fig. 3 TFT Array Tester for G10 (Assembling)

2. Design Procedure of Cloth Handling System and its Practical Application

Seiji HATA (Kagawa Univ.), Hirotaka HOJOH, Masaaki TODA (PUREX CO.), Toshihiro HAMADA (Kagawa Pref. Ind. Tech. Cen.)

The working environment in laundries is harsh because of the high levels of dust, heat, and steam. To improve the environment, fully automated systems are required. However, former robot systems are not suitable for handling flexible objects such as clothes.

On the basis of an analysis of human operations in laundries, the following points have been identified for consideration in devising an automated system.

(a) To wash clothes, it is necessary to hold two corners of one edge and spread the edge.

(b) When clothes are pulled up freely, one corner appears at the bottom of the cloth. To grasp the corner is the most reliable way to handle the cloth.

Further, from the analysis of human operations, three steps were identified as being necessary to wash clothes: (a) picking up one cloth from piled clothes, (b) holding one corner of the cloth, and (c) holding one edge of the cloth.

Robots appear to be well suited for performing these steps. When robots are used, the use of a proper combination of mechanisms and vision systems is necessary. In this paper, the vision systems with relative stereo algorithm and flexible cloth handling fingers with pins has been introduced to input washing clothes to the pressing and folding line.

The following figure shows the developed robot system. The system has shown a success rate of 80% for handling clothes and a tact time of 10 s. The expected success rate for a practical system is 90%. The development of a second version of the robot system that is capable of 90% success rate is currently underway.

Fig. 4 Cloth Handling Robot System