

Supplement

**Experimental 3d Maintenance Work Measurement and Analysis for Maintenance Improvement and Enhancement of Productivity of Semiconductor Manufacturing Equipment**

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We developed a measurement system consisted of 2D/3D sensors, head position and eyesight sensors, and hand motion sensors (Fig.1(A)). By using the developed system, we experimentally measured maintenance work of semiconductor manufacturing equipment such as parts assembly and wiping (Fig.1(B)), and extracted indicators of personal differences among workers. We extracted various indicators including wiping angular velocity, gaze point, distance between head and parts, and hand motion velocity. As a result, we demonstrated representative differences of indicators between a skilled maintenance worker and an unskilled maintenance worker (Fig.1(C)).

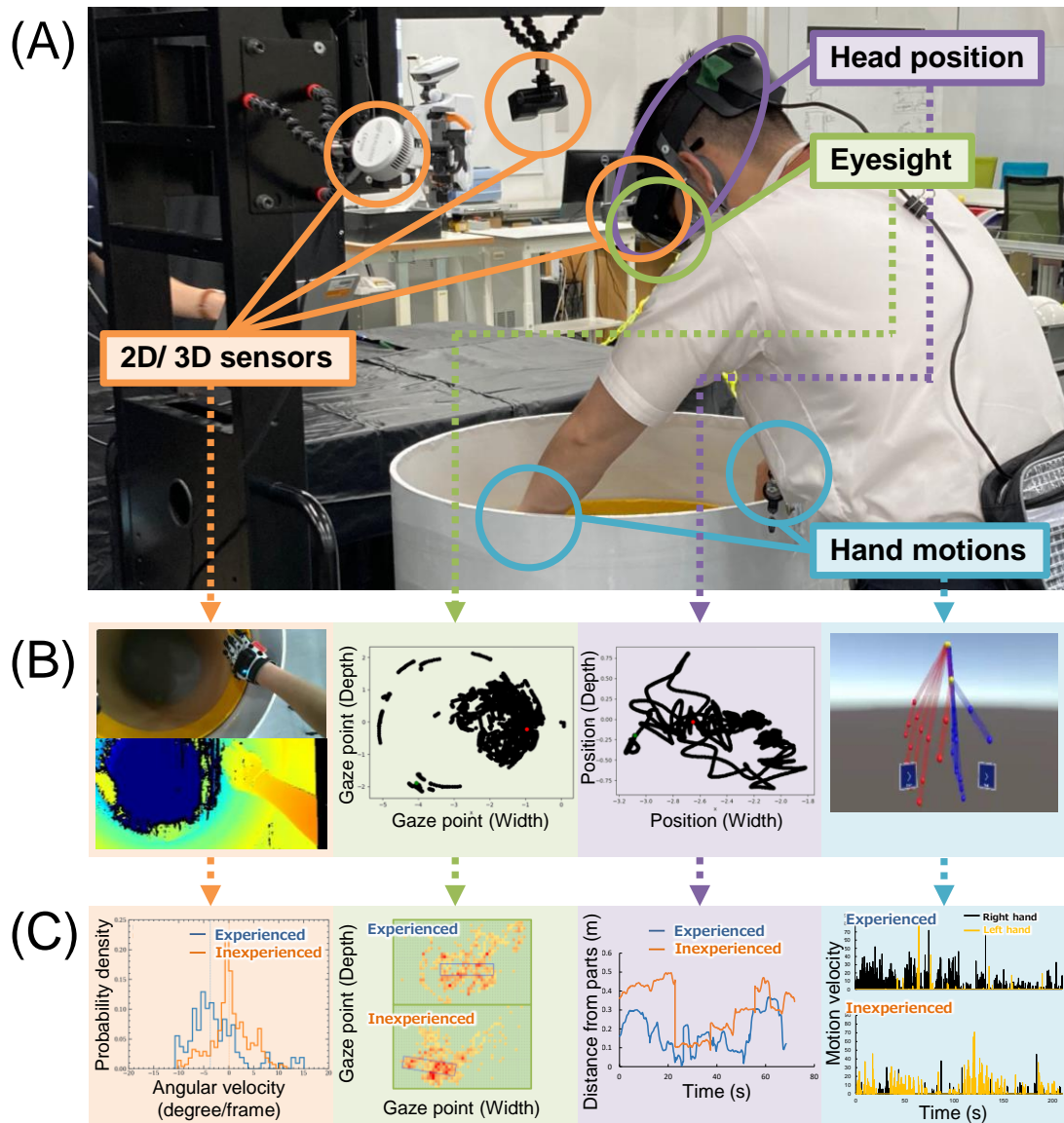


Fig.1 An example of a configuration of developed measurement system for maintenance work and representative results of maintenance work comparison between an experienced worker and an inexperienced worker. (A) An example of a configuration of developed measurement system for maintenance work, (B) examples of obtained work data, and (C) comparison results of extracted indicators such as wiping angular velocity, gaze points, distance between worker's head and parts, and hand motion velocity between an experienced worker and an inexperienced worker.