Ecological Interface Design for Teaching Assembly Operations to Industrial Robot ⋆

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Abstract: For the purpose of developing a practical support tool for human workers engaged in industrial robot teaching, the work domain of position teaching was analyzed in terms of means-end relations, and a mechanical explanation model was introduced into the analysis to capture the force-displacement relationship inherent in and informative on the work system. The resulting models were utilized for the analysis of the robot operators' decisions in search of accurate operation positions, and it clarified a basic operation strategy to make use of an invariant frame of reference in the position search space. Based on these findings, a prototype GUI was developed that can provide e?ective information supports for di?erent granularities of the activity in position teaching. On the basis of Ecological Interface Design, the proposed GUI represents the activity-related information in a way that a?ords the robot operators' intuitive and strategic operations.

Keywords: Ecological interface design, human-machine interface, industrial robots, robot teaching, work analysis.

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