

Development of Vision-Based Robotic Welding for Out-of-Position Welding

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Introduction/Background

Present day robotic welding systems are confined to work cells and rely on positioners to augment the degrees of freedom of the robot so that the welding process can be maintained in a preferred position. While many applications can live with these restrictions, in situ welding by robot is a valuable long-term objective. It would, for example, allow for welding in environments that are unsafe or unhealthy, or both, for humans.

Procedure

In this work, we are developing an automated welding system that uses visual feedback from the welding process to close the loop on the process control. The vision system is used to observe the weld pool and the parameters of the pool are supplied to a model of the welding process. The information from the model is then used to adjust the weld process. The model is based on fundamental principles rather than empirical data, and thus should be more robust to operational variations. This model-based approach is new, as far as we know, because of the use, in realtime, of the model and the fact that it is not an empirical model.

Results from our initial system integration and test will be available, along with an assessment of the approach.