

Shared Control of Hydraulic Excavators to Improve Energy Efficiency

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Presently, excavator operators manually control end effector motion. Decreases to a task's time or energy cost are historically achieved by designing better systems and components or through operator training. In the proposed approach, the human and machine share control of the end effector to improve machine performance. Here the operator is continually in the loop, meaning an operator input immediately elicits changes in actuator motion. This is in contrast to impractical autonomous machines for which pre-programmed trajectories remove the operator from the control loop. The proposed shared control scheme is exemplified by a controller having authority to modify the original command, thereby sharing control with the operator. The command perturbation is a function of estimates of the intended task and the pseudo-optimal trajectory for completing that task. The poster will introduce the idea of blended shared control in the context of excavation and present some preliminary experimental results showing the potential implications of shared control of hydraulic excavators.