### Abstract:

Motion estimation is a key function in scan rate conversion, advanced picture quality improvement, 2D–to–3D content conversion, and many other video processing steps. For hardware efficiency reasons, most motion estimation implementations are block–based. As object boundaries commonly do not coincide with block boundaries, artifacts may be visible at object boundaries using the block–based approach. Motion estimation for irregular shapes, such as image segments, can accurately track motion boundaries, but a straightforward translation of block–based motion estimation algorithms to segment–based ones leads to inefficient hardware implementations. Therefore, this paper proposes a modified segment–based motion estimation algorithm utilizing the efficiency of block–based processing. We demonstrate an efficient very large instruction word (VLIW) application–specific instruction–set processor (ASIP) implementation of this algorithm.