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| **Evaluation of Scan-Line Optimization for 3D Medical Image Registration** |
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| **- MI-tech Report 86 -** |  |  |
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| **Abstract**Scan-line optimization via cost accumulation has become very popular for stereo estimation in computer vision applications and is often combined with a semi-global integration strategy, known as SGM. This paper introduces this combination as a general and effective optimization technique. It is the first time that this concept is applied to 3D medical image registration. The presented algorithm, *SGM-3D*, employs a coarse-to-fine strategy and reduces the search space dimension for consecutive pyramid levels by a fixed linear rate. This allows it to handle large displacements to an extent that is required for clinical applications in high dimensional data. *SGM-3D* is evaluated in context of pulmonary motion analysis on the recently extended DIR-lab benchmark that provides ten 4D computed tomography (CT) image data sets, as well as ten challenging 3D CT scan pairs from the COPDgene study archive. Results show that both registration errors as well as run-time performance are very competitive with current state-of-the-art methods.  |  |  |

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