Multiresolution Mesh Blending for Surface Detail Reconstruction

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Abstract : In the area of mechanical reverse engineering, processes often encounter difficulties capturing small, highly localized surface information. This could be the case if a physical turbine was 3D scanned for lifecycle management or robust design purposes, with interest on eroded areas or scratched coating. The limitation partly is due to insufficient automated frameworks for handling -localized - surface information during the reverse engineering pipeline. We have developed a tool for blending surface patches with arbitrary irregularities into a base body (e.g. a CAD solid). The approach aims to transfer small surface features while preserving their shape and relative placement by using a multi-resolution scheme and rigid deformations. Automating this process enables the inclusion of outsourced surface information in CAD models, including samples prepared in mesh handling software, or raw scan information discarded in the early stages of reverse engineering reconstruction.