Layered Surface Detection for Virtual Unrolling

We present a method for virtual unrolling of a thin rolled object. From a volumetric image of the rolled object we obtain a flat image of the object’s surface, which allows visual inspection of the object and has a number of applications. Our method exploits the geometric constrains of the problem and detects a single rolled surface. For surface detection we adapt a solution to an optimal net surface problem, previously used for terrain-like and tubular surfaces. We present our approach on an example of a rolled sheet of microelectronic, which has a layer of flexible polymer substrate and a thin metal layer lithographically coated onto the polymer. Our approach is automatic and robust. The unrolled image is undistorted, and the surface structures may be accurately quantified making our approach a good candidate for an industrial application of virtual unrolling.

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