

A Security-cum-Background-Rating System through Face Recognition employing Edge-Based Dotted-Rasterstereography

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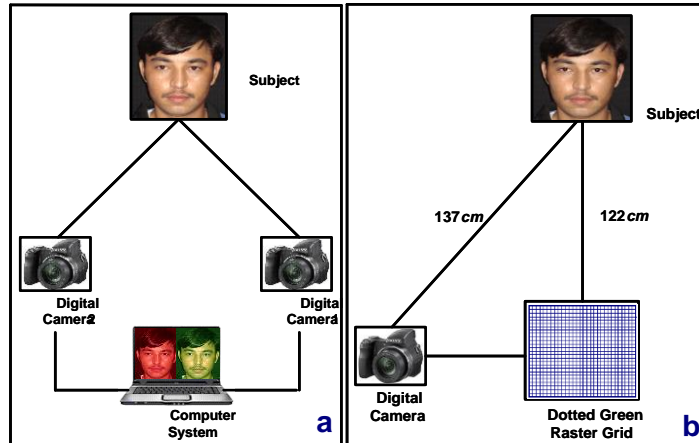


Fig. 1. (a) Stereophotogrammetry and (b) dotted-rasterstereography setups

This lecture explained **human-face recognition using edge-based dotted-rasterstereography**, a biometric identification technique employing **pattern recognition**, which has the potential to be used as identification-based-security system (Fig. 1). A raster grid was projected on human face, distortions of which were used to extract curvature information — unique for a face (principal identification and recognition criterion). This information, in coordinate form, was processed by image-processing algorithms. A modified-raster grid was constructed and tested. The modification, mainly, consisted of use of green dots instead of conventional screen composed of stacked squares, which gave acceptable results for green color (Fig. 2). Registration, identification and verification were 3 phases of face-recognition system. In the first step, subject's face was captured using a digital camera and stored in the system database. In the second one, the registered face was compared with all the stored faces in the database. The

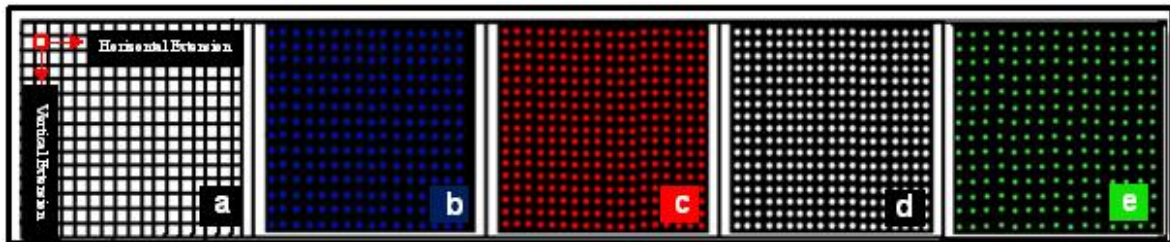


Fig. 2a-e. From conventional to dotted raster — various colored grids tested, best results were obtained in our lab for the last one, repeated-squared-raster grid, blue-, red-, white- and green-dotted-raster grids

verification phase consisted of comparing the identified face with own stored template. Once the facial image passed these three stages, the face was recognized as the one belonging to a particular individual. Our face-recognition system correctly recognized 190 out of 200 human faces during test runs. This algorithm was computationally efficient and effective (Fig. 3). The edge-based-rasterstereographic-face-recognition system seemed to be suitable for identification and security purposes as time and cost-saving mechanism. Once the face is recognized an identity file was attached with it, which displayed incumbent's name, age, education, profession and disposition/inclination towards a certain topic, so that if that individual asked a question, a reply was tailored to the understanding of the person putting up the query.

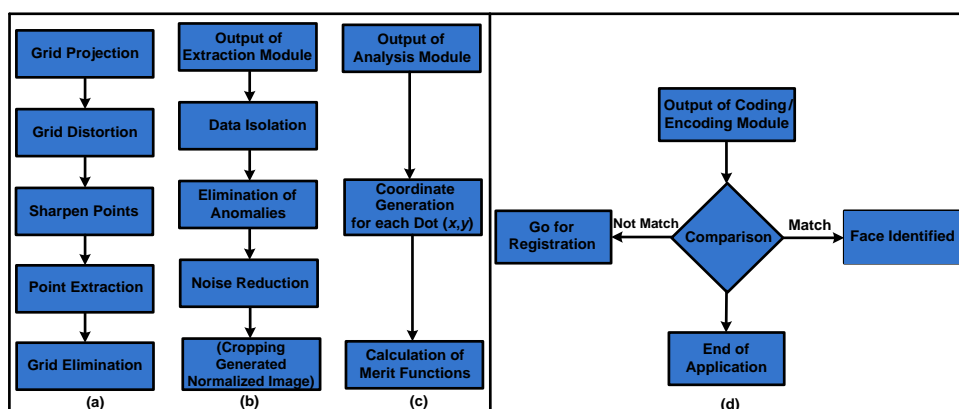


Fig. 3. Steps of face recognition using edge-based rasterstereography — (a) extraction module, (b) analysis module, (c) coding/encoding module and (d) recognition module

Keywords: 3-D-optical imaging • Curvature map of test object (subject) • Image processing • Non-contact measurements • Stereophotogrammetry

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