

## Publication

### A Monte Carlo strategy to integrate detection and model-based face analysis

**Book Item (Buchkapitel, Lexikonartikel, jur. Kommentierung, Beiträge in Sammelbänden)**

**ID** 2332543

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**Year** 2013

**Title** A Monte Carlo strategy to integrate detection and model-based face analysis

**Editor(s)** Weickert, Joachim and Hein, Matthias and Schiele, Bernt

**Book title** Pattern recognition, 35th German conference, GCPR 2013

**Publisher** Springer

**Place of publication** Berlin

**Pages** S. 101-110

**ISSN/ISBN** 978-3-642-40601-0

We present a novel probabilistic approach for fitting a statistical model to an image. A 3D Morphable Model (3DMM) of faces is interpreted as a generative (Top-Down) Bayesian model. Random Forests are used as noisy detectors (Bottom-Up) for the face and facial landmark positions. The Top-Down and Bottom-Up parts are then combined using a Data-Driven Markov Chain Monte Carlo Method (DDMCMC). As core of the integration, we use the Metropolis-Hastings algorithm which has two main advantages. First, the algorithm can handle unreliable detections and therefore does not need the detectors to take an early and possible wrong hard decision before fitting. Second, it is open for integration of various cues to guide the fitting process. Based on the proposed approach, we implemented a completely automatic, pose and illumination invariant face recognition application. We are able to train and test the building blocks of our application on different databases. The system is evaluated on the Multi-PIE database and reaches state of the art performance.

**URL** [http://dx.doi.org/10.1007/978-3-642-40602-7\\_11](http://dx.doi.org/10.1007/978-3-642-40602-7_11)

**edoc-URL** <http://edoc.unibas.ch/dok/A6212309>

**Full Text on edoc** Available;

**Digital Object Identifier DOI** 10.1007/978-3-642-40602-7\_11

**ISI-number** WOS:000329236100011