

# A Modular Framework to Detect and Analyze Faces for Audience Measurement Systems

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**Abstract:** In this paper we describe an approach that enables the detection, tracking and fine analysis (classification of gender and facial expression) of faces using a single web camera. One focus of the paper lies in the description of the concept of a framework that was designed in order to create a flexible environment for varying detection tasks. We describe the functionality, the setup of the framework and we also give a coarse overview about the algorithms we are using for the classification tasks. Benchmark results are given on standard and publicly available data sets. Although the framework is designed for general object recognition tasks, our focus so far has been in the field of face detection and fine analysis. With the capabilities provided by the system we see one main application field in the area of digital signage where providers are enabled to gather information, measure audience focus or even create interactive advertisement solutions. The varying applications require different software features and the provided framework approach allows to easily create different recognition setups in order to fulfill these specific needs. We show in a demo application for still images and movies that our framework can be well used for these purposes. This can be downloaded from <http://www.iis.fraunhofer.de/EN/bf/bv/kognitiv/biom/dd.jsp>.