

# Preface

The retail and advertisement industries are becoming more pervasive, with the need for measuring engagement of viewers/shoppers with newly launched campaigns. The Digital Signage sector represents today the third advertising medium in terms of annual revenues after mobile and online advertising. The trend is exponentially increasing and brands, network aggregators, and media planners' needs are moving toward understanding the level of engagement of viewers in order to measure their reaction to new products. While online advertising is mature and has established measurements tools, there are sectors of the sale industry where grabbing anonymous information from the human being is important to measure the effectiveness of a campaign and to take prompt actions to maximize the attention of people to the ad or to the product space. Point of sale and on-shelf solutions are also getting more pervasive due to the needs of measuring how shoppers engage, where attention and gaze estimation in free environment is difficult to perform. Also, measuring the customer experience will allow to stimulate a multidisciplinary approach, which will bring ethologist, psychologist, marketing, and media planner professionals to eventually propose new metrics to study and understand social behaviors of social media.

Video analytics may help in understanding the effectiveness of the branded message by studying and measuring public opinion and polling, geographical concentration of conversation of viewers. To this aim, computer vision and pattern recognition technologies will play an important improvement in audience measurement for its capability to understand several visual cues such as demographics, free gaze estimation, dwell time, emotion and group people proxemics, where low spatial resolution of acquired subjects, changing of the pose, occlusion, illumination changes, large variability of intra-class female age, and ethnicity cohorts represent some critical aspects for recognition.

The aim of this book is to provide an overview of state-of-the-art methods for audience measurements in the retail and Digital Signage sectors, attract end-users, and stimulate the creation of appropriate benchmark datasets to be used as reference tool for the development of novel audience measurement algorithms.

The book is organized into three parts. The first part is an introductory chapter and explains the usage of data for the decision making from a marketing research point of view. It also cover the analytics necessary to the media and marketing professionals to plan, execute, and control their marketing and media actions. This information is useful for computer vision and pattern recognition professionals in order to focus their studies on important data to be extracted from one or more video streams.

Part 2 is about demographics and discusses current and future trends on biometric features used to grab anonymous information about several cues. Several contributions are related to the latest powerful feature extraction and selection methods for gender, age, and ethnicity. Some of them are used both for reidentification purposes for returning viewers, recognition, and to trigger dedicated advertising campaigns to the

current viewer. The contribution of face alignment activity is also investigated and robustness in the recognition process measured. In this context, reidentification is a hot topic since it allows better viewer statistics by filtering repetitions. Besides biometric information grasped from the detected face bounding box, information regarding clothing attribute is also addressed. A contribution related to the use of an RGB-D sensor is also introduced in order to understand which product the viewer is focusing its attention and for how long.

Part 3 is related to modeling consumer behavior by using machine learning techniques. The majority of papers are related to aggregate and analyze demographics information, 3D viewer patterns in order to predict consumer behavior in a retail environment, especially oriented toward the purchase decision process and the roles in purchasing situations.

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