Preface

The concept of emotion-based design, production, and marketing was considered or dreamed in Japan in the 1950s. Since then, numerous methods have been studied to support humans in decision making, e.g., artificial neural networks and living structures as well as artificial intelligence were investigated in the 1960s and 1970s. Various methodologies such as fuzzy sets were also proposed during the same period. In parallel, in economics and marketing, people recognized that the influence of human psychological behaviors and preferences plays a pivotal role in decision making. Daniel Kahneman was awarded the Nobel Memorial Prize in Economic Sciences for his contributions in this line of research. Indeed, emotional experience is important in shaping our future behaviors.

Researchers started to investigate the practical use of human emotion and affective recognition in design in the 1980s. Such research was then extended from design and questionnaire-based analyses to more physiological, biometrical, and bio-measuremental experiments. Recently, studies on human emotions and affective senses have become prosperous. As highlighted in the book titled "Descartes' Error: Emotion, Reason, and the Human Brain" by Antonio R. Ramasio, human emotions play an important role in our thinking, and our rational behaviors are greatly governed by emotions. Therefore, it is imperative to take human affective feelings into consideration when we tackle problems in various domains.

In essence, affective (or Kansei) engineering is a scholarly field that focuses on discovering and utilizing the value of human emotions for the development or improvement of products or services, i.e., by incorporating human affective feelings and impressions into the product or service design, development, and delivery cycle. Indeed, the concept of affective engineering has become increasingly important in the economic value chain. This is apparent when the Ministry of Economy, Trade, and Industry of Japan launched the "Kansei Value Creation Initiative," and placed "Kansei" as the fourth value axis in the product or service value chain. In other words, the affective value now joins the other three axes (performance, reliability, and price) to help organizations maintain and improve their competitiveness, i.e., producing products or services not only come with high performance, high quality and reliability, and low price, but also with high human affective values. As a result, affective values need to be embedded into the whole economic value chain, ranging from upstream goods such as materials

and components to downstream goods such as finished products, services, and contents.

This edited book stems from the First International Symposium on Affective Engineering (ISAE2013) held at Kitakyushu, Japan, from 6 to 8 March, 2013. ISAE2013 managed to attract numerous participants from different backgrounds, which included academics, engineers, and practitioners to present and exchange knowledge, experience, results, and information related to the broad aspects of methodologies and applications of affective engineering. Following the success of ISAE2013, participants have been invited to extend their research works and contribute their findings as book chapters. Following a review process, a total of 22 chapters have been selected for inclusion in this edited book.

This book consists of two parts, i.e., methodology and application. Each part has 11 chapters. In Part I (Methodology), attempts and efforts in the design and development of a variety of methodologies related to affective engineering are presented. These include

- controlling the temperature and realizing a comfortable space based on human brainwaves;
- proposing a new method that is useful for estimating human social emotions by measuring micro body movements;
- developing a bi-level human migration model based on conjectural variations equilibrium;
- evaluating signs in the artisanal sign-making area with the aim to improve the level of customer satisfaction;
- defining the design subjects for creating attractive products and improving user experience without relying on designers' heuristics;
- devising an icon strategy to cultivate and attract consumers' loyalty that helps a company able to differentiate its products from others in the market;
- analyzing aesthetic experience as a Kansei element and a cognitive process in product design and development;
- understanding Kawaii (an affective value) feelings pertaining to shapes, colors, sizes, texture, and tactile sensation caused by product materials;
- evaluating the emotions for traditional Vietnamese clothes for women based on computer vision and machine learning methods;
- assessing the sound effects in e-book reader software packages based on near-infrared spectroscopy;
- investigating the relationship between cognitive style and webpage perception from people with different cultures.

In Part II (Applications), the effectiveness and usefulness of a variety of affective engineering models and techniques in practical environments covering different domains are presented. These include

- studying how the backrest structure affects the sitting comfort of a meeting chair based on body pressures and contact areas between user and the chair;
- using affective values as a key factor to luxury brand building by focusing on the Swiss watch industry;

- evaluating the transient signals of different button sounds by utilizing the wavelet transform method;
- investigating the differences in the production processes of high-end garments manufactured in Japan and Italy;
- adapting customers for online shopping of clothes by the ability to identify the fabric used and the prior knowledge in fabric;
- administering self-report and physiological measures to understand color-related emotions in different environments;
- gaining an insight into probable human-centered design trends by analyzing movie scenes;
- analyzing the volatile compounds of white mother chrysanthemum flower on sleep quality;
- examining emotional characteristics in response to various shades of white that could help in designing white-based products;
- understanding the differences in skin physiology parameters and affective values in skincare products;
- devising a machine learning model to extract important information pertaining to useful product features based on customers' reviews.

We would like to express our sincere gratitude to all authors who have contributed their works for inclusion in this book. We would also like to extend our appreciation to the editorial team at Springer who have diligently helped in making this book a reality. We hope that this book will serve as a useful reference for readers to learn solid knowledge pertaining to different methodologies of affective engineering and apply the acquired knowledge to undertake challenges in various industrial domains.

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