Modeling Digital Personality: A Fuzzy-Logic-Based Myers–Briggs Type Indicator for Fine-Grained Analytics of Digital Human

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***Abstract*— Digital human in cyberspace can help provide humanized services in specific applications, such as question & answer systems, recommender systems, chatter robots, and intelligent assistants. While most researches focus on behavior analytics, few of them integrate the personality that is also a closely related factor. As a classic indicator for personality representation, Myers–Briggs type indicator (MBTI) categorizes an individual into mutually exclusive types from four dichotomous axes (extraversion versus introversion, sensing versus intuition, thinking versus feeling, judging versus perceiving). Traditional recognition method using MBTI simply measures the user's preference frequency in each axis through questionnaires, treating the dominant value as the identified result. Such a paradigm, however, represents all the people with only 16 types and cannot distinguish heterogeneous users clearly. This article proposes a novel personality recognition method using fuzzy logic. Different from previous classifications, our new method categorizes the individual in a continuous space and represents one's personality in a more fine-grained level. We have designed comparative psychological tests for 77 people. The validation experiments on such tests indicate that the fuzzy-logic-based method is not only consistent with the classic MBTI tests (in the sense of defuzzification) but also provides the uncertainty for each personality type. Therefore, it can be viewed as a generalization of the classic MBTI tests and promotes the representation of individual's heterogeneity for fine-grained analytics of digital human.**

***Index Terms*— Digital human, digital personality, fuzzy logic reasoning, fuzzy personality recognition, Myers–Briggs type indicator (MBTI).**

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I. Introduction

PERSONALITY recognition, or computational personality assessment, is a vital area in affective computing and artificial intelligence (AI). Since personality is an indispensable cognitive part of human intelligence [1], its recognition is an endogenous factor to understand, interpret, and even "predict" one's behaviors [2], [3], [4]. Such understanding of human behaviors may probably benefit various application fields. For example, in a job recruiting process with large-scale candidates, personality analysis may help fast and accurate matching of positions and employees, which would expand the staff's personal advantages in their subsequent work [5]. The accurate matching of position and personality will achieve better division of labor, and thus elevate the efficiency of the whole company. For content recommendation in social media, personality recognition is able to help customize most appropriate information for different groups or individuals [6], [7], [8]. This will enhance users' satisfaction and thus, from the perspective of economics, improve the total utility of the whole system. In smart human–machine interaction [9], some studies prove that subjects' personality profiles have great influence on personal spatial zones in human–robot interaction and thus on the ultimate interactive effects [10]. And for education sector, teachers can tailor personal-oriented learning material to increase the effectiveness of the teaching process by referring students' personalities and psychological states [11], [12]. All these use cases have indicated that accurate personality recognition plays a core role in human psychology or behavior understanding [13], and it is of great value in various potential applications.

Generally, computational personality recognition is an interdisciplinary of psychology, cognitive science, and AI [3], [14]. With the fundamental hypothesis in classic psychology that person's behavior and appearance often depend on his personality, its primary objective, conversely, is to infer which basic personality type/types the user belongs to from his