

# Agent Augmented Inter-generational Crowdsourcing

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**Abstract**—Crowdsourcing is starting to attract elderly workers and can become a possible productive aging platform to help address the shortage of manpower as a result of population aging. An important challenge emerging from this development is how to promote effective inter-generational interactions. Currently, there is little empirical data to help multi-agent systems researchers to design incentive mechanisms for this purpose. In this demonstration, we showcase an inter-generational crowdsourcing mobile app to bridge this gap in existing research. The app enables researchers to conduct large-scale empirical studies designed to construct useful datasets reflecting the effectiveness of various persuasive techniques on people from different age groups in promoting inter-generational interactions.

## I. INTRODUCTION

The world population is ageing rapidly due to falling fertility and mortality rates. In the foreseeable future, inter-generational interactions will be an everyday occurrence in the workplace. However, such interactions might not always happen in the physical world [1], [2], [3]. Recent reports from Japan suggest that the elderly are starting to turn to crowdsourcing for jobs.<sup>1</sup> Crowdsourcing, which refers to the arrangement in which contributions (e.g., observations, contents, and services) are solicited from a large group of unrelated people [4]. Some crowdsourcing tasks require workers to perform tasks in given locations (sometimes with the help of mobile devices). This type of crowdsourcing is referred to as mobile crowdsourcing [5]. Due to the high level of flexibilities, online or mobile crowdsourcing systems present a good match to the elderly’s life style which emphasizes work-life balance.

Although existing commercial crowdsourcing platforms, such as the *Amazon’s Mechanical Turk (mTurk)*, mostly rely on workers to pro-actively look for and take up tasks, research works in artificial intelligence (AI) and multi-agent systems (MASs) [6] are moving towards building intelligent agents automate the allocation of crowdsourcing tasks in a situation-aware manner [7], [8], [9], [10], [11], [12], [13], [14], [15]. Nevertheless, existing research in this area has not yet taken inter-generational interactions into account. The subject expertise from the elderly and the technical capabilities from the young can be combined

through crowdsourcing to tackle complex and challenging tasks [16]. However, inter-generational crowdsourcing has also posed an important open research question to the intelligent agent community - what motivate people to join crowdsourcing?

## II. DEMONSTRATION CONTENT

In this research, we attempt to bridge this important gap with an inter-generational crowdsourcing based persuasive technique study platform - the SG50 Wish App. The platform consists of a mobile app and web-based platforms. It provides a channel for Singapore residents to share their well wishes in celebration of Singapore’s 50th Anniversary of independence through multi-modal expressions including texts, photos, and augmented reality images.

The app is incorporated with a functions that potentially require inter-generational interactions. The augmented reality function of the app is able to detect an “SG50” logo through the camera embedded in a mobile device. Once the logo is detected, the app super-imposes a virtual birthday cake onto the logo to create a novel photograph for the user. However, this function requires two persons to cooperate. As young people are often more technically savvy than the elderly, they tend to cooperate in the way as illustrated in Figure 1.

We have embedded various central and peripheral persuasive designs into the mobile app based on the Elaboration Likelihood Model (ELM) persuasion theory [17]. These design factors include:

- 1) *The Appeal of National Spirit*: the app is positioned as a platform for people to share their wishes for celebrating the 50th National Day of Singapore;
- 2) *The Appeal of Sense of Belonging*: as a sub-function of the app, it allows people to write well-wishes for various participating community organizations;
- 3) *The Appeal of Social Networking*: the app and the web platform allows people to comment and like each others’ photos and wishes;
- 4) *The Appeal of Innovative Interaction*: the app is incorporated with augmented reality functions such that it can produce specialized photos incorporated with various virtual artifacts.

<sup>1</sup><http://thebridge.jp/en/2013/06/japan-seniors-employment>

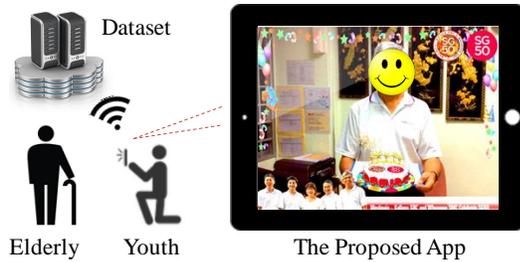


Figure 1. The proposed crowdsourcing-based app for investigating factors contributing to inter-generational interaction.

The platform records sequence of usage for each user, the contents contributed by each users, and situational information such as time and location of usage and send these data into a central cloud server for storage. Together with the profile information (e.g., gender, age, cultural background) provided by the users during registration, we aim to build a large-scale dataset reflecting the relationship between people’s background and their response to different persuasion techniques.

The system has been deployed in Singapore in collaboration with various local community organizations to start data collection. This dataset will allow us to investigate the motivating factors for people from diverse demographic backgrounds to engage in interactions with those from different age groups. The resulting dataset will be published to support the AI and MAS research community. This dataset will help researchers determine which of the persuasion mechanisms is likely to be in effect for each user, and act as an evaluation benchmark for proposed agent-based solutions for motivating inter-generational interactions in crowdsourcing.

### III. FUTURE RESEARCH

In subsequent research, we aim to propose models capturing the possible temporal dynamics inter-generational interaction behaviours. We will also leverage the goal oriented modelling methods [18] to represent complex knowledge possessed by the elderly to support inter-generational crowdsourcing of the elderly’s wisdom and experience.

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