

Abstract

Singapore has been facing a rapidly aging population in recent years, as total fertility rate dropped to an all-time low of 1.16 in 2010. This creates a societal pressure, as there will be less economically active adults to financially support an increasing cohort of elderly residents. As such, the Central Provident Fund Board (CPF Board), the state pension agency, commissioned a large-scale nationwide face-to-face survey to collect data on retirement adequacy and study the social issues and public health needs related to retirement amongst the local resident population aged 45 to 85 years old. Nielsen, being the leading market research and intelligence company, has been appointed as the execution agency to conduct the survey and data collection on behalf of CPF Board.

One of the key execution challenges in such a large-scale face-to-face survey is the efficient deployment and allocation of manpower resources to conduct the interviews in an orderly and competent manner to enhance productivity, while ensuring a high quality data collection process. In this project, we propose an evolutionary-based algorithm to autonomously perform the allocation of interviewers to survey respondents to facilitate the fieldwork design. The allocation is done in two stages. Firstly, K-means clustering is used to partition the survey respondents based on their geographical locations. The second stage employs a modified discrete particle swarm optimization (PSO) technique to assign the interviewers to the respective clusters of respondents to minimize the travel distance of each interviewer while ensuring a near-even spread of the survey workload across all the interviewers.

Finally, we evaluate the effectiveness of the algorithm by comparing the results against currently used methods and discuss possible areas for future work.