Connected Living—Part I

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With the recent, remarkable advancements in the Internet of Things, wireless communication, edge/cloud computing, and artificial intelligence, the connection between human beings and their surrounding environments has dramatically increased, entering a new era of connected living. New challenges and opportunities are also brought up in the complex interaction between human beings and technologies. The focus of this special issue of IEEE Internet Computing *is on investigating new technologies and human-technology interactions that will enable connected living to enhance well-being management and quality of life. The articles in this special issue investigate and present new technologies, visions, and projects in human–technology interactions toward connected living.*

With the rapidly changing intelligent technologies, we have entered a new era of connected living in which human beings and their surroundings are intimately linked. This transformation has also enabled new knowledge and synergies that impact daily living and improve quality of life in different aspects. At the individual and/or family level, new Internet of Things systems enable ubiquitous health monitoring and well-being management; new security systems protect people's privacy and everyday life. At the community level, new smart and connected community solutions enhance efficiency, accessibility, and thus, the overall quality of life. This new era of connected living also brings challenges to the complex interaction between human beings, technologies, and the surrounding environments. The foreseen public health and societal impacts and the multidisciplinary nature call for special attention and contemplation from researchers and stakeholders.

The goal of this special issue of *IEEE Internet Computing* is to seek new technologies and human–technology interactions that enable connected living to enhance well-being management and quality of life from both the individual/family and community levels. All the accepted articles went through at least a two-round peer-review process with at least three reviewers. The included articles present new technologies, visions, and projects in human–technology interactions toward connected living. Three of them will be published in the May/June 2023 issue *IEEE Internet Computing*, and the remaining two will be included in the September/October issue.

The first article, "Healthful Connected Living: Vision and Challenges for the Case of Obesity,"[A1] envisions a new integrated suite of multimodal sensing and artificial intelligence (AI) techniques that can incorporate advances in health psychology to produce effective solutions for long-term healthful living. In this article, Singh et al. discuss the challenges and opportunities arising from realizing this vision of healthful connected living with constant attention to health and persistent, healthful behaviors. Their envisioned solution brings forth challenges in sensors for AI, user modeling, social context understanding, and continual evaluation.

The second article, "Model Ensemble for Predicting Heart and Respiration Rate From Speech,"[A2] proposes a nonintrusive, low-cost, and automatic stress monitoring framework facilitating timely activation of stress relief methods and/or stress prevention. In this study, Ntalampiras designed a multidomain speech feature-extraction scheme capable of revealing complementary stress-related characteristics, which are then modeled by a synergistic framework that is able to encode both linear and nonlinear relationships. This study then employed an appropriate corpus encompassing job interviews, constructed based on a standardized experimental protocol. The proposed method outperformed the state of the art by 12.3% and 33.3% in predicting heart rate and respiration, respectively. This new method provides an interesting solution for mental health monitoring from speech.

The third article, "User-Centric Federated Matrix Factorization Based on Differential Privacy,"[A3] proposes a user-centric federated matrix factorization model based on local differential privacy to solve privacy-preserving problems for recommendation system, which can be used in the connected living environment. In this study, Liu et al. improved the federated matrix factorization algorithm, with users as participants, and used a local differential privacy mechanism to perturb the gradient information for privacy protection. This article provides a feasible solution to protect privacy in recommender systems in everyday life.

The two remaining articles to be published in the July/August issue present community-level solutions for connected living environments. They are introduced in the next "Guest Editors' Introduction."

APPENDIX: RELATED ARTICLES

A1. M. P. Singh, M. Chi, and V. Misra, "Healthful connected living: Vision and challenges for the case of obesity," *IEEE Internet Comput.*, vol. 27, no. 3, pp. 7–14, May/Jun. 2023, doi: 10.1109/MIC.2023.3257994.
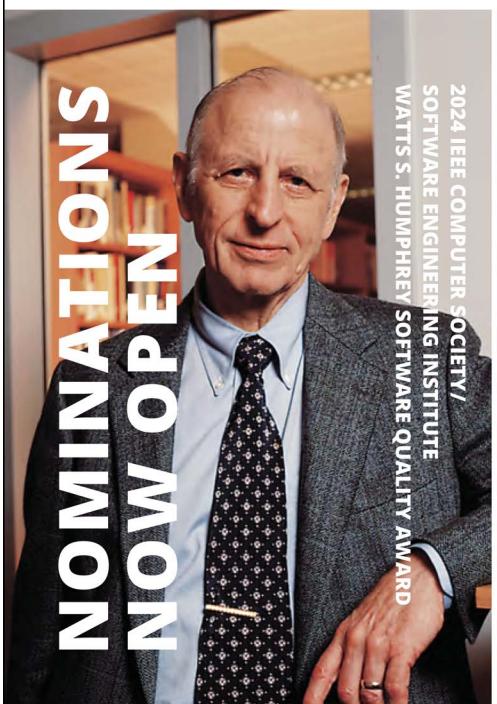
A2. S. Ntalampiras, "Model ensemble for predicting heart and respiration rate from speech," *IEEE Internet Comput.*, vol. 27, no. 3, pp. 15–20, May/Jun. 2023, doi: 10.1109/MIC.2023.3257862.

A3. Y. Liu, W. Xu, J. Lai, and J. Wang, "User-centric federated matrix factorization based on differential privacy," *IEEE Internet Comput.*, vol. 27, no. 3, pp. 21–27, May/Jun. 2023, doi: 10.1109/MIC.2023.3263896.

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