Editorial

Introducing the Special Issue on Artificial Intelligence Applications for Sustainable Urban Living

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1. Introduction

All global cities are in the process of transforming from classical cities to sustainable smart cities. In this process, people face many urgent challenges in sustainable urban living, such as urban safety, urban living quality, urban energy usage, urban traffic management, urban information security, and so on. In dealing with these urgent challenges in sustainable urban living, artificial intelligence (AI)-based applications play an important role. State-of-the-art AI-based technologies in image processing [1–3], video processing [4,5], speech and audio processing [6–9], music processing [10], natural language processing [11], multimodality processing [12–14], Internet of Things [15], edge computing [16], autonomous driving [17], heterogeneous computing [18–20], wireless networks [21–23], social science [24] and smart healthcare [25–28] could be helpful in adding intelligence to urban living and will provide better solutions to address challenges in sustainable urban living.

The aim of this Special Issue is to present a multidisciplinary state-of-the-art reference regarding theoretical and real-world challenges, and innovative solutions by inviting high-quality research papers for AI applications in sustainable urban living.

2. Methods

To explore the AI applications for sustainable urban living, methods from these aspect are considered:

- image classification, denoising, segmentation, object detection and tracking;
- video surveillance, video object detection, video object tracking, and video denoising applications;
- automatic speech recognition (ASR), text to speech (TTS), speech denoising, and speaker identification applications for urban living;
- artificial intelligence-based music composition, analytics, recommendation, and instruction applications;
- natural language processing (NLP) applications for urban living;
- multimodality applications for urban living;
- artificial-Intelligence-based content generation applications for sustainable urban living;
- optical flow estimation for sustainable urban living;
- autonomous driving techniques' applications;
- IoT applications in urban living;
- Edge computing models and lite deep learning models for real-time applications;
- heterogeneous computing for smart urban living;
- human–computer Interaction applications for smart and sustainable urban living;
- medical image processing and smart healthcare applications for urban living;
- wireless artificial intelligence applications for sustainable urban living;

- other artificial intelligence applications in the transformation of classical cities to smart cities.

Computer vision aims to improve the obtained image quality, detect its contents, and estimate the motion of its contents. The major parts include image enhancement, image fusion, object detection and tracking, optical flow estimation. Such computer vision technologies will highlight the objects and their behaviors in the images. Video related processing includes video surveillance, video object detection, video object tracking, and video denoising applications. These applications will be beneficial for intelligence systems to real-time monitor the real scene and provide strong evidence for possible unsafe behaviors in sustainable urban living.

Speech processing and music processing is another AI application areas, which utilizing audio as input of AI system. Audio related applications includes Automatic speech recognition (ASR), text to speech (TTS), speech denoising, and speaker identification applications. While NLP application utilize text as input of AI system. Audio and text is widely used in urban living, utilizing these information can help people achieve better communication and easily access to useful information.

Multimodality applications utilize information from more than two modalities. Combining different modalities of information can achieve better understanding of urban living environment and make more accurate decision. AI system can also generate content based on the specific input, these generated content can be used for advertisement and many other scenarios.

The Internet of things (IoT) application connected smart devices together and will provide convenience for people. To achieve IoT performance, edge computing focus to address the limitation of power and computation usage for small edge devices. While heterogeneous computing aims to get better computation efficiency and achieve faster computation. These applications will provide solutions for faster computation and more efficient energy usage. Wireless artificial also plays a important role in urban living, especially for autonomous driving, which is supposed to realized in urban living in the near future.

Human–computer interaction aims to find a more efficient way to communicate with computing devices. Smart healthcare solutions will provide better user experience for future urban living. Other AI applications will also be covered in this Special Issue. All these applications will provide good directions in the transformation of classical cities to smart cities.

3. Discussion and Conclusions

This issue contains several articles about artificial intelligence applications for sustainable urban living. These papers provide more AI application details in the transformation of classical cities to smart cities.

Thanks to all of the authors, reviewers and editors for your efforts and supports. By sharing your professional knowledge in various ways, the readers will be provided clear view of AI applications for sustainable urban living.

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