Making Crowds Smart

Tokyo is tackling overcrowding at large-scale public events.

by **Tim Hornyak**

For example, even after going to a crowded fireworks venue, people will be able to return home without stress due to human flow guidance technology.

About 10 million spectators are expected for the Olympic and Paralympic Games Tokyo 2020. With some 40 million travelers from overseas anticipated for the whole year, there will inevitably be congestion on the roads and sidewalks, as well as in the train stations of the capital. In the past, crowds have been an unavoidable aspect of any large sports event, sometimes producing frustration among attendees, and occasionally overly congested situations. Researchers today, however, are trying to harness computers to minimize these problems.

Scientists at a major Japanese telecom's research institute have developed technology for crowd-flow optimization using AI that can be used for sports and other events that attract big numbers. It is based on predicting the flow of people and forecasting where congestion will occur with a technology called multi-agent simulation that attempts to reproduce the movements of each person in the crowd. Directing the "human flow" with AI and accumulated human know-how from past experience can help reduce congestion and potentially hazardous situations. The laboratory has been doing research into human flow simulation and optimization since 2015. It has conducted experiments at Saitama Super Arena, one of the Tokyo 2020 Games venues, to predict congestion using video and mobile phone location information.

The team has been researching test case scenarios based on popular fireworks displays. In one simulation, the system analyzed 1.57 million possible routes for some 85,000 attendees at a fireworks event. The system's optimization technology found the most efficient routes for the attendees in only two hours—previous methods would have taken a whole year. The routes identified by the program have shorter wait times and fewer dangerous areas compared to simulations without any crowd flow control. By directing crowds based on recommendations from the technology, fireworks fans can get home faster and safer. The laboratory is continuing to develop the system so it can analyze events in real time.

While knowledge and expertise accumulated from previous Games will guide crowd-control strategies, the Tokyo 2020 Games will have a number of new venues that have yet to host large-scale international events. This new technology and new methods and insights gained from the recent groundwork carried out by the research institute may also be used to supplement human experience at the Games.

The goal is that spectators will be able to enjoy the events and return home with minimal stress.

The Tokyo Metropolitan Government (TMG) is also striving to reduce congestion in the capital, not only for the Games but year-round. Under its Smooth Biz campaign, which calls for teleworking and flexible hours, the TMG is working with private-sector companies to implement various measures under Travel Demand Management to ease congestion on roads, rails and other impacts on public infrastructure ahead of the 2020 Games.

"Smooth Biz is a new initiative to ease congestion during the Games," Tokyo Governor Koike Yuriko told a press conference. "Our hope is that as flexible work styles gain traction, we will see increased productivity and greater participation for people from a more diverse range of backgrounds."