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Hitachi, Ltd.

Putting fun into maintaining physical distance by system to link walking people and spatial distance

Preventing infection in crowded public spaces while reducing stress



Demonstration video at “Physical-Distancing Aquarium”

Hitachi, Ltd. has developed an experiential video solution to help prevent the spread of the novel coronavirus infection (COVID-19). The technology naturally raises awareness of physical distance and incentivize human behavior to maintain physical distance while enjoying images projected onto the floor around them that keep space with their movement. Highly precise sensors such as LiDAR¹ and ToF² cameras, are used to monitor the positions and distance between moving people in real time, without identifying them. The system is linked to spatial perimeter indicators, such as a visual sphere of moving objects that moves together with the person but disappears when the perimeter is broken. It is hoped that the solution will inhibit the spread of the coronavirus in public spaces where people congregate such as train stations, airports, large commercial facilities, and amusement parks, and thereby contribute to improving business continuity in the service sector. Further, the solution aims to reduce the stress in maintaining a physical distance by raising awareness in a fun

and enjoyable way. Focusing on an era of “with-“ and “after COVID-19,” Hitachi will continue to optimize feedback methods using people flow measurements and analysis to develop incentivized human behavior solutions.

*1 LiDAR: Light Detection and Ranging.

*2 ToF: Time of Flight.

■ Background

- As the global spread of COVID-19 continues, people are being placed in a situation for a prolonged period where their movement is restricted. This method of infection containment is having a negative effect on service sector industries such as retail, dining, and tourism, where there is a higher possibility of close contact, and the deterioration of the business environment has become a problem.
- For both business continuity of the service industry and infection protection, physical distancing of at least 2 meters between persons, is recommended.
- Although floor stickers and other signs are being to request physical distancing, they may not be noticed or give a bad impression as detracting from the scenery, or with prolonged use, even blend into scenery so much that the request is ignored.

■ Technology developed

- “Physical-Distancing aquarium, “a behavior-inducing demonstration where projected images change according to the density of people, to suggest physical distancing
- A coordinated control platform system that easily enables real-time feedback from people flow measurement, linking real-time detection of a person’s position and the image projected around them.

■ Confirmed results

- Physical distancing can be maintained with enjoyment.
- Sign placement is flexible, unlike floor stickers. Moving images are individually projected around each person, leaving little chance of the person overlooking it.
- The images to be projected can be replaced by logos or characters promoting the attractiveness of the facility.

■ Technology details

1. “Physical-Distancing Aquarium” behavior-inducing demonstration:

In this demonstration, images of fish are projected on the floor around visitors. The images keep pace with the person’s movement, creating a sense of fun and entertainment. However, when the distance between people become close and thus the possibility of infection arises, the fishes disappear, resulting in a less entertaining scene compared to that of a lower risk distance. Through such means, the behavior of a person to maintain an entertaining environment is naturally linked to behavior to maintain a safe distance from others. The demonstration is based on an assumed use case for an aquarium but the projected images can be adjusted to other scenarios and new images can be added depending on the intended use.

2. A coordinated control platform to support easy development of applications using real-time feedback from detection of people flow measurement

“Physical-Distancing Aquarium” is a high-precision projection mapping system with feedback from tracking systems, such as LiDAR and ToF sensors, which are free from privacy issues. For ease of implementation, IoT-standard specification-based system design with extendibility is adopted. As a result of the development, we can implement a revision of content with high frequency to support facilities’ concept promotions and event planning. Frequently changing the projection image also helps to maintain the stimulus, preventing the person from becoming accustomed to the image and thereby making the countermeasure to reduce the risk of infection obsolete.

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