Intelligent cooperation to provide surveillance and epidemic services in smart cities

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There has been a lot of interest in mobile robots and unmanned aerial

vehicles (UAVs) in recent times, primarily because these technologies have the potential to provide us with immense benefits. With the rise of 5G technology, it is expected that UAVs or drones and mobile robots will efficiently and safely provide a wide range of services in smart cities, including surveillance and epidemic prevention. It is now well established that robots can be deployed in various environments to perform activities like surveillance and rescue operations. But to date, all these operations have been independent of each other, often working in parallel. To realize the full potential of UAVs and mobile robots, we need to use these technologies together so that they can support each other and augment mutual functions.

To this end, a team of researchers led by Associate Professor Hyunbum Kim from Incheon National University, South Korea, have designed an Artificial Intelligence (AI)-assisted cooperative infrastructure for UAVs and mobile robots. In a paper published in *IEEE Network* , the researchers outline the entire structure that can use UAVs and mobile robots in public and private areas for multiple operations like patrolling, accident detection and rescue, and epidemic prevention.

According to Dr. Kim, "it is critical to look at surveillance and unprecedented epidemic spread such as COVID-19 together. This is why we designed the next generation system to focus on aerial-ground surveillance and epidemic prevention supported by intelligent mobile robots and smart UAVs."

The system designed by the team is composed of two subsystems, one for public areas and one for private areas. Both systems comprise of a Centralized Administrator Center (CAC). The CAC is connected to various Unified Rendezvous Stations (URSs) that are situated in public areas. These URSs are where the UAVs and mobile robots receive replenishment and share data. Mobile robots are also equipped with charging facilities to recharge airborne docking UAVs. The public

system aims at patrolling public areas, detecting accidents and calamities, providing aid, and performing epidemic prevention activities like transporting medical equipment. The private system can provide rapid medical deliveries and screening tests to homes.

But what about privacy under such surveillance? Dr. Kim says that "privacy is indeed a major concern for any surveillance mechanism. Therefore, we have created different privacy settings for different systems. For the public system, there are restricted districts where only authorized public UAVs can enter. For the private system, there are permanent private zones where no UAVs can enter except in emergencies and temporal access zones where permitted UAVs can enter with legal permission from the owners."

The authors are optimistic about the potential of this infrastructure to improve people's lives. The system can provide a vast array of services, from detecting and preventing potential terror in public spaces to detecting and extinguishing fires in private homes.