Reported Ethical Concerns Over Use of Robots for COVID-19 and Recommendations for Responsible Innovation for Future Pandemics

Robin Murphy (Computer Science and Engineering), Paula deWitte (Computer Science and Engineering), Jason Moats (Texas A&M Engineering Extension Service), Angela Clendenin (School of Public Health), Vignesh Gandudi (Computer Science and Engineering), Henry Arendes (School of Law), Shawn Abraham (School of Law)

Ground and aerial robots are successfully used in 48 countries in the COVID response, but with policy, legal, and ethical concerns and violations. An analysis of 338 entries (January 24, 2020 -- January 23, 2021) expressed concerns or violations with fears related to: loss of privacy (13), robots replacing workers (10), violations of regulations (9), unproven claims of effectiveness (9), lack of regulations to protect citizens from abuses (8), unwarranted surveillance (7), and professional ethics (5).

Explanation/Conclusion:

Most concerns or violations stemmed from public safety applications reflecting distrust of drones as representing policing policies, distrust of new technologies, or potential for impersonating or misrepresenting authorities by drones.

International diffusion of innovation is problematic due to cultural differences and expectations. The origin of some drone applications (e.g., quarantine enforcement, disinfection, and thermal identification missions) originated in China which may explain the concerns about public safety drones in other countries. While drone missions and techniques did not appear to violate United States law, their use did not match societal expectations creating ethical concerns resulting in a need for relevant agencies to create policies to guide the adoption of new technology for future emergencies. This will better inform and educate the public for public acceptance.

Short-Term Recommendations to Promote Ethical Use:

While responsible innovation takes significant engagement, disasters require immediate decisions. A proposed framework enables stakeholders and roboticists to perform a demand analysis:

1. Is this robot in everyday use for a similar application, a one-off laboratory prototype, or a minimum viable product?
2. What are the cultural expectations of privacy, product safety, and public accountability?
3. Does the robot record or permit the capture of imagery, conversations, or data about the public? If so, how is that stored, secured, and protected?
4. Does the robot meet all applicable certifications, and is there a clear provenance of intellectual property?
5. What infrastructure and technical skills are needed to operate and maintain the robot for an extended time?
6. What is the rate for different failure conditions? How are failures detected? Are the causes understood and predictable? What are the consequences of failures? What are the corrective actions, and who is responsible for them?

Figure 1: Reported Use of 338 Ground (219), Aerial (117), Marine (2) Robots for COVID-19 in 48 Countries from Jan. 24, 2020, to Jan. 23, 2021
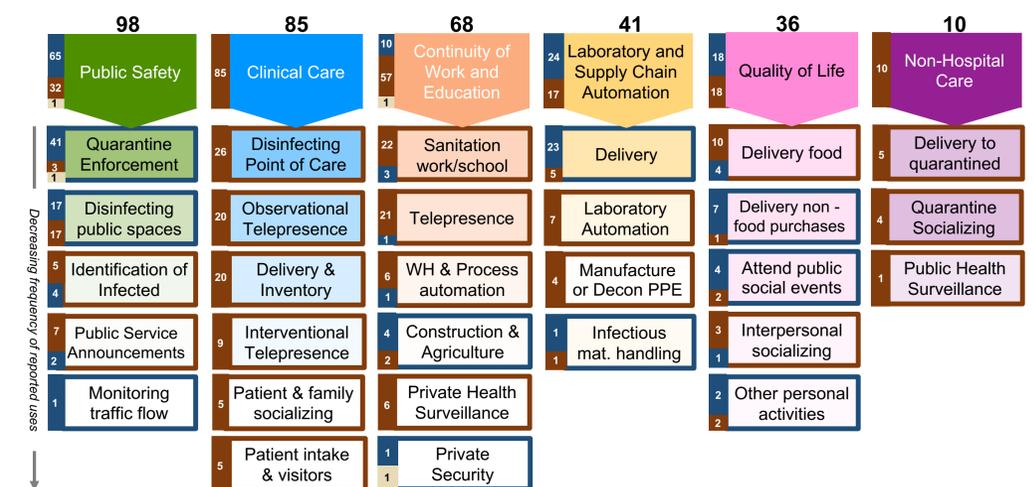

Figure 2: Reported Ethical Concerns for Ground and Aerial Robot Worldwide for COVID-19

TEXAS A&M UNIVERSITY