

Project Title: Development of Motorized Roboticmedical Assistant for Nursing, Sanitization, and House-keeping in Isolation Wards

Objective- This project aims to develop a motorized robotic vehicle fitted with robotic arm, for performing multiple tasks in the healthcare set-up dedicated for the patients suffering from highly communicable diseases such as COVID19. The proposed multipurpose robotic assistant can perform various tasks such as collection of pathological samples, acquiring physiological parameters such as temperature, delivery of food/ medicine in the isolation ward, sanitization of the isolation wards and approaching areas. This will significantly minimize the risk of transmission of infections into the healthcare workers and support staffs working in such environment.

Motivation: Corona virus pandemic has made the lives of medical staff vulnerable for infection. Medical personnel are very likely to get infected from the Corona positive patients being treated under their supervision. Further, support staffs serving in such conditions, are also vulnerable to the infection. Hence, there is a need to devise a multi-tasking robotic system that reduces the interaction between the patient and medical staffs. Such autonomous system greatly reduces the risk of spreading the corona infection in healthcare workers working in the highly infectious environment.

Proposed System: The system comprises a robotic arm mounted on a motorized vehicle. Such an autonomous robot may assist in nursing, delivery of food/ medicine or any other item in the isolation wards. The autonomous robot can host a thermal imaging camera to acquire and record the temperature of the admitted patients or the new patient suspected of the CARONA like infections. Further, when a person is identified corona positive, there is a need of nursing staff who can attend the patient. The autonomous robot can assist into this. The motorized robot can be programmed and remotely controlled to deliver medicine, food or any other item to the patients staying in isolation wards. The proposed robotic assistant integrated with suitable audio-visual module, can facilitate medical staff in carrying out tele-round of the isolation wards in place of physical round. This again reduces the risk of corona infection to medical personnel significantly. Such a system is supposed to serve a great assistance to medical staff who are providing treatment to corona patients and thus, enabling them to extend their capability to treat relatively larger number of patients.

Salient Features& Deliverables:

- Involves an autonomous motorized robot that can be programmed and remotely controlled forperforming variety of tasks.
- Can be utilized for the sanitization and primary screening (temperature capture) of suspected patient.
- Can be used to deliver scheduled drugs to multiple patients staying in isolated wards.
- The proposed robotic assistant can be remotely guided to approach a patient staying in the isolated ward and a tele-medicine platform may facilitate audio-visual interaction between patient and the medical staff. The patient may be provided appropriate instructions and counseling without any physical presence.
- The proposed robotic assistant can perform sanitization tasks in the isolation wards and other infection sensitive areas.

Future Extension: The proposed motorized robotic platform fitted with the robotic arm, can be customized and scaled –up for performing many other tasks which require greater complexity and higher degree of freedom. One of the very critical future extension would be automated collection of pathological samples and the proper packaging of the collected sample, without any human intervention. Further, the same autonomous robot may be reconfigured for variety of application areas that promote contactless interaction to prevent the spreading of corona virus like diseases.

Proposal Submitted by

Dr. Manish Tiwari, Associate Professor (ECED), MNNIT Allahabad, Prayagraj
Dr. Basant Kumar, Associate Professor (ECED), MNNIT Allahabad, Prayagraj