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Environmental Mitigation Artificial Intelligence System

Transmission of airborne diseases often occurs through aerosols and microdroplets containing viable pathogens. Because of the small size of aerosols/microdroplets they can remain airborne for extended periods of time, sometimes days. Contaminated aerosols/microdroplets are generated by sneezing, coughing, breathing, speaking and sweating. Although personal protective equipment is one mechanism to mitigate transmission, creating clean and controlled indoor environments is also an important measure. While ventilating spaces may reduce the concentrations of aerosols in the air, it makes it difficult to maintain comfortable conditions without expending undue amounts of energy and increasing operating costs.

Researchers at the Biodesign Institute of Arizona State University and collaborators at Mayo Clinic, Arizona, have developed a novel environmental mitigation artificial intelligence system (EMAIS) for sensing and controlling aerosols/microdroplets in a closed/indoor environment. Aerosols in the closed/indoor environment are detected and controlled using an artificial intelligent algorithm and novel hardware including wireless sensors and actuators. This system could be deployed in classrooms, hospitals, health-related offices and clinics, public places, government buildings, airports and more. This system has been tested in various locations.

Sensing and controlling aerosols in closed or indoor environments not only promotes safe and energy efficient practices, but also decreases the risk of transmission and spread of pathogens such as SARS-CoV-2, Flu and other viruses.

Potential Applications

- Mitigating airborne contamination in a closed or indoor environment
 - o Classrooms, hospitals, health-related offices/clinics, public places, government buildings, airports, transportation facilities, retail stores, corporate facilities, and more

Benefits and Advantages

- The mitigation measures are only utilized when necessary to return to

acceptable aerosol/microdroplet levels so as to minimize energy consumption and reduce operational costs

- Reduces transmission of aerosolized pathogens in indoor/closed environments
- May be coupled to disinfection/sterilization means as well
- Can include audible, visual or tactile triggers indicative of environmental conditions

For more information about the inventor(s) and their research, please see

[Dr. Forzani's Biodesign webpage](#)

[Dr. Patel's Mayo webpage](#)