

## Chapter 2

# A Real-Time Smart Sewage Cleaning UAV Assistance System Using IoT

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### ABSTRACT

*There is a boom in autonomous systems with rapid technological development that cannot adapt without human interaction to actual life conditions. Such programs will free people from the added activities which are mundane, repeatable, and invalid. The unmanned aerial vehicle (UAV) can use in boring, dusty, and hazardous environments, where human health and welfare are at significant risk. Autonomous systems deliver efficiencies in the supply chain, tracking, and hazardous climate control. This paper proposes the concept to improve the UAV's effectiveness, the compression and track architecture is combined. In addition, the UAV and pipe can increase the friction of the trackwheel. The process of cleaning starts when the sensors feel the mouth. The washing mechanism will not occur if the sensors do not detect the dirt. The focus of this chapter is on the drainage cleaning system automation. Device automation is required to address the mobility and space challenge. This chapter proposes the effective use of this method to manage waste disposal and routine wastage filtration.*

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## INTRODUCTION

The municipal (Zhang et al., 2021) corporation is responsible for keeping cities clean, healthy, and safe (Pandey et al., 2021a). Numerous towns have implemented subterranean drainage systems. If the drainage system is not properly maintained, pure water will become contaminated with drainage water, leading to the spread of infectious diseases. During the rainy season, drainage systems become blocked, disrupting daily living. People may grow agitated, traffic may become crowded, and the environment may become filthy. Frequently, clogged drains can cause sewage and wastewater to accumulate and perhaps overflow onto your property. Consider a facility that enables authorities or other interested parties to quickly learn about any blockage or clogging inside the drainage systems, together with the extent and location of the obstruction. Consequently, our key purpose is to utilise sensors to monitor (Pavan & Sivakumar, 2012) maintenance gaps. If a drain becomes clogged or water overflows, the sensor detects the occurrence and notifies the necessary persons by transmitter. Due to the horrible environment (Yaghoubi et al., 2013) and the difficulties of continually monitoring maintenance hole state, human maintenance of maintenance holes is challenging. Immediate determination of whether a person entered the maintenance hole, or an accident happened within is impossible. Drainage systems are crucial for urban residents because they lessen the consequences of flooding by transferring water away (a facility for disposing of liquid waste). Numerous persons are harmed by the present drainage system's inadequate maintenance.

Roads are the primary places impacted in many metropolitan areas due to a weak, inefficient drainage monitoring system. Roads are constructed to accommodate both pedestrian and vehicular traffic. Urbanization has a detrimental effect on the drainage systems of many cities and towns worldwide—inadequate drainage system monitoring results in water pollution and the spread of water-borne illnesses. Stagnant water on highways deteriorates them. More significantly, flooding creates traffic bottlenecks, which results in the loss of precious human hours, income, and jobs. Contamination of groundwater is also a possibility, and once polluted, it is challenging to clean up. A well-designed and effective drainage system is critical for growing nations such as India. The design of drainage systems plays a crucial part in the development of many smart (Pandey & Pandey, 2022b) cities. Maintaining an effective and appropriate drainage system requires additional human resources.

Artificial intelligence (Pandey et al., 2021c), UAV (Nex & Remondino, 2014), and robotics engineers have made tremendous efforts, but this is still an open challenge due to the unstructured cleaning environment. A new UAV introduced in this paper for household wastewater purification. Many studies deal with various problems dealing with mobile UAVs, the bulk of which are related to wastewater purifying. There are, however, a limited number of documents directly concerned with drainage UAVs (Pandey et al., 2022d). They seem to be very specialized, and the key emphasis is the coverage algorithm (Pandey et al., 2022e). In turn, this article outlines the combined usage, even when the human being is absent, of various skills that aim to build a full drainage-cleaning UAV mobile.

In artificial (Pandey et al., 2021f) areas like hallways in a house, global track planning must guide a precise spot, for instance, at the junction of two corridors in a building. The local route preparation is part of the travel of the UAV around walls that prevent hurdles. Therefore, the navigation system demands a framework to define and locate these specific positions in the building on a world map that guides to an end. In addition, a free space map in the entrance hallway has developed. The industrial internet of things (IIoT) is critical for industrial (Prema, Kumar, & Sunitha, 2009) efficiency and quality improvement, and cost and resource reduction. However, there have been few officially documented actual IIoT-based project implementations yet. For outdated automation (Gurunath, Samanta, & Pandey, 2022) devices in

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