Origin of the Proposal:

Our PM Narendra Modi has started Swatch Bharat initiative in order to clean India, as an Indian I wanted to take part in this initiative, so I decided to work on something that help India make clean. India is a country where population is big problem so cleaning of streets, assisting workers to clean the streets is very difficult, instead of controlling it manually the control should be automatic.

PROBLEMS IN PRESENT SCENARIO:

- Massive Garbage across street,
- Because of corruption no proper construction of road (path-hole),
- No proper monitoring of workers,
- Complains about dirtiness in streets.

So many diseases spread across India due to waste problem, waste is dumped in streets where no one cared to pick up the waste and clean the streets. So this project will help municipality to address the issues related to waste and cleansing. This project will be automated less amount or no amount manpower will be needed, also this project will be fully accurate and efficient.

All sorts of disease-causing bugs found in the faeces of infected people find their way into our bodies through contaminated soil handled by infected people, these problems occurs due to dirty streets. Proper disposal of solid waste helps to reduce the collection of water in discarded articles, some of the diseases can be stamped out with improved sanitation is Cholera, Hepatitis, Malaria, Scabies, Dengue, etc.

Due to this project government can be able to clean the streets and reduce the risk of health problems occurs due to this problem. It will also detect the potholes on roads so that it will be easy for the government to look into the problems without wasting time.

Risk elements and Rewards:

Risk elements:

- Drone will fly across the streets taking the photos and videos every day, but that

will create an issue of public's privacy, drone will see the things which will breach the privacy of human.

- There will be multiple drones flying across the streets, so the drones will collide with each other as well as will collide with buildings, birds, people. So the accurate waypoint mode will be needed and this features is not available in cheap drones.
- Drones are based on simplistic computing architectures that were not designed to be highly secure, much like IoT devices, making them vulnerable to even average calibre hackers.
- Some drones collect and store data (such as video) locally, and this data is unencrypted in almost every case. If the drone crashes, anyone could access the memory element inside it and view this data.

Reward Factor:

- The hyperspectral imaging can provide information on the location where the garbage is disposed, type and quantity of garbage so that measures can be taken immediately to clean them. A control room will be put in place from where the drones can be monitored.
- Government suffers from shortages of manpower, and in such circumstances, drones can make things easier for us. Presently, we have to rely on verbal versions of the supervisors about the area cleaned or amount of garbage removed from various places. But by using the images of drone we can get a clear picture and check corruption to some extent.
- As we use the fully automated system, utilization of man power will be more.
- The cost of this system compared to the cost of manpower needed every day to clean the streets will be very less.
- This can be one of the project which makes the city smart and can be used under the PM's initiative of Smart City.
- This will help promote new technology and the resources in India that will encourage students to another projects under the part of smart city.

Review of status of Research and Development in the subject

International Status:

A drone, or an unmanned aerial vehicle (UAV), is an aircraft which is remotely or non-remotely piloted. Drones are originally developed for soldiers and for military purpose, nowadays drones can be used in thousands of applications.

The increase comes after the Obama administration in 2016 implemented new rules that opened the skies to low-level small drones for education, research and routine commercial use. Policy makers are still debating whether to allow a sweeping expansion in drone use for activities like deliveries where aircraft would fly beyond the sight of an operator. The FAA said it estimates the fleet of small hobbyist drones will more than triple from an estimated 1.1 million vehicles in 2016 to more than 3.5 million by 2024. The agency also estimates the commercial drone fleet will grow from 42,000 at the end of 2016 to about 442,000 aircraft by 2024. The aviation safety agency said there could be as many as 1.6 million commercial drones in use by 2024. [1]

Figure 1 A DJI S1000 drone flies over Calvert Vaux Park in Brooklyn, New York, on June 10, 2019.[2]

In most law enforcement scenarios, drones are being flown for traffic management or crime-scene photography, according to the study. They're also used for search and rescue, hazardous material spills, mass evacuations, and aerial viewing of fires or tracking fire personnel in dangerous settings. "We'll see more use cases in the coming years," predicts Dan Gettinger, the report's author, who is also founder and co-director of the Bard center. [2]

The General Atomics MQ-1 Predator is an American remotely piloted aircraft (RPA) built by General Atomics that was used primarily by the United States Air Force (USAF) and Central Intelligence Agency (CIA). Initially conceived in the early 1990s for aerial reconnaissance and forward observation roles, the Predator carries cameras and other

sensors. It was modified and upgraded to carry and fire two AGM-114 Hellfire missiles or other munitions. [3]

Some of the applications of the drones is stated below.

- One of the main application of the drone is precision farming, where drones are used to monitor the crop fields, etc. Drones capture regular aerial views of vast fields to become the quintessential part of the Internet of Things (IoT) put to use in farms. Physical monitoring and scouting is reduced to increase farmer productivity using the Unmanned Aerial Vehicles (UAV)). The aerial cameras eliminate the irritants of satellite imagery with ease of access and do away with pre-ordering images. This precision farming using drone will be very cost efficient, time efficient, some of the monitoring of the crop fields by the drone is stated below,
    - Monitor crop progress and health.
    - Report crop health.
    - Soil monitoring.
    - Live video feeds to report intruders.
    - Warn of approaching hazards like pests and animals.
    - Examine storm and flood damage.

- Surveillance: The defence of any country usually tends to conduct regular surveys in order to ensure protection of the people and the place. Using drones, in this case, could be an interesting idea. This reduces manual labour and you get a wider field of view. This also does not hamper the normal lives of the people making it easier for them.

- Shipping and delivery: Even though the shipping and delivery applications of the drones are still under process, this idea could be revolutionary for the world. This could significantly improve delivery times and reduce human labor. Be it delivering pizzas, letters, or even small parcels, these programmed drones could do the work for you.

- Disaster Management: One of the most important applications for these unmanned vehicles lies in disaster management. It is often seen that there is utter chaos and mismanagement of resources soon after a disaster, be it a man-made or a natural calamity. Drones could help you significantly here. With powerful cameras, these devices could collect information and pictures of the debris working in a specific area.

- Safety Inspections: Some companies need to carry out regular inspections in order to ensure safety of their infrastructure. This includes surveying power lines, oil and gas pipelines, wind turbines, bridges and buildings under construction and the likes. Drones are being put to use for these purposes.

Some of the other applications of the drone is: Surveying of objects and ground on the basis of digital heights and 3d models from the sky, Industrial inspection of solar parks, wind parks and inspection of agriculture, monitoring of private firm, monitoring of government body, inspection of parking areas, landscape photography, up to 360° spherical panoramas, Point-of-Interest (POI) imaging and Circle-of-Interest (COI) imaging, real estate photography, Drones are used to search and rescue the human from fire by doing fire-fighting work by giving the location of a person and drone can determine co2 and o2 into the atmosphere by using special equipment, Drones are best used coastal surveillance, perimeter monitoring, anti-piracy operations.

National Status:

Prime Minister Narendra Modi said that India with one of the most tech-friendly populations, was best placed to leverage power of technology and leapfrog into future. He said the country is the hot-spot of digital innovation across all sectors. It not only has a growing number of innovative entrepreneurs but also a growing market for tech innovations, he told many things about digital India, so it's time we adapt these technologies and make India proud in front of the world.

The World Health Organization (WHO) says, "Unhygienic conditions and practices at the household level create a dangerous environment with immediate health risk to children. Also, lack of sanitation facilities in schools helps transmit diseases. Sanitation interventions, technical and managerial, are badly needed in all areas in houses,

schools, and within the community at large. These must be accompanied by the necessary behavioral changes in the child and adult populations, which pose a formidable hygiene education challenge to the health sector." [4]

The WHO report adds: "Further work on the evidence base, specifically targeting children, is required across the spectrum of sanitation, hygiene and behavioral interventions to reduce infectious diseases with an environmental aetiology. "[4]

Drones are evolving more than ever, and India is yet to adapt this technology, so this project will help the people of India (Scientists, students, politicians) to think bigger and start working in this area and enter into the new era. One of the many uses of UAV drones is that of providing an aerial platform for volumetric and topographical surveys, such as those required by landfills and waste dumps. World is now using drones in almost all areas like precision farming, mining, surveillance, monitoring, etc.

"Drones have a lot of capability. Hence, it was generating a lot of interest. Not having any regulations amounted to a complete ban," civil aviation minister Ashok Gajapathi Raju said at a press conference. "So, we decided to go ahead and develop a regulatory framework."[5]

Importance of the proposed project in the context of current status

Why we should use drone in waste monitoring system?

As we know the population of India is increasing day by day and as the population increases government finds very difficult to manage the waste dumped by people. And we know that to control such a big country with such a big population is very difficult job, plus there is so much corruption going on in India. Man power is less in India so handling of these manpower is very difficult because these man cannot go to the streets every day.

The Government suffers from shortages of manpower, and in such circumstances, drones can make things easier for us. Presently, we have to rely on verbal versions of the supervisors about the area cleaned or amount of garbage removed from various places. But by using the images of drone we can get a clear picture and check corruption to some extent.

Government suffers from shortages of manpower, and in such circumstances, drones can make things easier for us. Presently, we have to rely on verbal versions of the

supervisors about the area cleaned or amount of garbage removed from various places. But by using the images of drone we can get a clear picture and check corruption to some extent. So if we use drones to take control over the cities and to find waste and potholes, the task will be lot easier for the government of India.

If the project is location specific, basis for selection of location be highlighted:

A smart city is an urban area that uses different types of electronic data collection sensors to supply information which is used to manage assets and resources efficiently. This includes data collected from citizens, devices, and assets that is processed and analyzed to monitor and manage traffic and transportation systems, power plants, water supply networks, waste management, law enforcement, information systems, schools, libraries, hospitals, and other community services. Instead of using sensors we can inspect power plants, water supply, waste management using the drones, by using the images of drone we can get clear picture of a city and we can take control over cities through drone and computer.

India is a country where over population is the main concern. Unhygienic conditions and practices at the household level create a dangerous environment with immediate health risk to humans. Waste dumps sites on the outskirts of almost all major cities provide hazardous environmental conditions to those living nearby and even more so to those living as scavengers on such waste. So we use drone to overcome all this problems by inspecting city using multiple drones and sending the workers to clean the city after getting the clear picture of a city. Government will find easy to handle such a population by using drones in multiple projects like waste management, water supply networks, inspection of schools, hospitals and many more.