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## Review paper on connecting the dots using drones

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### ABSTRACT

From the past few years, drones have been a trending topic surrounding technology. There are many applications leading to the advancement of the drones such as aerial photography as well as videography, shipping and delivery, geographic mapping, disaster management, precision agriculture, search and rescue operations, weather forecast, wildlife monitoring, law enforcement, and many more. In a country like India drones will play a vital role in dealing with problems from the front. A Drone with the latest technology onboard will be able to change the downgraded frame of India. Like a drone with a medical kit will give higher efficiency in reachability, remote farming will be smoothly operated using a drone, from a military point view it will be helpful in guarding the hilly posts over LOC, etc. Thus, if the future technology implemented as soon as possible in India it will provide huge latency.

**Keywords**— Drones, Medical kit, Military, Agriculture, Wildlife, etc.

### 1. INTRODUCTION

"Drones overall are going to be more impactful than I feel people recognize in positive ways to assist society." -

Gates

From the past few years, India is developing phenomenal and heading towards to be a superpower. However, we are lacking behind in Dr. Kalam Sir's vision 2020. In developed countries nowadays drones are playing a key role in handling most of the extraordinary problems effortlessly n that's what we felt like the same can be done for India too.

The drone becomes a popular name today although originally it is an Unmanned Aerial Vehicle also known as UAVs. A few years back they were totally meant for the sole role of military operations, however as soon as they became commercial in foreign markets a huge demand arises. The military purposed UAV's were greater in size but the commercial was small, tiny just equipped with little accessories to get the job done. In aviation and space, a drone refers to an Unpiloted aircraft or spacecraft. Another term is "Unmanned Aerial Vehicle", or UAV. Drones don't require rest, enabling them to fly as long as there is ample fuel in the craft with no mechanical difficulties. The drones in India is growing year by year, it's giving great shape to the fashionable environment to the industries in India. Drone services involve mapping techniques and offer services such as 3-D Mapping & Modelling, Orthophoto, Projection, GIS Survey, Topographical Survey, Land Survey. With these services, the drone provides many other applications. It offers you 360° Virtual tour service a service that helps you to observe from 360°. In India, if brought this modern Technology on the extended diameter that means other than government censored limited jobs then it might will be a boon. If we were able to plan properly and implemented this to all the sectors then this tiny machine will get the jobs done with the output of higher efficiency with respect to time, reachability, cost, etc. The Manpower of India can be utilized not only for drone operations throughout the country but also in manufacturing, assembling with new innovations to cater to the problems and thus exporting it to meet the global demand. The detailed ideas were explored in the next section of the paper.

### 2. THE DOTS

#### 2.1 "Be where the world is going....."

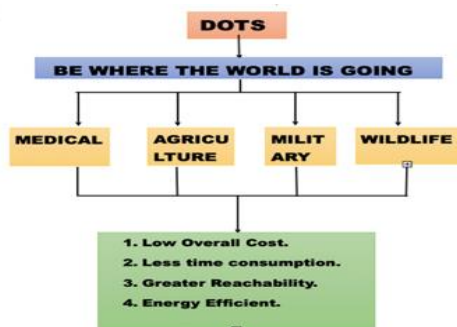


Fig. 1: Concept of the paper

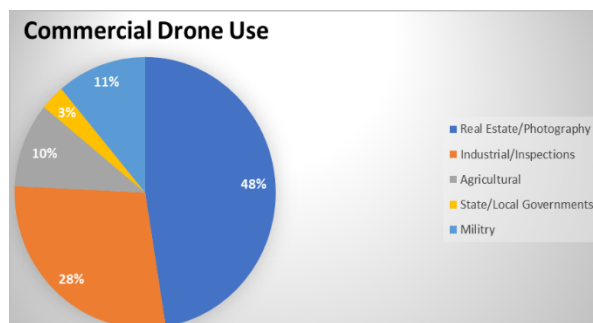
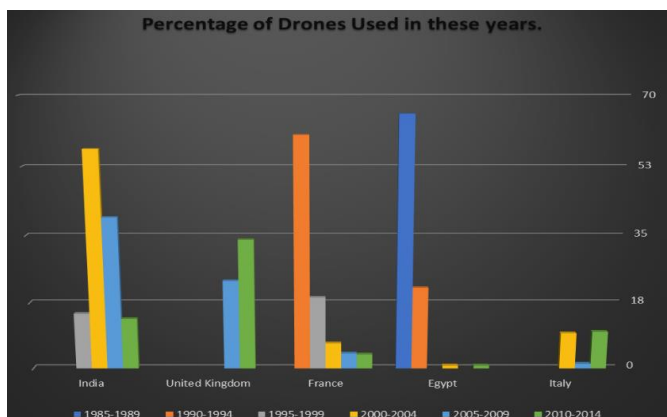


Fig. 2: Commercial drone use

Over the year it is has been observed that humans tend not readily accepting new ideas or thoughts that might be beneficial for mankind. The innovation or discovery took several decades for being willingly welcomed by the community. Sometimes the high-level criticism even lengthens the period unto centuries. However, the nations who had changed their attitude towards welcoming new technology, ideas, innovations, as well as discovery, have grown up so drastically that few become developed by all the means. This shows that accepting new thoughts will bring the overall development of mankind. Now converging our point towards India, we Indians are still lacking so much behind on accepting the new idea. However, the Bharat before British Raj was the world leader in innovation. We gave the Zero, the Chess, Buttons, shampoo, cure for leprosy, Fibonacci pattern, Cataract surgery, trigonometric functions, candied sugar, and so many inventions. From the British colonialism till today, we are still stuck in the mindset of doubtfulness towards new ideas. For we Indians, even the welcoming of new technology developed by other countries remains under the drawers of criticism. Our typical Indian societies are not yet ready to taste them. Our haters and critics community create a huge gap of junk over the large community people to keep them underrated in older technologies. Thus, we Indians took decades to just understand the basics of new technologies that are developed for mankind and fall away behind with the outer world. Hence, we are writing this paper to unfold and highlights the practical applications of drone technology from India's perspective. And thus, trying to showcase how the adaption of modern tools leads to manifold mankind aspects.



**Fig. 3: Percentage of Drones Used in these years**

## 2.2 Medical Drone

Telecommunication drones are being used for diagnosis and treatment, perioperative evaluation, and tele-monitoring in remote areas. Drones have the higher potential to be reliable more over the traditional methods of medical delivery platforms for pharmaceuticals, vaccines, microbiological and laboratory samples, emergency medical equipment, and patient transport. Nowadays healthcare is trending due to the advancement and innovation of drones. Using Drones, more efficient healthcare can be provided to patients from a distance or even while mobile. In the future, small drones will be eliminating some human steps by delivering medicine to the bedside of a patient from the pharmacy, this would lead to a more rapid and less error-prone administration of medications. The existing method is of implementing tremendous sensors onboard; however, we are proposing a drone with AI and ML-based coded integrated chips to vanish the weight of the sensors. An algorithm for detecting Heartrate, Temperature, Frequency of Accident, Aid needed to be applied, etc. will help to figure out the patient's report immediately on the spot and thus sending it to the hospital

for extending a proper on the spot treatment. A GPS module will also be integrated to track the location of the patient and help the drone to take a self-flight to reach destiny. This will work on India's NavIC technology to provide a wider and more precise position locator. From the Blood Bank point of view, a drone with a carrier for blood transporting will be a quicker and time effective method. However, it will be embedded with all parameters to keep the blood fresh. A city like Mumbai which is a traffic-oriented city will be more helpful in transporting Blood samples with greater reachability in less time span. A city like Delhi which has vast expanded over kms can be beneficial from the sense of greater helping hand towards reaching each and every corner using drones.

**2.2.1 Medical drones in emergency situations:** The usage of this technology gradually decreases the fatal cases. It is used to save time and helps in patient's survival. The medical quadcopter or drone can measure various modes of parameters from the body by arriving at the critical spot. This helps the paramedics and the doctors to know about the patient's condition before arriving at the spot. The medical drone acts as a tool kit which flies to various emergency Situation and helps the ambulance and the hospital team so that they will be ready to serve to the needs of the patients. A full-fledged smart drone will also be integrated with the ambulances. A nearby ambulance from the spot will toggle a help notification, thus enabling them to reach out to the spot more quickly. All the above were the technology-driven aspects but the ambulance drone we are proposing will be equipped with a half-liter water bottle as a first aid kit. As we all know water is the necessity hence for dealing with every situation patient will have an additional option.

## 2.3 Agricultural Drone

An agricultural drone is an unmanned aerial vehicle used to develop agriculture operations, rise in crop production, and keeping track of crop growth. Sensors and digital imaging potentiality can give farmers a richer picture of their fields. Agricultural drones are mostly used for precision agriculture.

There are multiple uses for agricultural drones, including:

- Scouting land and crops.
- Checking for weeds and spot treating plants.
- Monitoring overall crop health.
- Managing livestock and monitoring for health issues.
- And many more.

Drones are equipped with technology like propulsion systems, infrared cameras, GPS and navigation systems, programmable controllers, and automated flight planning. Plus, with custom-made processing software, any collected information can instantly be put to use towards better management decisions. The impact of Technology in agriculture may be a positive trend because it is that the solution to feeding the teeming population. Food security is a question that needs to be addressed, in the background of environmental degradation, pollution, and water scarcity, and an effective solution is a high priority. This is where usage of Drone can guarantee a justifiable solution. Drones in agriculture can ignite an enormous change in improving the efficiency of agriculture. To a really good extent, it's an inexpensive and economical thanks to managing to farm. Our Indian farmers are still stuck in the traditional methods of farming. Which results in the prime challenge of low crop yield. Thus, even after putting their 100%, India fulfills its demand by importing basic grains. Thus, the implementation of the Drone technology will lend a hand to overcome this plight. As we mentioned above drone can play diverse roles in farming. From

India's perspective, a drone equipped with soil testing capability will sort 40% - 50% of issues. This can be done with the help of specialized AI and ML chips. The algorithm can be developed even for giving recommendations of crops suitable according to the land report. This will generate a massive yield with fewer challenges. The World Health Organization estimated that due to the manual spraying of pesticides and fertilizers over one million farmers caused its adverse effect. Thus, a drone with sprinkling facility onboard will also help in reducing such harmfulness. A Drone not only becomes a lifesaver for farmers but also proves to be a technical tool for modern-day smart agriculture. As agricultural activities are the basic need for human survival, modern technology implementation in farming for India will provide a sector advancement as well as making it proficient and capable of exporting grains from India. All this can be achieved by taking advantage of this drone technology with innovations and proper implementations. Drones are often utilized in Agriculture in India but there are several drone laws that needed to be followed, which keeps on changing. The operators need to make sure that they need to follow basic drone laws when flying a drone over 250 grams weight. The basic criteria for operating drones are that it's to be done only in the daytime. Besides this legal question, there are practical problems like the ability to use a drone for spraying fertilizers, then the fragmented nature of farms.

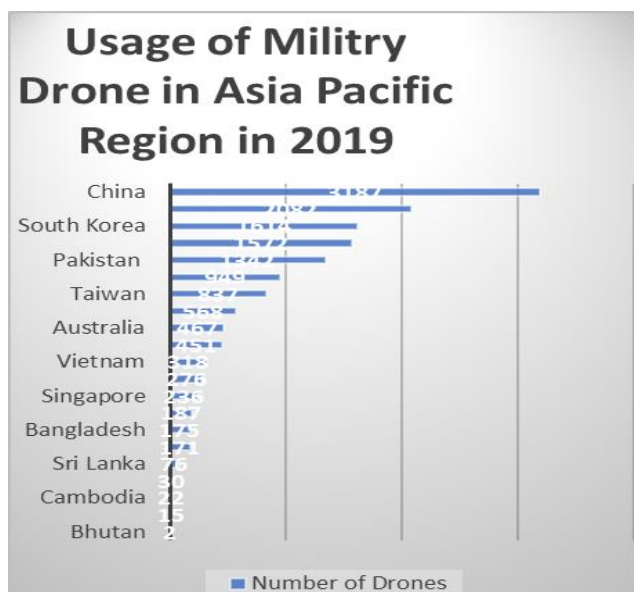
**2.4 Military Drones**

Drones for the Military purpose have taken a drastic change after the Vietnam War and the late 20th century. Over the past few decades, this technology under tremendous innovations over the other fields drone usages has created warm as a military tool. More and more advancements along with efficiency have been made to cater to the utmost use of drones for military operations. Our India has great potential and a very vast usage for military drones. From the western frontier of Gujarat to the mighty Thar Borders of Rajasthan, we needed a well-equipped surveillance drone with long flight capability. This technology will not only provide safety for BSF personnel but also will cater to the mighty sand dunes. Over the Northern frontier along the Line of Control where hilly ranges of Himalaya reduce the Army's surveillance power a drone will overcome to a greater extent. It will be also capable of carrying flight even in the low-temperature areas. The Hidden bunkers of terrorists can also be spotted with advanced cameras on the board thus reducing their striking possibilities.

A weapon detector algorithm can be developed and fitted on board which will help the military to detect the unusual infiltration from the POK (Pakistan Occupied Kashmir) side. The above methodology can also be implemented along the eastern borders of India. Thus, a technology with more reliability will not only help in proper monitoring of India's frontier but also in reducing the risk of unusual and surprise striking on Military personnel. Although India has adopted this technology long back its wider perspective needed to be applied to a greater extent. Our top five drones used by the Indian Military are Searcher, Nishant, Heron, Harpy, Netra. These are packed well with the latest technology but real problem solving as per India's challenges are needed to be developed with vast production. Thus, enabling the development of indigenous technology and exporting it to the global market.

**2.5 Wildlife Monitoring**

Till this paper, we have discussed three major useful applications of the drone. Now one more prime field is there where the drone usage can share the benefits for humans as well as wildlife. Yes, the wildlife today is needed to be conserved and protected. Today for wildlife monitoring CCTV cameras are providing promising technological usage. The usage of new and developed wildlife monitoring technology is moving the worldview of wildlife protection and management. These digital technologies are helping wildlife researchers and conservationists around the globe to screen and supervise wildlife with more precision and efficiency. Unmanned Aerial Vehicles or UAV's, also known as 'drones '(self-propelled aircraft that does not have a pilot on-board), one such technology that is increasingly occupying operational space. These appear to offer a versatile, precise, and economical solution to many challenges in wildlife conservation including monitoring and law enforcement. The utilization of drones is vast in habitat mapping, wildlife population evaluation, and monitoring of other biological features. The data obtained from these aircraft are more precise and most importantly, it is cost-effective and time-saving. UAV's are considered to be particularly useful with respect to direct conservation applications to rapidly monitor and assess unreachable areas or terrains that are very difficult to reach from the ground. Drone-based monitoring is very advantageous when used in combination with modeling approaches to predict the territorial and temporal patterns of illegal activities. UAV technology is also effective in the development of research methods in the future; this may reduce research cost associated with a reduction in time and manpower needed for a field survey. Merging experiences from over the globe and from this ongoing activity, drone technology is probably going to turn into a backbone in the field of wildlife surveillance, monitoring, and protection. This is additionally prone to open up novel applications for field managers and new ventures for innovation gatherings, which would additionally authorize the spread of technology-based answers for wildlife management in India. However, a drone equipped with modern tools will be able to provide seamless monitoring. They are more promising for the prone areas where human intervention is bounded. Also, the CCTV cameras can only take shots or can keep the track of animals from the uniform angel. Thus in many more ways drone will the drone will provide ease in monitoring. A drone with higher resolution cameras onboard will be able to keep the track of animal movement. It can be either in the form of live tracing or a recorded form. This will be more helpful for an emergency situation if arises and animal needed urgent treatment. Also, the rescue operations for any needy animal can be accelerated. Also, various sensors can be board that can be helpful for gathering various factors. A thermal sensor will be



**Fig. 4: Usage of Military Drone in Asia Pacific Region in 2019**



capable of detecting an animal's temperature. Thus their health can be traced. Taking advantage of AI and ML-based chips specially developed in consideration for wildlife monitoring will also provide factors that are helpful. Wildlife tourism can be boosted using drone technology. The sanctuaries and parks can shoot movies using drones to publish them for public so that online exploration can be done which will attract them to visit. Also, the winsome pictures of animals, birds, trees, sceneries, etc can be captured using drones about the individual sanctuaries that can be posted publicly thus spreading awareness about the inside wildlife available to explore.

### 3. PRESENT SCOPE

From the web to electric vehicles, we'd be during a golden age of technology advancement. The world of unmanned aerial vehicles (UAVs) or drones is no exception. Throughout the paper, we were broadly highlighting the present implementation of drone technology in India. As we mentioned earlier also Dr. KALAM's vision 20-20 can be achieved by applying it in the current scenario. Drones are more helpful broadly across wider aspects of industries, including e-commerce, construction, agriculture, utilities and energy, media and entertainment, and moreover in financial services. The drone industry will be also able to generate employment for today's youth enabling them to innovate this tool as per the global need.

1. Drones can be utilized by boarding a thermal scanner for COVID-19 pandemic.
2. Soil testing and spraying on crops can be done by drones
3. They are helpful in carrying out proper security surveillance.
4. Medicine, medical essentials, food packages and courier delivery.
5. Photography and videography
6. Drones can be used for oil, gas, and mineral exploration.
7. Drones can be used to discover new places.

### 4. FUTURE SCOPE

The drone technology has a wider future scope. Drone technology is consistently evolving, so future drone technology is currently undergoing groundbreaking progressive improvement. As many studies show that drones will be an essential need for various industries in the coming era. In the future, it might be capable of onboard automation of flight. As these technologies still evolve and grow, drones will become safer and more dependable. The technology can be further expanded also in many fields that all will provide a contribution towards the welfare of mankind.

### 5. CONCLUSION

The drone space in India is catching up thereupon in other nations and gaining considerable momentum. For drone-based services to still thrive and grow, it's necessary for regulations to be on site. The most effective outcome of implementing drone technology in various fields is of time consumption. Less time will be needed to generate more productivity. Benefits of using drones; Drones minimize the obvious dangers and health risks, Collection of in-depth and higher detail data, Quick deployment or launch, Flexibility to suit a majority of inspections, Easily shareable data, Use Drones for marketing and advertising, Little to zero downtime for equipment and systems, Ability to inspect difficult to reach and hazardous areas, Low insurance costs, Save time and money. Also, the cost-cutting factor will be there as the drone needs lower maintenance for operation. As it is battery operated rather than fuel usage it will be quite ecofriendly in some aspects. India with huge market availability can boost production on a large scale.

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