Detailing the Design Process of Rockets, Sensor Detection, Autonomous Drone Flight, and Airplane Design for Reforestation

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Abstract: ***This paper aims to introduce the design process of rockets, sensor detection, autonomous drone flight and airplane design for reforestation. Concepts of electrical, aeronautics and computer engineering will be included in this paper.***

Key words: rockets, sensors, airplanes, artificial intelligence(AI)

I. Introduction

With the advancement of technology in today's society, more robots are beginning to appear and one of them is drones. One essential function of drones is its autonomy. This allows the drones to work on its own in some way. In order to make it autonomous, engineers use sensors to detect the environment and use AI to process it and make decisions. Moreover, as engineers and scientists have more experience in rocket design, the design process is defined, but it still varies based on its mission. Additionally, aerospace technology also impacted the environment and society positively through reforestation.

II. Design Process of Rockets

A rocket's design process is a methodical, highly sequential procedure that starts with determining the requirements and

mission objectives. The goal of the rocket, such as orbiting satellites or carrying humans to far-off planets, is initially imagined by engineers. The initial concepts include creating a basic architecture with propulsion systems, structural integrity, navigation and control mechanisms, and cargo accommodations. Using computational models and simulations is essential to maximizing these parts' performance, economy, and safety. Phases of prototyping and testing ensue, when small-scale models and subsystems are assessed in controlled settings to verify their integration and functionality. The ultimate design is the result of constant improvement based on test results and user input, guaranteeing that the rocket satisfies strict requirements for dependability and mission success.

III. Sensor Detection

Humans have 5 senses that let them perceive the world. These are very useful as it can tell a lot. Similarly, computers and robots also need sense to perceive their surroundings. Sensor detection is how robots and other machines identify and measure properties or changes in their environment.There are many sensors that exist such as temperature, light, ultrasonic, infrared, pressure, and much more that are utilized in detection as seen in Figure 1. However, sensors can also be categorized into active and passive sensors. An active sensor relies on external power to be able to understand its environment. Conversely, a passive sensor relies on the environment for its power, for example a solar panel[4]. Sensors have made great breakthroughs in society, helping many with their functions. One of the more helpful ones are ultrasonic sensors. They are able to detect objects. It works by sending out bursts of ultrasonic waves to an entity that reflects back the wave[3]. The usage of these sensors are used in any basic mechanism like in self driving cars.

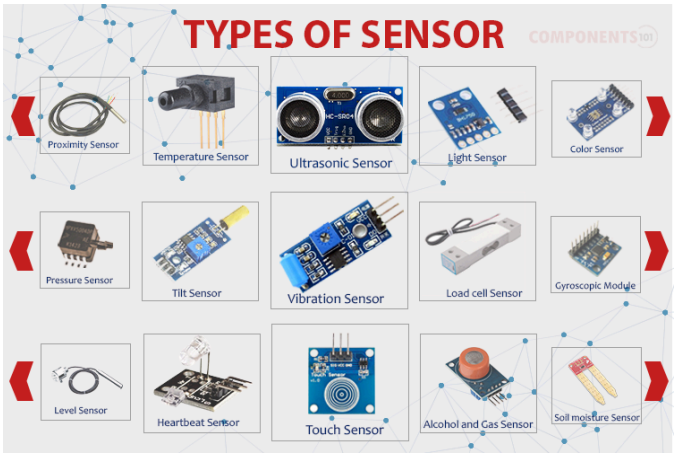


Figure 1

IV. Autonomous Drone Flight

Drones can now operate independently thanks to GPS, sensors, and artificial intelligence (AI), a revolutionary technical advance, thanks to autonomous drone flying. In agriculture, they maximize crop management by keeping an eye on health and administering remedies on their own. In movies, they expertly and creatively capture dynamic aerial video for use. They are essential in emergencies, surveying inaccessible places to assist with search and rescue operations. But as these technologies advance, issues like privacy, legislation, and safety must be addressed. Autonomous drones promise to further change sectors by supporting safer, more efficient practices in logistics, urban planning, and environmental monitoring. This is made possible by continual developments in AI and sensor capabilities.

V. Airplane Design for Reforestation

With the deterioration of the environment and the increasing pollution on the earth, reforestation has become very necessary. Reforestation can efficiently reduce the greenhouse gases in the atmosphere, and control the effect of global climate change. Using airplanes for reforestation can date back to the 1930s, the earliest and most common method is aerial seeding. This technique sows seeds by spraying seeds through aerial mechanical means like drones, planes or helicopters. The process is not complex, all it takes is the following steps: prepare easy to grow and germinate seeds, plan the seeds drop site, the airplane follows the predetermined route and releases the seed. Also, as an innovative environmental technology, it has many advantages, high efficiency, wide range, and reducing human interference. The most striking one is its Precision Deployment, it ensures precise seed deployment, ensuring seeds land in suitable soil, increasing their survival rate. Now many countries have used planes for reforestation, such as Thailand, Myanmar, and Kenya and achieved remarkable results.

VI. Conclusion

Technologies today advance quickly and many stuff got defined such as the process of designing rockets. For example, engineers will first determine what the missions of the rocket then expand based on that task. In addition, another technology that increases a lot is sensors. With better sensors, the autonomy of robots started to develop such as the autonomous drones that use sensors and AI. Moreover, aerospace technology is also used in reforestation to improve the environment and society.

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