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"Vision of Hope" The Quad Copter

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A B S T R A C T

A Drone is a flying robot that can be remotely controlled. It can also be controlled either by a pilot from the ground or by autonomous. A drone is an aircraft without a human pilot onboard and a type of unmanned vehicle. Hence, Drones are formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UASs). Essentially, a drone is a robot that can be controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with onboard sensors and GPS. Drones are most commonly abbreviated as follow due to its features of usage Drone being a future technology marks its importance in industries, defense and various other fields. Due to its remarkable wide application the usage of drones is exponentially increasing. The goal of this project is to build a quad copter and to develop customized remote for controlling the drone and its features. Drone is installed with on-drone camera that is used to monitor the live video footage and for aerial photography, which can be accessed online. Drone is also equipped with pick and place unit which can be controlled by customized remote via wireless technology. Drone also boosts the cellular signal in forest where weak signals are available.

Keywords: **Drone, Signal Booster, Ultrasonic Sensor**

1. Introduction

A Drone is a flying robot that can be remotely controlled. DRONE stand for Dynamic Remotely Operated Navigation Equipment Which in terms also called as UAV was formally known as Unmanned Aerial Vehicle (UAV) / Unmanned Aircraft Systems (UAS). It can be controlled by either pilot from the ground or autonomous. A drone, in technological terms, is an unmanned aircraft. Drones are more formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UASs). Essentially, a drone is a flying robot that can be remotely controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with onboard sensors and GPS. In the recent past, UAVs were most often associated with the military, where they were used initially for anti-aircraft target practice, intelligence gathering and then, more controversially, as weapons platforms. Drones are now also used in a wide range of civilian roles ranging from search and rescue, surveillance, traffic monitoring, weather monitoring and firefighting, to personal drones and the business drone-based photography, as well as videography, agriculture and even delivery services. Military drone use solidified in 1982 when the Israeli Air Force used UAVs to wipe out the Syrian fleet with minimal loss of Israeli forces. The Israeli UAVs acted as decoys, jammed communication and offered real-time video reconnaissance. Drones have continued to be a mainstay in the military, playing critical roles in intelligence, surveillance and force protection, artillery spotting, target following and acquisition, battle damage assessment and reconnaissance, as well as for weaponry. While drones serve a variety of purposes, such as recreational, photography, commercial and military, their two basic functions are flight and navigation. Navigational systems, such as GPS, are typically housed in the nose of a drone. The GPS on a drone communicates its precise location with the controller. If present, an onboard altimeter can communicate altitude information. The altimeter also helps keep the drone at a specific altitude, if commanded by the controller. To achieve flight, drones consist of a power source, such as battery or fuel, rotors, propellers and a frame. The frame of a drone is typically made of lightweight, composite materials, to reduce weight and increase maneuverability during flight.

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2. Literature Survey

1) Real-time Implementation of Target Tracking System for Air Surveillance Radar Applications October 2019. This paper presents a single-sensor multiple-target tracking system applicable with air surveillance radars. ASRT is a single-source MTT system, developed by following a systematic approach which we believe had significant contribution to system's quality. Though the system is intended for application with air surveillance radars, it could be used with other types of radars which operate on similar principle, such as radars used in maritime navigation or vessel traffic service applications. Performance evaluation section revealed that contemporary CPUs easily handle tracking of large number of targets, with currently used algorithms. This leaves room for using more advanced algorithms, which could enable effective use of ASRT in harder tracking problems Department of ECE, SaIT | Page 2 than it was initially envisioned for Implementation of such algorithms could be a subject of future work. Another interesting direction could be finding sector tracking parameters, which provide optimal balance between processing delay and system reliability.

2) Survey of Cellular Signal Booster Elizabeth N. Onwuka, Michael Okwori, Salihu O. Aliyu, Stephen S. Oyewobi, Caroline O. Alenoghena, Habeeb Bello-Salau, Sani S. Makusidi, Victor Asuquo Telecom. Engineering Research Group, Federal University of Technology Minna, 920211, Nigeria The development of wireless technology has facilitated the wide deployment of mobile communication systems. The beauty of wireless communication is that all nooks and corners can be reached at a cheaper and faster rate when compared with wireline. Wireless is now dominating the telecommunications market. Initially, the dawn of wireless was seen as the dawn of communications to poor countries and rural areas which were poorly covered by wireline devices due to high cost. Currently, the story has changed. Both the wired and unwired environments are clamoring for wireless connectivity. Considering the hype of R&D in broadband technologies and easy acceptance in the market place, wireline communications may soon die a natural death. However, wireless communications face a few challenges. One of them is that the radio frequency (RF) carrier signals used in these communication systems degrades as it travels through the air interface due to attenuation and interference. As a result, the range of coverage may not be as planned leading to very weak reception or even dead zones where no communication can be done. This problem has resulted in the development of cellular signal boosters that help in receiving the weak signal, amplifying and then retransmitting it to reach the uncovered areas. Boosters are now giving hope to the frustrated wireless users such as indoor users and those at the fringes of a cell site. These boosters are diverse in make, range, method of operation, deployment and cost. In this paper, a survey of various signal booster designs, deployment and performance is presented. It is hoped that this will serve as a one-stop shop for researchers and developers in the important field of wireless signal boosters and extenders, who wish to know what is available and existing challenges.

3) Surgical and Medical Applications of Drones: JulySeptember 2018 A literature search was performed by EBSCO (Elton B. Stephens Company) Discovery Service, searching the phrases "drones," "UAV," "unmanned aerial vehicles," "UAS," "unmanned aerial systems." A second search was used to identify sources that contained "drone" in the subject or title and "medicine" in any of the text, yielding 60,260 results. After screening for irrelevant material, 1296 sources remained applicable. Major themes and number of sources were as follows: 116 public health and medical surveillance, 8 telemedicine, and 78 medical transport systems. Drones are used for surveillance of disaster sites and areas with biological hazards, as well as in epidemiology for research and tracking disease spread. This paper describes that the Drones have the ability to gather real time data cost effectively, to deliver payloads and have initiated the rapid evolution of many industrial, commercial, and recreational applications.

4) Visual monitoring of civil infrastructure systems via camera-equipped Unmanned Aerial Vehicles (UAVs): Dec 2017 The purpose of this paper is to provide a concise review of the most recent methods that streamline collection, analysis, visualization, and communication of the visual data captured from these platforms, with and without using Building Information Models (BIM) as a priori information. Specifically, the most relevant works from Civil Engineering, Computer Vision, and Robotics communities are presented and compared in terms of their potential to lead to automatic construction monitoring and civil infrastructure condition assessment. The goal of a UAV-driven visual performance monitoring procedure is to collect images or videos from the most informative views on a project site, analyze them with or without a priori BIM to reason about performance deviations during construction (e.g. progress and quality), monitor ongoing operations for productivity and safety, characterize the as-is conditions of existing civil infrastructure systems, and quickly and frequently visualize and communicate the most updated state of work-in progress with onsite and offsite project participants. The analytics of visual data has been a research subject for more than a decade.

3. Proposed Algorithm

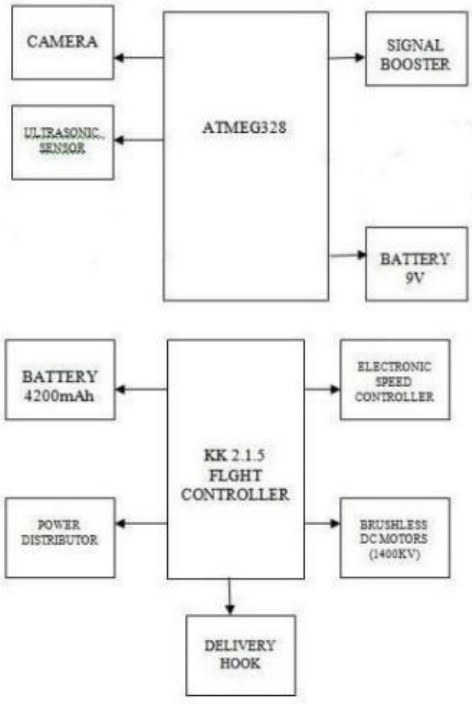
1. CAMERA: Drone surveillance is the use of unmanned aerial vehicles (UAV) to capture of still images and video to gather information about specific targets, which might be individuals, groups or environments. Drone surveillance enables surreptitiously gathering information about a target as captured from a distance or altitude.

2. ULTRASONIC SENSORS: Effective collision avoidance and Detection of the obstacles helps in identifying the objects and helps in avoidance of collision with the object. The algorithm that detects and avoids obstacles autonomously in the vicinity of a potential collision by using a single ultrasonic sensor and controlling the movement of the vehicle. The objectives are to minimize the deviation from the vehicle's original path and also the development of an algorithm utilizing ultrasonic sensors available for lost cost systems.

3. CELLULAR SIGNAL BOOSTER: In forest areas, we'll be getting weak signals, by using cellular signal booster we can increase the strength of the weak signal improving call quality & data quality. This system works only where weak signals are available & can't be use in dead zones.

4. DELIVERY HOOK: This is used for distribution of products with minimal weight from one place to another. For Ex: as Amazon uses its drones to deliver its products accurately.

5. KK 2.1.5 FLIGHT CONTROLLER: It manages the flight of (mostly) multi-rotor Aircraft (Tri copters, Quad copters, Hex copters etc.). Its purpose is to stabilize the aircraft during flight and to do this, it takes signals from on-board gyroscopes (roll, pitch and yaw) and passes these signals to the Atmega324PA processor, which in-turn processes signals according the users selected firmware (e.g. Quad copter) and passes the control signals to the installed Electronic Speed Controllers (ESCs) and the combination of these signals instructs the ESCs to make fine adjustments to the motors rotational speeds which in-turn stabilizes the craft. The KK2.1 Multi-Rotor control board also uses signals from your radio system via a receiver (Rx) and passes these signals together with stabilization signals to the Atmega324PA IC via the aileron; elevator; throttle and rudder user demand inputs. Once processed, this information is sent to the ESCs which inturn adjust the rotational speed of each motor to control flight orientation (up, down, backwards, forwards, left, right, yaw).



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