IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 2, March 2025

First Person View Drone Technology: Challenges and Future Prospects

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Abstract: *First-Person View (FPV) drones have revolutionized aerial technology, offering immersive piloting experiences, precise control, and a wide range of applications. This project focuses on developing a next-generation FPV drone system equipped with real-time high-definition video transmission, ultra-low-latency communication, and fully customizable flight controls. The drone integrates a high-resolution camera (a smartphone), a robust wireless transmission system, and a responsive flight controller supporting Betaflight, iNav, or ArduPilot firmware. Designed for racing, freestyle flying, autonomous navigation, and professional applications, this drone offers advanced PID tuning, firmware updates, and On-Screen Display (OSD) customization via wireless connectivity (Bluetooth/Wi-Fi). Performance optimization is further enhanced through Blackbox log analysis. Additionally, mission planning capabilities expand its utility for aerial photography, industrial inspections, and search-and-rescue operations. The system features autopilot functionality, allowing the drone to autonomously navigate to user-selected locations. A gimbal stabilization system, paired with a smartphone camera, ensures smooth video capture. The camera supports live HD video transmission for FPV piloting while simultaneously recording high-quality videos and photos, making it ideal for aerial photography and surveillance. The modular design also enables AI-driven customizations, including object tracking, obstacle avoidance, and autonomous flight optimizations. Furthermore, the drone can be adapted for delivery tasks by integrating a servo-controlled crane mechanism for secure and precise payload handling. By leveraging cutting-edge flight control technologies, AI integration, and mobile application support, this FPV drone redefines versatility and performance, catering to both enthusiasts and professionals seeking a seamless, high-performance aerial experience*

Keywords: FPV Drone, HD Video Transmission, Flight Controller, PID Tuning, Blackbox Log Analysis, Autopilot, Object Tracking, Obstacle Avoidance, Mission Planning, AI Integration, Aerial Photography

DOI: 10.48175/IJARSCT-23723
ISSN 2581-9429 IJARSCT