MATRIX BARCODE BASED DETECTION AND TRACKING FOR AUTONOMOUS UAV LANDING

A PROJECT SUMMARY

submitted by

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The autonomous landing of drones is always a field of interest for attaining tasks such as rapid deployment or recovery of UAVs, continuous flight tasks, mobile recharge stations, extended operational ranges. This system would be helpful in the warehouse management, delivery system, for security purposes. Creating and deploying a drone having a fully automated operational feature along with the focus of reduction in economic expenditure, attaining more accuracy over the landing zone with the effect of external disturbances like wind, lighting etc is the focus of the research.

The main aim of our project is to implement a Drone(UAV) that can autonomously maneuver to a given location and land on the moving landing pad at that location.Our system will have the following advantages over the existing established projects.

1. A fast landing self maneuvering UAV
2. Precision landing over the feed of a matrix barcode placed at a platform irrespective of the platform mobility(whether the platform is in motion or stationary)
3. Feed of whether the UAV has successfully landed or not

The project has been divided into various segments

The Guidance

The guidance subsystem is responsible for generating control reference signals with the aim of following a specific trajectory or arriving at a specific destination.

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The Control

The control subsystem is responsible for manipulating the motor thrusts in order to execute the guidance commands while maintaining the airborne quadrotor's stability.

The object recognition

The object detection and recognition is used to detect the landing pad in the given location from the live camera feed.In this phase the different feature extraction and cross-matching methods such as SURF is used to detect the apriltag on the landing platform and help aid the drone to land precisely in the location .

Our main focus with this system lies in the implementation of the control algorithm in a low-cost, lightweight embedded system that can be integrated into micro UAVs.This system can find application in almost every sectors like defence ,agriculture,surveillance where the application of UAV are restricted due to issues in battery backup and range of the transmitters as our system provides the UAVs the ability to find landing platforms and charging pads on their own.