Design and implementation a Quadrotor with optimized flying time

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Abstract Four-engine copter(Quadrotor), is a drone with four engines. Due to its unique capabilities, such as lack of intrusion, flying and vertical landing, in-flight movement, more degrees of freedom, and military and civilian applications, it has attracted the attention of many researchers. Due to the nonlinear and complex dynamics of this multivariate system with six degrees of freedom, modeling and controlling this device is one of the challenging areas in engineering issues. This Project focuses on controlling a Quadrotor based on the estimation of the status of the sensors. After extensive surveys on various Quadrotor, these applications and their dynamic and aerodynamic properties, the dynamic quadrotor model is extracted. Then, using the PID algorithm, its control is performed and quadrotor is constructed using the Newton-Euler equations is described. Finally, a lightweight quadrotor with a weight of about one kilogram, with capability of doing commission by remote operations in closed environments, has been designed and manufactured. The main goal of manufacturing of this quadrotor is increasing the flight time of bird, which is clearly evident by reducing the weight of the quadrotor in this project. Other issues which are excluded in this project in order to increase the flight time of quadrotor, are the use of optimum engine power instead of maximum engine power. The results of the contoroller performance using the output of the sensors have been evaluated, which indicates good performance and proper control of the proposed system.

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