Indoor Low Cost Multipurpose Autonomous Blimp Robot: Mechanical Implementation

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Abstract

Various conventional implementations of popular autonomous flying robots have restricted time of flight, due to their inefficient power consumption. Main reason for this inefficient power consumption is the unavoidable load caused by usage of brushless or DC motors to provide lifting force. This issue can be solved by implementing an airship balloon that uses a gas lighter than air such as Hydrogen or Helium to provide the required lift. But, the use of such gases significantly affect the cost of the flying robots.

Considering these practical issues, technical structure implementation of a flying robot, capable of auto navigating in indoor environments was carried out under this project. This project has focused on the structures, materials as well as hardware requirements to ensure both the functionality and the cost efficiency for multi purposes of a blimp robot.

Implementation of the blimp robot was done, firstly by conceptually designing it in SolidWorks CAD tool and determining all the relevant materials and chemical requirement. The robot was mathematically modeled to determine its dimensions and propulsion system. Next the hardware circuitry required to control the blimp was implemented and according to the dimension restrictions the designed mechanical parts were 3D Printed and assembled as shown in Figure 1.

Importance of such flexible robot causes to make it applicable for multi purposes through modifications such as providing mobile security for an indoor environment, risky environment inspection, RFID tag scanning for malls and High tension power line inspection. Therefore, factors including excess weight support, sustainability for drags and performance were thoroughly ensured in this project.

Figure 1: Front view (left image) and Side view (right image) of the implemented Blimp Robot

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