Bio-Mimic Robot

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Abstract: The fly mechanism and motion characteristics of the birds were analyzed. By the bionics principle, a new bionic flapping wing mechanism was proposed in order to imitate the motion of bird wing. The kinematic simulation analysis was applied to the prototype analyze the aerodynamic force of bionic wing. These outcomes abbreviate the time of assembling of fluttering wing system, and can give hypothetical premise to the exploration and fabricate of bionic fluttering wing robot. The investigation breaks in order to validate the feasibility of this mechanism. And computational fluid dynamics software, named Fluent was employed to down the fowl flight with various methodologies and calculations of control. The outcomes are sure for the development of flying robots and another age of planes created to the likeness of flying creatures. A winged animal robot model was actualized in light of materials used to develop demonstrate planes. It consists on a body, wings and tail with servo actuators independently controlled though a microcontroller; a radio transmission system and batteries were also used in order to avoid wired connections between the computer and the robot.

Index Terms - Robotic, Bird, Control, Aerodynamics Bird-size aircraft, Flapping flight, Flight mechanics, etc.

I. INTRODUCTION

In order to visualize the behavior of the bird during the simulation we developed a 3D model in AutoCAD inspired in a seagull as can be seen fig. Each adjacent part (with different colors) corresponds to individual elements connected through joints. For simplicity, the structure of the wings is defined in the sense of a human arm, using the terms arm and hand accordingly. The corresponding wing joints will be denoted the shoulder and wrist.

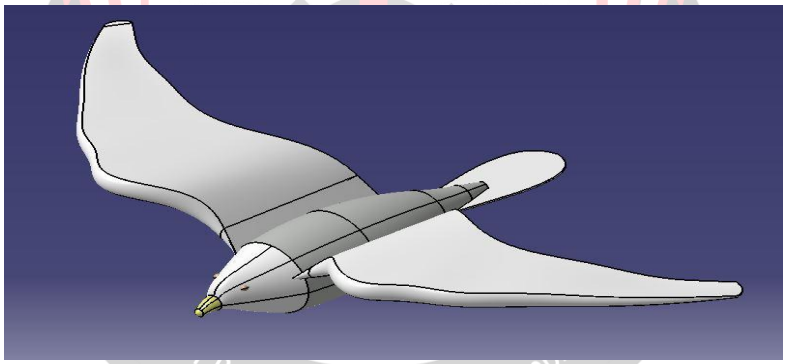

Fig.1.1: 3D Model of the robotic bird.

We can subdivide flight in two distinct types: quasi-steady and unsteady states. For extensive flying creatures the flight can be approximated utilizing semi relentless state suspicions in light of the fact that their wings fold at bring down recurrence amid cruising.. This means that the wing tip speed is low compared to the flight speed. Thus large birds, such as eagles and seagulls, tend to have a soaring flight. Their wings behave closely to fixed wings. On the other hand, small birds and insects fly in an unsteady state regime in which their wing tip speed is faster than their flight speed. The forces and flows around a flapping wing are still a challenge in fluid dynamics. Some characteristics of real birds when considering a bird flight simulation can be found.

II. PROBLEM STATEMENT

- Design and control of winged animal like robots have been drawing in much consideration of numerous analysts, and different models of fowl like robots have been proposed. Everything about a feathered creature is made for flight and hence; the kinematic and dynamic displaying of birdlike robots is more unpredictable than that of serial robots.
- In request to develop a mechanical fowl, we first need to execute a PC recreation considering each and every physical and dynamical viewpoint. When creating control calculations for flying robots, a recreation apparatus ends up being critical to diminish the improvement time, maintain a strategic distance from harms and discover blunders in the control framework.

III. OBJECTIVES

- In the last decades robotics became a common subject in courses of electrical, computer, control and mechanical engineering.
- Progress in scientific research and developments on industrial applications lead to the appearance of educational programs on robotics, covering a wide range of aspects such as kinematics and dynamics, control, programming, sensors, artificial intelligence, simulation and mechanical design.
- Nevertheless, courses on robotics require laboratories having sophisticated equipment, which pose problems of funding and maintenance.
- To The development of simulation platforms became an important ally of science, and today it is spread in the most varied sectors.

IV. METHODOLOGY

- Identify problem.
- To find a different solution.
- Market survey.
- Implementation of the machine.
- Identify part needed.
- Work distribution.
- Conceptual and detail design
  a) Mechanical design
  b) Electrical design
- Fabrication of model.
- Final testing of the model.

V. WORKING PROCESS OF MODEL

- First, Assembling all the parts of bird.
- 6 channel transmitter bind with receiver.
- 1000kv brushless motor having 12000 rpm runs two stage gear box. Through 30A electric speed controller.
- Transmitter transmit signal to receiver and receiver receive the signal and transfer to motor.
- 850mah lippo 3 cell battery connected to brushless motor for power supply
- power is transmitted to gear box to wings and wings get oscillate at high speed.
- During oscillation of Wings, having angle of inclination due to inclination of wing surface it creates lift force to upward and birds successfully Glide in air. Lift depends upon inclination of wing.
- Tail having two degree of freedom and control the bird to rotate left or right and up and down direction by using two servo control motor.

VI. ACTUAL WORKING PROTOTYPE MODEL

Fig.4.1: Actual prototype model.

VIII. APPLICATION

Agribusiness Robotic Bird can be outfitted with photogrammetric gear; (ex. Supporting governments and agriculturists) a camera that gathers exceptionally point by point, high-determination ethereal photographs from various edges. The data collected from Robotic Bird flights makes it easier for governments to monitor how fields, coastlines and forest areas are doing and plan interventions and infrastructure projects that benefit local farmers.

IX. FUTURE SCOPE

Generally known initially for their utilization for military purposes, progressively, scientists, help associations,, governments and private companies are exploring the many ways bird can be used for good. Otherwise known as unmanned aerial vehicles or UAVs, these flying robots have started to transform various industries, including agriculture. Let us hop on a flight to three destinations to find out how robotic bird support and improve food production.

X.CONCLUSION

From the purpose of bionics, the twofold area symmetric bionic fluttering wing system is composed. Under the flapping flight requirement, the mechanism can better imitate the birds plunging and folding movement in flapping flight. The prototype of flapping-wing mechanism .With the virtual prototype technology, we can shorten researching cycle, reduce procreative cost, and improve the efficiency and quality of analysis.

XI. REFERENCES

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