

Automated Scarecrow and Bugs Controller

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Abstract In this system we are building a major project which would consist of a structure which would look like a eagle bird. This system would consist of movable wings which would move in certain intervals scaring small birds. Also, it would consist of sound system which would create noise which insects don't like.

The structure will be a life like size of an eagle, it is observed that most of the cropdestruction is caused by home crows and pigeons, also home crows and pigeons both the birds species are preys of eagle. Also, it is observed that most of the crop destruction on mass scale is caused by pests wherein 50-60% of total food crop production is destroyed by pests like locusts. Also, locusts get irritated by specific frequency of sound. The structure would also consist of speaker system which would create sound which irritate the locusts at certain level.

Key Words: Automation, Embedded Automation, IOT based, Python based, Automation in Agriculture

1. INTRODUCTION

In this system we are building a major project which would consist of a structure which would look like an eagle bird shown in figure 1. This system would consist of movable wings which would move in certain intervals scaring small birds. Also, it would consist of sound system which would create noise which insects don't like. My contribution in this project is that I solely came up with this whole idea of structure and concept

2. Body of Paper

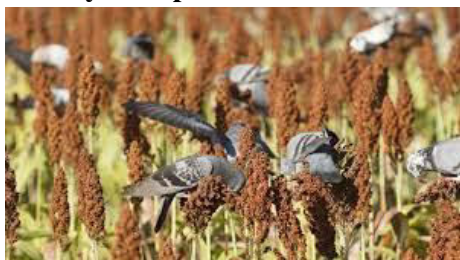


Figure 1. Birds Impacting Agricultural Crops

The foraging activities of cropland bird species like House Crow have caused more damage to wheat, while pigeons and doves cause damage to pearl millet and sunflower. Also, the

parakeets and crows were found to inflict more damage to the crops than what they actually consumed. They carried parts of kernels of the Jowar with them and then fed on the grains. But, while feeding on the grains in this way, a major portion of the kernel with the grains falls down. A maximum loss is recorded to the sorghum crops by sparrows, weaver birds, and parakeets that accounts to 52%. The minimum damage was recorded for wheat crop which was 17% and most of the damage was caused by crows, which was recorded on the site in Akola district. Pigeons damaged 42% of the peas crop (chick peas and pigeon peas) while sparrows and weaver birds damaged the groundnut crop by 26% in the sampling plots. The maximum damage to the pearl millet and sunflower was caused by sparrows and weaver birds. Figure 1 shows pigeons destroying crops.



Figure 2. Ornithopter Mechanism

The ornithopter mechanism is the most basic mechanism usually used by birds to make them uplift from the ground. An ornithopter is an aircraft that flies by flapping its wings. Designers seek to imitate the flapping-wing flight of birds, bats, and insects. Though machines may differ in form, they are usually built on the same scale as these flying creatures. Manned ornithopters have also been built, and some have been successful. The machines are of two general types: those with engines, and those powered by the muscles of the pilot. Wherein we are using this basic mechanism to make the wings of our bird structure to move and scare the pigeons away. Figure 2 represent simplest bird wing mechanism with two gear and single motor,



Figure3. Locusts Swarm destroying crops

Normally, these grasshoppers are innocuous, their numbers are low, and they do not pose a major economic threat to agriculture. However, under suitable conditions of drought followed by rapid vegetation growth, serotonin in their brains triggers a dramatic set of changes: they start to breed abundantly, becoming gregarious and nomadic (loosely described as migratory) when their populations become dense enough. They form bands of wingless nymphs that later become swarms of winged adults. Both the bands and the swarms move around and rapidly strip fields and cause damage to crops. The adults are powerful fliers; they can travel great distances, consuming most of the green vegetation wherever the swarm settles. They can destroy the whole crop field in matter of seconds.



Figure4. Women scaring off locust's swarm

Chemicals, especially Chlorpyrifos 20 EC diluted in water, can be sprinkled on crops. There is a possibility of great damage to the crops. Therefore, excessive use of pesticides is not always recommended. Locusts can be scared away by producing noise by beating of drums and utensils. Locust hearing is sensitive over at least 1–30 kHz. We found the greatest tympanal movement and electrophysiological response between 4 and 8 kHz. And by producing these frequency sounds we can scare off the locusts from the crop fields.

The eagle bird wing structure would consist of movable wings connected with hinges to a stepper motor wherein it would be moving using ornithopter principle mechanism. The basic gear mechanism with hinges and stepper motor would make this structure more affordable.

Stepper motors effectively have multiple "toothed" electromagnets arranged as a stator around a central rotor, a gear-shaped piece of iron. The electromagnets are energized by an external driver circuit or a micro controller. To make the motor shaft turn, first, one electromagnet is given power, which magnetically attracts the gear's teeth. When the gear's teeth are aligned to the first electromagnet, they are slightly offset from the next electromagnet. This means that when the next electromagnet is turned on and the first is turned off, the gear rotates slightly to align with the next one. From there the process is repeated. Each of those rotations is called a "step", with an integer number of steps making a full rotation. In that way, the motor can be turned by a precise angle. Wing mechanism would be made to rotate at specific angle using stepper motor.

The AT89C51 is an age old 8-bit microcontroller from the Atmel family. It works with the popular 8051 architecture and hence is used by most beginners till date. It is a 40 pin IC package with 4Kb flash memory. It has four ports and all together provide 32 Programmable GPIO pins. To control the direction of the Stepper Motor. The circuit consists of AT89C51 microcontroller, ULN2003A, Motor. AT89c51 is a low power, high-performance, CMOS 8bit, 8051 family microcontroller that has 32 programmable I/O lines.

Ultrasonic transducers convert AC into ultrasound, as well as the reverse. Ultrasonics, typically refers to piezoelectric transducers or capacitive transducers. Piezoelectric crystals change size and shape when a voltage is applied; AC voltage makes them oscillate at the same frequency and produce ultrasonic sound. Locust hearing is sensitive over at least 1–30 kHz. We found the greatest tympanal movement and electrophysiological response between 4 and 8 kHz.

Solar radiation may be converted directly into electricity by solar cells (photovoltaic cells). In such cells, a small electric voltage is generated when light strikes the junction between a metal and a semiconductor (such as silicon) or the junction between two different semiconductors. We can use solar panels to completely make our eagle bird wing structure and sound system to work autonomously.

3. CONCLUSIONS

In growing need of food supply we cannot simply rely on dumb methods like use of scarecrow and also use of pesticides can deteriorate the health of human beings. Wherein we need a strong solution where this structure can help reduce this crop destruction at some extent.

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