

Hong Kong Student Science Project Competition 2022
Template of Extended Abstract (Invention Design Proposal)

Team Number: SCBC298

Project Title: UrbaNest

Project Type: Invention Design Proposal

To our best knowledge and after thorough literature research, as of 20/04/22, there are no* similar works. If there are, the reference links are as below:

I. Background

Passer montanus (Eurasian tree sparrows) are one of Hong Kong's most prominent resident species. They play an important role in the ecosystem, where they contribute to the food chain and act as food sources, while also contributing to germination. Sparrows feed on grains, fruits, flowers, insects, and seeds. Sparrows spread seeds away from the parent plant, which helps in preventing competition for nutrition between the child and parent plant. Moreover, sparrows have been biological indicators of assessing ecological quality (Suman & Tayebulla, 2021). However, due to major environmental issues such as climate change and air pollution worsening, the population of sparrows is declining. According to the 6th Hong Kong Sparrow Census organized by the Hong Kong Bird Watching Society (HKBWS), there are about 210,000 Eurasian Tree Sparrows in Hong Kong, a drop of 30% from 2016 (Koren, z.d.). The decreasing population acts as a good bioindicator of exposure and effects to the environmental problems. The exacerbating air pollution effects on sparrows were observed through the appearance of anemia in polluted areas (Li et al., 2021). Additionally, sparrows do not have sweat glands, so they lose heat through their respiratory system and exposed skin. A positive correlation between the rising global temperatures has been exhibited through the decrease in the size of sparrows, which are an environmental response in order to increase surface-area-to-volume ratios, so they can exchange heat more quickly (Cimons, 2020).

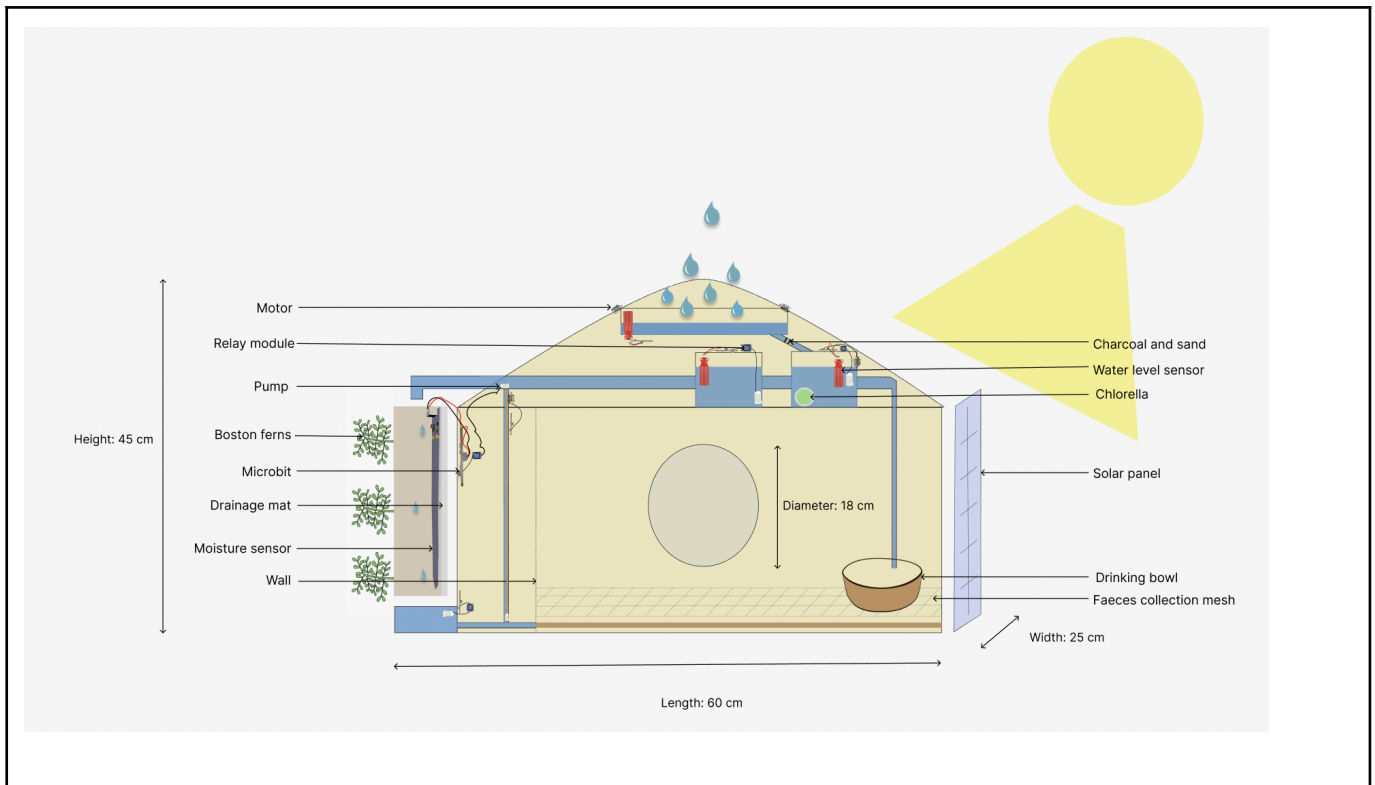
II. Objective(s)

This research aims to design a nest that is feasible to be used by Eurasian Tree Sparrows in an urban environment such as Hong Kong. It will preserve the sparrows by cohabiting with humans in urban infrastructure.

III. Methodology

Water is collected through the rooftop of the bird's nest, which is filtered in a two-step process. Firstly, the water is filtered in charcoal and sand to remove both solid particles and organic matter. However, the water is not completely purified, so it will be passed onto the next section to be purified biologically by chlorella. The water is then ready to be used by plants in photosynthesis and consumed by birds. The excess water that is not used by the plants will be recycled to be diluted with the bird feces, which will then be coded to fertilize the Boston ferns every once a month.

V. Design of Invention



IV. Application / Market Need

A bird nest is vital for birds as it provides a sanctuary for them to shelter themselves from prey. Unlike many birds, nests in the existing market UrbaNest use and involves biology in creating a birds nest. As Hong Kong has a lack of bird nests around urban areas of Hong Kong tall infrastructure is the perfect way to utilize the space in order to preserve Hong Kong's sparrow population which over time has been significantly decreasing due to climate change. As most of the existing nests defeat the purpose and objective of a nest as it lacks the ability to shelter birds during different seasonal changes as well as shelter from predators.

Some existing proposed solutions require very high costs such as underground cabling for mobile towers and use indirect strategies to eliminate problems faced by sparrows.

V. Conclusion

All in all, after designing the UrbaNest, one of the crucial steps in testing and creating it in real life. As it is needed to be constructed beyond the theoretical design to further dive into its limitations and improvise. Implementation is the next step to successfully fulfilling our project's goal, into Hong Kong's most polluted places like Sham Shui Po and Causeway Bay. Along with conducting research, to see the impact it makes on the population and health of Eurasian Tree Sparrows.