Project Background

Team 20, nicknamed vertiGrow, has set out to design and build an automated, indoor robotic garden that would minimize the need for human interaction. A compact and efficient indoor garden could be used in a variety of urban areas where proper conditions for plant growth could not be otherwise obtained, whether due to lack of greenspace or unfavorable climate. Automating the agricultural world is a growing topic today, especially as the world's population continues to increase as the amount of fertile land decreases. Many large commerical enterprises are investing in the automation of indoor farming, but small-scale solutions for personal use are often inefficent or ineffective. Team 20's concept provides a sustainable, efficient, scalable, and compact system that could provide fresh garden vegetables in urban settings and transform unused space in the urban world.

from left: Matthew Lenko, M.E., Jonathan Manni, E.E., Toby Dalla Santa, M.E., and Matt Cok, M.E.

vertiGrow

Design Overview

The garden will consist of two tiers, each with a planting bed available for various nutritious plants. The garden will automate the daily tasks of watering and fertilizing the plants, and will also be capable of planting a variety of seeds. To carry out these three primary functions, a robotic system will move along the outside of the garden frame. The current design focuses on a robotic arm that will swing out over the plant beds with the capability to carry out functions in a predetermined locations through a custom nozzle.

With the ability to move vertically along the outside of the frame and horizontally over the plant bed and both the x- and y- axes, the system will maximize efficiency as the precise amount of water and fertilizer will be given for each plant based on proper growing cycles. Each seed will be positioned in the soil with the proper amount of space needed to grow into a mature plant. All of the growth cycles will be monitored automatically, and feedback to the user will alert them of the current plant growth status and inform them when the garden produce is ready to be harvested.

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