

Wireless Environment Control System

Status: Filled

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Project Description

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On a top level view, the main objective of this project is to create a wireless network of sensors and actuators that will be able to control, monitor and regulate a specific environment in a small scale and low cost package. The focus will be in creating a system which would have its own power supply and be able to send and receive data through wireless communication thereby eliminating the need for bulky wiring. The system would then be able to connect to a particular device with wireless capabilities (i.e. smartphone Bluetooth via an App) to which the data would then be available for interpretation and monitoring. Lastly, as an added feature, if the device were to move outside the range of the wireless transmitter the app would then switch over to a WIFI connection thereby allowing it to continue its duties. The focus of this project will be towards environment control; two specific applications are considered the first can be categorized under horticulture and the second under aquarium management.

First Application: Horticulture

One of the main issues of gardeners and farmers alike is the environment that their products are exposed to. For example, it's a known fact that tropical plants will not grow in this part of the hemisphere except by using a greenhouse, however, not only is this method expensive but it requires space that most consumers cannot afford. The solution in mind is to create a miniaturized "greenhouse" that would be small enough to fit within the garden and even in the home so that individual plants can be grown with its own specific temperature, humidity and climate. This product not only targets consumers with an interest in gardening or those that have spaces for a garden, but also those individuals living in apartments, condominiums and town houses with very limited yard space. Ideally the finished product would be placed anywhere within the home and would have a customizable pre-determined setting which would be ideal for the plant in question so that the device could be used to grow organic tomatoes and vegetables for the health conscious and tropical flowers such as the one native to the Philippines, the "Sampaguita", for the gardening enthusiasts.

Second Application: Aquarium Management

The health of all aquatic animals depends on their environment such as pH and ammonia levels. Presently, fish owners use different types of litmus paper in order to manually test their aquariums for these chemicals. This process can be automated and displayed digitally by using sensors; this in conjunction with the wireless and WIFI communication would be able to warn owners about any dangers that could plague their pets, such as the common cause of fish death –the nitrogen cycle. The WIFI communication would be a great asset to owners that are not regularly at home so that even if one fish is affected the problem could be addressed sooner so that not all would be lost. If enough sensors are used, then even specific environments can be recreated so as to reproduce the ones native to specific fish. In a grand scale for example, this solution can even be implemented by individuals or groups aiming to farm their own supply of seafood such as mussels, clams, crabs, and bottom feeders.

Immediate Milestones

1. Market Research, feasibility studies, and design selection
2. Selection of sensors, materials, and communication which includes the power supply
3. Establish communication between sensors, actuators and main controller and determine/interpret sensible sensor readings
4. Establish wireless communication between main controller and a wireless capable device, including platform and protocol selection, app and GUI design
5. Initial prototype design of the basic general layout
6. Creation of full scale prototype for the First application: Horticulture
7. Establish WIFI communication, such as IP protocol, html, etc.

Future Milestones

1. Selection of sensors specific to the second application: Aquarium Management
2. Repeat the same procedure as the first application using and modifying chosen protocols and communication interfaces
3. Create individual profiles for different products (vegetables and fish)