EE459Lx/MKT446/FA436

Spring 2011

Swimming Pool Safety Device

Product Overview

Approximately 3500 people die each year from downing in the US. For children between 1 and 4, it is the second-leading cause of death (30%). Many of these deaths occur in family swimming pools. The goal for this semester is to produce a product that goes in or near a swimming pool and alerts the homeowner if there has been an unexpected access to the pool. How the device actually detects an unexpected entry into the pool or pool area is up to the product teams to decide on. It might measure the wave action of the water, use sonar detectors to watch for changes in the pool's contents, monitor motion detectors around the edge of the pool, etc.

Products are currently available that homeowners can use to monitor and limit pool access. Teams should research the features of ones currently on the market when determining how their product will work. The goal for this semester's product teams is to improve on what is commercially available by utilizing state-of-the-art technology and sound design practices.

- Make it easier to operate by improving the user interface. Remove the excuses for not using the device "I never remember to turn it on." or "I always forget to change the battery in it."

- Make it more reliable. A homeowner should feel a sense of peace-of-mind when they have installed this product and be confident that it will alert them when needed.

- Reduce the number of false alarms. Too many false alarms lead to people ignoring the warnings.

- Add additional features that will appeal to consumers.

Design Requirements

The essential design requirement for this product is "Guard the pool." The device must consist of two parts. One part is the exterior sensor that detects if there is something in and/or near the pool. The second part is the interior control panel that receives notification from the sensor and alerts the homeowner. The two devices communicate with each other over a wireless link of some type. The link between the two devices must be a bidirectional (two-way) link. The exterior device must be able to send alerts to the interior device, but the interior device must also be able to query the exterior device to see if it is still working, or otherwise check its status (dead battery, etc.) Beyond that, all aspects of the product's design are free to be determined by the EE/MKT/FA product team members.[*]

Any questions that come up during the semester as to whether some feature must be included in the design or can be left out should be directed to the instructors. The above requirements may be modified slightly during the semester as the teams go through their design process.

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[*] The EE students are supposed to be designing an electronic device. Specifying the exterior device to be "a loud guard dog" is not acceptable.

Team members should remember that they are part of a "multidisciplinary" as opposed to an "interdisciplinary" product development team. With interdisciplinary teams, the members of each component group collaborate but mostly keep to within their own areas of expertise. On multidisciplinary teams, the lines between the component groups are more blurred and all teams member are encouraged to provide suggestions and criticism on all aspects of the product development process.

Additional Features

Teams are encouraged to incorporate into their product whatever additional features they feel are useful and will increase its chances of being a commercial success. Some possible features might include:

- External sensor can be configured in such a way to avoid too many false alarms. For example, if the sensor is detecting wave motion, it should be able to program it to ignore small ripples due to winds.
- The homeowner must be able to easily disable or override the alerts. For example, turn off the sensor while the pool is in use or being cleaned.
- Solar power for charging the exterior device's battery.

While extra feature may improve the product, they will most likely increase its cost. Teams must avoid adding features that make the product so expensive that no one will buy it.

It is possible that some advanced features are too complex to be developed within the time frame of this semester. These features can be described in the final report as features that should be considered for inclusion if and when the product goes into production. Any additional features that are important for the products success but cannot be incorporated into the prototype should be discussed with the instructors.