"School-Lyceum No60" in Astana

«Flow track» Leakage and water level sensor in the sewer.

Direction: Smart City

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Annotation:

Technologies for avoiding floods on the streets and residential buildings are very much in demand nowadays. Our team took on the creation of low-cost multifunctional sensors. Sensors are able to report a flood using a bot in the Telegram application, as well as automatically cut off the inflow of water, in order to avoid leaks while the owner is not at home.

Problem:

Flooded streets of Astana due to overcrowding of the sewer collector are increasingly bothering us, in addition, flooding in apartments is also not a rare occurrence, no one wants to drown neighbors, so to solve the problem, we have created water level control sensors.

Stages of work:
- Searching: acquaintance with the structure of sensors of different models.
- Practical stage: building with available materials and the Arduino set.
- Analytical: analysis of the results obtained and the implementation period.

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Chapter No1 description of the technology.

Flood-proof leak detector
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Leakage sensors work on the principle of "alarm", as soon as the sensor detects the presence of water, it gives a sound signal to a person. Leak detectors with a controller that shuts off the flow of water are much more effective, because even if there are no people in the room, the controller prevents flooding. Such sensors are needed in every home, since no one is immune to leaks. This technology is in demand in the market, and it is not cheap.

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Our idea
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We set the task of making effective flood protection with a controller and notifying the owner through the Telegram application, the sensor of which can later be used to monitor the water level in the sewer, with calling the appropriate services for pumping out water.

<u>The components of a leak sensor consist of the following main parts:</u>

1. A water sensor to detect the presence of water on a surface or in a specific area.
2. Controllers for processing signals from the sensor and controlling other elements of the system.
3. Stepper motor or solenoid valve to shut off the water supply when a leak is detected.
4. Wi-Fi module to provide communication with the remote notification app.
5. Power supply for autonomous operation of the device.

<u>Advantages of using a sensor with a controller:</u>

1. Automation the device will automatically shut off the water
2. Remote notification on mobile phone, receives a notification through the Telegram application.
3. Avoiding floods will save a lot of financial losses.

Chapter No2 of recommendations.

As a result of researching similar models and analyzing the number of leaks in apartments and sewer flooding, the creation of technology for water control is useful. Such sensors are expensive on average, although the principle of their operation is simple. Our analogue is convenient and easy to use, in sewers around the city, in residential buildings and apartments it will be a very necessary thing. Therefore, we can safely recommend the technology for arranging the convenience and comfort of residents of the capital. The introduction of such sensors in residential buildings and urban infrastructure of Astana will help reduce the number of emergencies associated with floods.

The technology is easy to use and can be scaled to other cities with similar problems.

Practical part.

For the body of the apartment model, we used plywood, a barrel with a tap, a transparent tube and a sheet of plastic, and a bottle with a plastic container for sewerage.

To begin with, according to the drawing, we cut out and assembled all the parts, then we treated all the joints with a sealant and painted over with gray spray paint.

Next, Arduino components were attached, namely a stepper motor, a water sensor, a Wi-Fi module.

Principle of operation

When the water reaches the sensor, a stepper motor is triggered and shuts off the water. Then, using the Wi-Fi module, the bot sends messages about the incident.

Application:
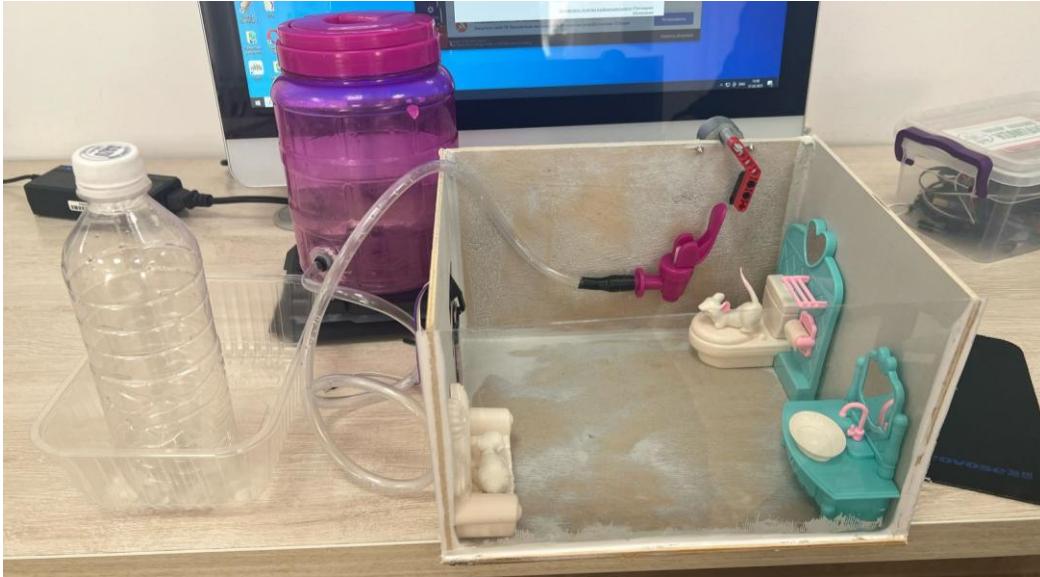
Conclusion

Our project demonstrates that even with limited resources, it is possible to create an effective and affordable flood prevention solution. We hope that our development will be useful for improving the quality of life of residents of Astana and other cities.

Our work was aimed at creating a low-cost and multifunctional solution to prevent floods in residential buildings and on the streets of Astana. We have developed a sensor that not only notifies about leaks through a Telegram bot, but also automatically shuts off the water, minimizing damage.