DEVELOPMENT OF A REMOTE CONTROL ALGORITHM OF A SEGMENTED SHUTTER

Bobirjon Zayniddinov
Senior Teacher

Uktam Mamirov
associate professor, TashSTU

A water release process with a control mechanism provides for the release of water during periods of excessive flooding. Water release can also be done by controlling reservoir channels and tunnels. Gates are provided to ensure flow control: various hydraulic gates and risers, water discharge mechanisms, water filling mechanisms, adjusters, air ducts, tunnels, etc. In order to choose the gate and its lifting device correctly, the designer needs to design the gates and their lifting devices together [1].

Previously, the control of the sluice was carried out manually, if the water level exceeds a certain level, then the sluice is lowered to a certain level, and the water is released, but if the water level increases sharply, that is, the amount of water in the reservoir may unexpectedly increase due to floods and other reasons, and residents living in nearby areas may be affected by floods and suffer material and moral damage [2].Here, instead of traditional control methods, we propose to use fuzzy logic to control the valves of hydrotechnical facilities, and in order to provide a safe solution, we will implement this process using an Atmega16 microcontroller.

Ultrasonic sensors are placed in the reservoirs, which continuously measure the water level and send information to the controller based on fuzzy logic installed in the main dispatching point. Analog signals to the controller are transmitted from three different inputs. As a result, based on these analog inputs, the microcontroller makes a decision to open and close the shutter.

The shutter is opened or closed depending on the signals given to the microcontroller. Here we will develop an algorithm to perform the tasks specified in the rules for the controller based on fuzzy logic.

All values are calibrated by the sensors and transmitted to the display step by step to control the segment shutter [3]. Based on these inputs, the shutter stepper motor rotates in different steps depending on the fuzzy logic rules embedded in the microcontroller. The shutter is controlled using the engine control unit (Fig. 1). A remote operator can access data in real time via GSM.
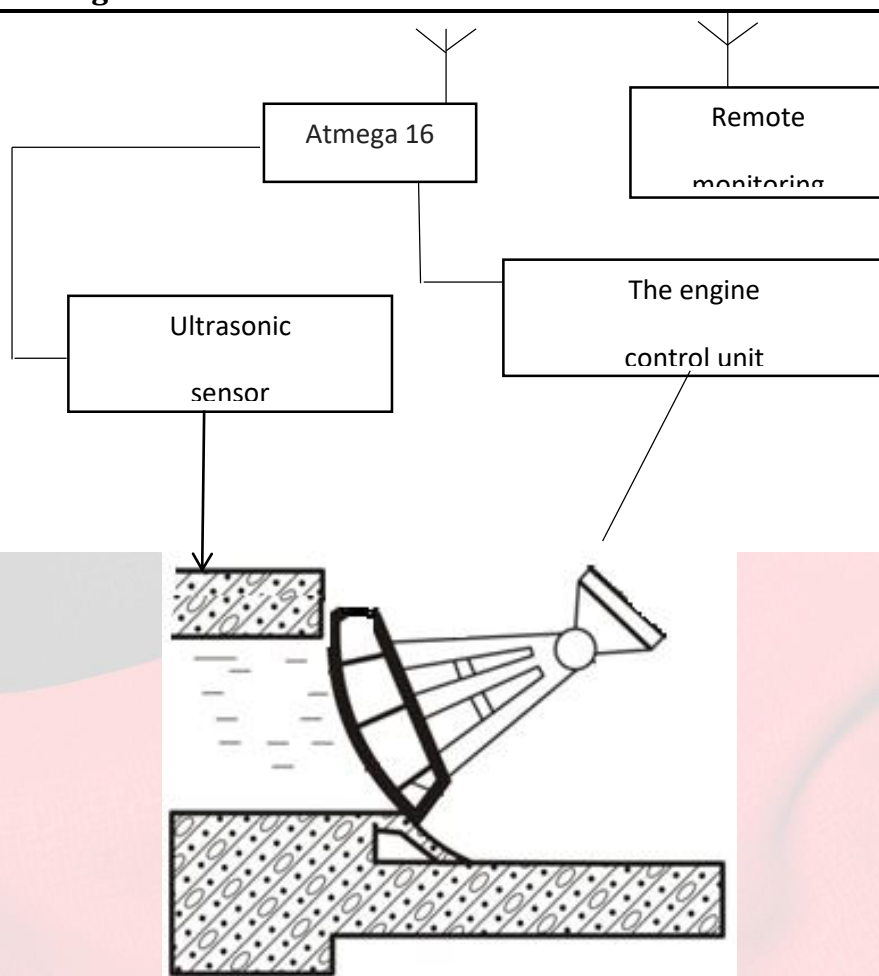
Figure 1. Illustration of the segmental shutter control system based on the proposed method

The purpose of this section is to provide effective control of the water level in the dam with the help of remote automatic opening and closing of the sluice and to ensure the safety of the public with a properly designed notification system.

References
1. Ismailov G.Kh., Bolgov M.V., Fedorov V.M. A model of water resources management in the river basin taking into account water quality. 2008. No. 1. -FROM. 212-216.

2. Magomedov R.I., Magomedov I.I., Magomedova E.S. Modeling of the change in the amount of water in the reservoir using the stochastic differential equation // Bulletin of Dagestan State University. Series 1: Natural Sciences. 2020. #1. -FROM. 53-59.

3. Regular algorithms for the synthesis of adaptive controllers in problems of control of dynamic objects Igamberdiev, Kh. Z. Regular algorithms for the synthesis of adaptive controllers in problems of control of dynamic objects / Kh. Z. Igamberdiev, AN Yusufbekov. - Text: direct // Young scientist. - 2012. - No. 1 (36). - T. 1. - S. 13-16.