ics and rapid progress of communication facilities (Internet, Wi-Fi, GSM) allow to realize the concept "the smart house" at the expense of inexpensive and available elements self-contained.

This research describes the model of the functional node for tracking water leaks.

The main role in system is carried out by the one-paid Raspberry Pi computer allowing not only to obtain data, but also to operate all system, including remotely.

The developed control system behind leakages of water is intended for the operated buildings with long-laid communications. A principal component of system is the aquatic ball faucet with the electric drive installed on an input of cold water. It works using an electrical power unit on 12B which is connected to the laid cables. To close the crane, the third operating wire has to be connected to a zero phase. The crane will open when disconnected from "zero".

The power supply unit 2A on 12B (Fig. 1) will be constantly connected to network 220B and connected to the electric crane. The zero phase is connected through the operated contacts of the relay to the operating electric crane wire. The radio socket will be connected to network. On a signal from the controller, the radio socket supplies power to the unit 0,5A which operates the relay (see Fig. 1) [1].

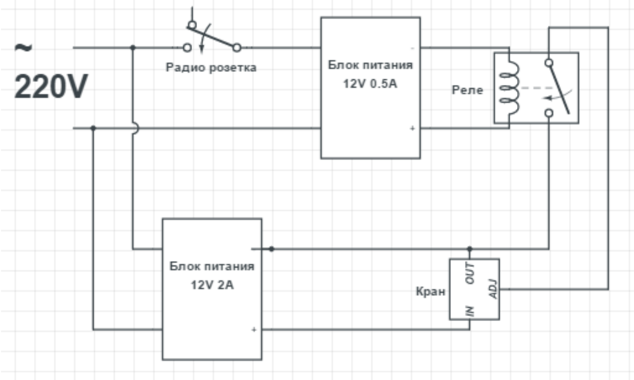

Fig. 1. Scheme of connection of the aquatic ball faucet with the electric drive to network

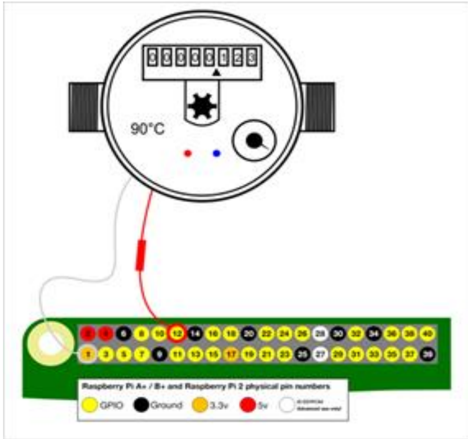

Fig. 2. Connection of the counter to Raspberry Pi

One more component of system is the water sensors reacting to liquid and sending a signal to the controller. The controller creates the notice on this event, sends a signal to the controlled relay. As a result, there is an emergency overlap of water in the system. It provided that the sensor has digital and analog outputs. Water Counter with a pulse output can be connected to the contacts according to the scheme (Fig. 2).

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SOLAR FLARES AND THEIR PREDICTION METHODS

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This article provides an overview of methods for predicting solar flares that are currently in use. Radiation from solar flares often reach our planet, exerting a strong effect on the upper layers of the earth’s atmosphere (ionosphere). They also lead to the occurrence of magnetic storms and auroras. Predicting solar flares more than the day before they occur will provide early warning to protect satellites, power systems, and astronauts from potentially hazardous radiation.

Keywords: solar flares, solar magnetic fields, neutrinos, solar activity.

Solar flare is an explosive process of energy release (kinetic, light and heat) in the solar atmosphere. These solar flares are characterized by a colossal energy release affecting planetary weather, as well as the behavior and health of living organisms. But they can not be observed without special technology. Usually, the development of a flash begins with a sudden increase in the brightness of the flare area - an area of a brighter, and hence more hot photosphere. Then there is a catastrophic explosion, during which the solar plasma heats up to 40–100 million K Some of the most powerful flares even generate solar cosmic rays, the protons of which reach a speed equal to half the speed of light. Such particles have deadly energy. They are able to penetrate the spacecraft almost unhindered and destroy the cells of a living organism. Therefore, solar cosmic rays can pose a serious danger to the crew caught in the flight by a sudden flash.

Thus, solar flares emit radiation in the form of electromagnetic waves and in the form of particles of matter. The amplification of electromagnetic radiation occurs in a wide range of wavelengths – from hard x-rays and gamma rays to kilometer-long radio waves. In this case, the total flux of visible radiation remains always constant up to fractions of a percent.

One of the methods for predicting solar flares is based on an analysis of the magnetic fields of the sun. Now there is no doubt that solar activity is first of all a magnetic process. The convective zone works as a powerful generator of magnetic fields. Their penetration into the atmosphere of the Sun leads to the phenomena that are commonly referred to under the general name “solar activity”. The magnetic field penetrates through the photosphere into the rarefied atmosphere of the Sun. This field causes two effects underlying solar activity. First, its energy is released directly in the form of kinetic energy of gas mass movement, in the form of thermal energy of gas condensations and (mainly during solar flares) in the form of accelerated charged particles with energies from several keV to huge – tens of GeV. Accelerated particles in turn cause such manifestations of solar activity as non-thermal X-ray and radio emission, radiation in the ultraviolet, optical and other ranges of the electromagnetic spectrum. In all these effects, the magnetic field plays an active role, since the initial energy is directly magnetic energy.

Secondly, the magnetic field, penetrating into the atmosphere, plays a passive role, changing the structure of the chromosphere and the corona, the nature of mechanical movements and waves that cause the heating of the upper atmosphere, as well as the direction and intensity of heat flows. In these processes, there is no transfer of magnetic energy to any other forms, however, as a result of changes in the properties of the medium under the action of a magnetic field, a number of phenomena characteristic of solar activity arise. In accordance with the role of the magnetic field are also commonly used indices of solar activity.

However, the magnetic structure of the Sun is so unstable that it is not currently possible to predict a flare even in a week. NASA gives a forecast for a very short period of time, from 1 to 3 days: on calm days in the Sun, the probability of a strong flare is usually indicated in the range of 1–5%, and in active periods it only increases to 30–40%.

Another method for predicting solar flares: prediction by measuring the differences in the atoms of radioactive decay of gamma radiation elements. It was proposed in 2006. Jer Jenkins noted changes in the decay rate of radioactive samples, occurring up to 39 hours before the next flare appeared on the Sun. The scientist continued his research under the guidance of Professor Efraim Fischbach, repeatedly confirming this amazing effect in experiments. In their opinion, accurate measurements of gamma radiation accompanying radioactive decay will allow one to predict solar activity over a fairly long time.

Weak changes in the decay rate of radioactive Cl-36 were also noted by other researchers, who showed its dependence on all aspects of exposure to solar radiation: the current distance from the Sun to the Earth, activity on the side of the star facing us, the phases of the solar cycle, etc. Themselves as Jenkins and Fischbach conducted experiments with Mn-54, Cl-36 and Ra-226, which, decaying, create gamma particles, the account of which allowed to track the decay rate exactly. Thus, the authors collected observational data for a dozen solar flares, and each time they recorded a change in the decay rate. Apparently, neutrinos are the culprits of this effect: the closer the Sun is to us, the more active it is, the more powerful the flow of these particles covers the Earth, and the more accelerated the radioactive decay.

The study of solar flares is necessary to create a scientifically based, reliable forecast of the radiation situation in near space. This is the practical task of flash theory. It is important, however, and more. Flares on the Sun need to be studied to understand various flare phenomena in a cosmic plasma. Unlike flares on other stars, as well as many other similar (or seemingly similar) non-stationary phenomena in the Universe, solar flares are available to the most comprehensive research in virtually the entire electromagnetic range - from kilometer radio waves to hard gamma rays. The physics of solar flares is a peculiar cut through many areas of modern physics: from the kinetic theory of plasma to the physics of high-energy particles.

The method of forecasting using three-dimensional images obtained by the "Solar Heliospheric Observatory." This method involves extracting the functions that will be used to create the corresponding 3D models. These models will provide physical and visual descriptions of features of interest that would be more complete than current text descriptions and model specifications. Prediction using this method makes it impossible to achieve a high percentage of forecast accuracy and requires significantly more time to make a forecast, in comparison with other methods.

Another of the developed methods is the prediction of solar flares using neural networks. The main stages of forecasting using neural networks are reduced to the fact that, at the first stage, the MDI image of the Sun is processed to detect spots. The second stage is the classification of the resulting spots into groups. The third stage involves the use of a neural network to calculate the likelihood of an outbreak and determine its possible class. The Cascade Correlation network is best suited for this, as it provides the best link between solar flares and class spots. The Cascade Correlation Network is a multilayered network of a special (cascade) architecture that allows you to train it in a constructive way: when the convergence stops, a new neuron is added to the network and upon further training, only the connections of this neuron are modified. This approach allows you to determine the size of the network, adequate to the problem being solved, and significantly reduce the computational cost of training. This method gives the most accurate predictions of possible flares in the sun. The accuracy of forecasts using neural networks is about 80%.

ESTIMATION OF THE SPATIAL DISTRIBUTION OF THE POPULATIONS OF COMMON ADDER, THE DEVELOPMENT OF THE PLACES WITH THE HIGH NUMBER, PROMISING FOR ORGANIZING THE TRADE

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Work presents spatial distribution the populations of the viper of usual in the territory of Minsk and Brest regions, and the number of its territorial groupings and the density of populations in the inspected regions is also determined. Are as a result established the most favorable localities of the viper of usual, among which are separated the moist or swampy forests.

*Keywords:*gerpetofauna, the density of population, spatial distribution, favorable localities, Brest region, Minsk region.

In the territory of Belarus' in the corollary measures of protection from the reptiles require usual verdegris, marshy tortoise and common adder. But, in spite of this position of common adder, its protection does not exclude the possibility of capture and using its poison for the Belorussian pharmaceutical industry.

Consequently, studies were directed toward the developments of the mass concentrations of the viper of common in the territory Brest and Minsk region- with the purpose of the possible mastery of the poison usual adder. With places conducting a study was selected on 4 region in Brest and Minsk regions: Stolbtsovskom, Pukhovichskom, Logoyskom and by Minsk; Stolinskom, Baranovichskom, Pruzhanskom, Brest.

The density of the population of the viper of usual through the Minsk region is approximately located on the same level. By the highest density is noted The pukhovichskiy region (24,4±3,4 of ekz./ga), while Minsk region it is characterized by the smallest density (9,3±1,2ekz./ga). Variation in the data two regions composes 1,5±56,8 ekz./ga and 0,3±24,6 ekz./ga respectively. As far as other regions of Minsk region are concerned, they are located approximately at the identical level (Logoyskiy – 22,7±3,4ekz./ga; Stolbtsovskiy – 17,9±2,6 ekz./ga).

If we examine density on Brest region, it is possible to come to the conclusion that here the spread of densities is considerably more. Thus, The pruzhanskiy region is separated from all regions (including from the regions on the Minsk region), with the mark in the graph of density into 45,94±4,86 ekz./ga, and variation on this population composes 1,5±112,6 ekz./ga. The low number of snakes in Thebaranovichskiy region is explained by the combination of unfavorable natural and anthropogenic factors (large sections of the free spaces, the domination of dry pine forests, intensive agricultural activity). Because of this, only statistically reliable data (6,7±5,6 of ekz./ga) were obtained on the upper swamps, where the highest (for this region) number of viper of usual was fixed. The low density of population was observed also in The stolinskiy region (7,3±1,7 of ekz./ga). Concerning Brest region, the like of density it a little is inferior To the pruzhanskomu region (28,1±6,44), however the spread of variation in it somewhat more than – 0,9±121,9 ekz./ga. This can be explained by higher urbanization and larger the interference of anthropogenic factors in the formation of biocenoses.

As a result it is possible to say that the populations of vipers predominantly prefer the moist or swampy forests (alders, pine forests); however, in the separate regions (Baranovichskiy region) they can be encountered on the upper swamps. As far as the most disliked places of the inhabiting of the viper of usual are concerned, here of