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STRUCTURE AND ELEMENTS OF THE INTERNET OF THINGS NETWORK FOR SOUND CONTROL

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The IoT multi-agent system for monitoring sound information (MAIOT) in the environment is a set of agents for sound detection, classification, analyzing and transformation by the help of IoT [1]. The objective of this report is to propose a methodology from the integration between IoT and multi-agent system for detecting sound from environment to classify and take a decision.

The multi-agent system for monitoring sound information using internet of things (MAIOT) is composed of two different agents that works together with the supervision of IoT. The process of MAIOT has several algorithms that can cover various needs at the same time we can modify this concept so it can be used is several domains and needs [2].

This system consist of a Raspberry Pi 3 computer and incredibly small microcomputer packed onto a single board. For all that, the Raspberry Pi 3 is packed with enough power to handle demanding computer projects [3].

Raspberry Pi3 is a rewarding device that's ideal for creating Internet of Things network, wearable, and embedded projects, to keep the size down. The Raspberry Pi 3 features a smaller-than-normal mini HDMI socket, and it offers a full computer experience. Raspberry Pi 3 will be connected to a solar power rechargeable battery, that provide it power 24/7, and on the other hand it will be connected to wireless to the internet using the Wi-Fi connection. A microphone is connected also to Raspberry Pi 3 to detect the sound from the environment, also Raspberry Pi 3 is connected to an Arduino Uno, that is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins, that may be interfaced to various expansion boards (shields) and other circuits.

The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. This module can be used for security, switch, and monitoring applications. Its accuracy can be easily adjusted for the convenience of usage. It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing.

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer [4].

IoT and multi agent system for detection of audio data for safe environment is discussed. Developed the IoT system with the capability of sensing some types of domestic violence and recognizing with the help of IoT. An history for the operation of this system is presented, hardware and software installation are shown.

Proposed the system that reports the incident to the police server for a possible action to be taken quickly. This system can be integrated with the services of fire departments for abnormal thing. It can be used to detect and report the specific incidents with sounds to the concerned departments using audio analytics.

<div align="center">REFERENCES</div>

1. Roslyakov, A.V. The Internet of Things: textbook. manual / A.V. Roslyakov, S. V. Vanyashin, A. Yu. Grebeshkov. - Samara, PGUTIYA, 2015. - 115 p.

2. Visniakou U.A. Approach to distributed multi-agent system for processing sound information of the environment / U.A.Vishniakou, B. H. Shaya // System analysis and application informatics, 2019, N 3. – P. 47-53.

3. McManus, S. (2014). Raspberry Pi for dummies. John Wiley & Sons.

4. Arduino. Arduino open-source prototyping platform. http://www.arduino.cc, 2012.