



# DEVELOPMENT OF A MOBILE ROBOT CONTROLLED BY VIRTUAL REALITY TECHNOLOGY

Yagshygeldi Annagurdov<sup>1</sup>, Bossan Atayeva<sup>2</sup>, Perman Ezizgulyyevich Hojagulyyev<sup>3\*</sup>

<sup>1,2,3</sup>Oguz Han Engineering and Technology University of Turkmenistan, Ashgabat, Turkmenistan.

\*Corresponding author

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Today, robotic technology is evolving and became a most important technologies that used in industries and daily life [1, 2]. Among the emerging technologies, virtual reality is becoming more and more popular. Virtual reality technology places the user in an imaginary 3-dimensional world. It can be an island, a city, a cartoon world, a virtual world that exists in reality or does not exist in real life. Virtual reality technology is used not only in the creation of games, but also in the creation of cyber-physical systems, allowing the transfer of reality into virtual reality. The main component of virtual reality is the VR goggles [3].

In this project was made Mobile VR robot that performs real-life tasks using virtual reality technology. The user can control the robot using his own virtual reality goggles by downloading special software on his mobile phone.

Main components of the mobile robot:

- Arduino Uno;
- NodeMcu esp8266;
- Mi Router 4c;
- Hikvision IP camera;
- 2 Servo motors;
- 4 DC motors;
- L298N motor driver;
- Mi powerbank 10000 mAh;
- 2 Li-ion batteries that power the motors.

Since the designed robot is mobile, all components and equipment are housed inside the robot. All data exchanges are carried out through using the 4-pronged Mi Router 4C in the robot. Electronic scheme of a VR mobile robot is illustrated in figure 1.

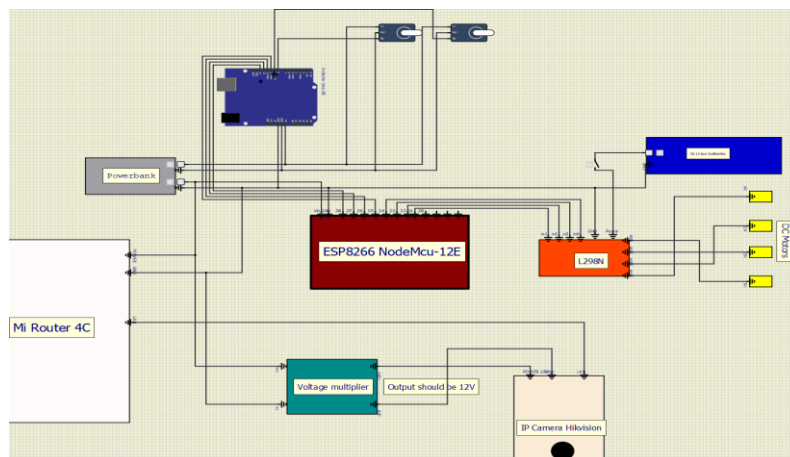


Figure 1. Electronic scheme of a VR mobile robot

As shown in figure 1, this router is connected to a Hikvision IP camera via LAN. The reason we chose this IP camera is that it is resistant to dust and rain, which increases the uptime of the robot. Since the Powerbank supplies 5 volts and the IP camera runs on 12 volts, we installed a Voltage Multiplier circuit and adjusted it to return 12 volts. For stable operation of a robot 2 Li-ion batteries are connected externally to the motors.

The camera rotates according to the head movement of the person wearing the virtual glasses. This project has many uses. This robot is easy to control from a distance. Therefore, the VR mobile robot can be used in these places, whatever work needs to be done at a distance. For example, inspecting pipes underground, in low-oxygen areas, entering and monitoring thin and narrow places, working in dangerous places [4], etc. The developed VR mobile robot is depicted in figure 2.



**Figure 2.** External view of VR mobile robot

In the future, it is planned to develop the mobile application for controlling the robot and to add the function of object recognition with the help of the camera.

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