CADMD 2023

Conference Proceedings

of the XXXI International Conference

“CAD in Machinery Design. Implementation and Educational Issues”

Conference in memory of Professor Jerzy Wróbel

Department of Computer Aided Systems

Lviv Polytechnic National University

Faculty of Mechanical Engineering

Bialystok University of Technology

Faculty of Mechanical Engineering and Robotics

AGH University of Science and Technology

Institute of Machine Design Fundamentals

Warsaw University of Technology

Supraśl, 2023

PATRONAGE:

Rector of Białystok University of Technology

Rector of L'viv Polytechnic National University

Rector of AGH University of Science and Technology

Rector of Warsaw University of Technology

Main Board of SIMP (Polish Society of Mechanical Engineers and Technicians)

President of ProCAx Association

ORGANIZED BY:

FACULTY OF MECHANICAL ENGINEERING

BIALYSTOK UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF COMPUTER AIDED DESIGN SYSTEMS,

L'VIV POLYTECHNIC NATIONAL UNIVERSITY

FACULTY OF MECHANICAL ENGINEERING AND ROBOTICS,

AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY

INSTITUTE OF MACHINE DESIGN FUNDAMENTALS,

WARSAW UNIVERSITY OF TECHNOLOGY

Proceedings

The conference materials are presented on problems in the field of MCAD and ECAD techniques and CAx tools in automation of machine and mechanism design), identification, modelling of processes and systems, UAV, UGV, robotics, automation, electromechanical systems, application of information technologies in engineering, software, programming and algorithms, additive technologies, reverse engineering, databases, CAx engineering education, educational methods and Internet technologies in education.

CADMD 2023
XXXI International Conference
CAD IN MACHINERY DESIGN IMPLEMENTATION AND EDUCATIONAL ISSUES
26 - 28 October 2023, Supraśl, Poland

A SMALL-SIZED ROBOT PROTOTYPE DEVELOPMENT USING 3D PRINTING

Igor Nevliudov[1], Vladyslav Yevsieiev[1], Svitlana Maksymova[1], Olena Chala[1]
Kharkiv National University of Radioelectronics[1]
svitlana.milyutina@nure.ua

ABSTRACT

The work presents the development of all parts of a mobile small-sized robot, except engines and electronics, using 3D printing technology. For control it is proposed to use ESP32-KAM, for which a place is provided in the design. This will allow the robot to broadcast a video stream via Wi-Fi.

KEYWORDS: **3D printing, mobile robot, small-sized robot, prototype, assembly.**

I. INTRODUCTION

In the modern world, especially in our country, enormous destruction occurs every day due to a wide variety of explosions. Their scale is enormous. Such sites of man-made disasters require careful investigation. As a result, the need arose to create small-sized robots that can perform the necessary research. Such robots must certainly be inexpensive, since in the current situation their consumption is becoming enormous.

II. ROBOT PARTS DEVELOPMENT

So, we need to develop a small-sized mobile robot. Taking into account the requirement to reduce the cost of production of such robots, we propose to use 3D printing technology to create all parts except engines and electronics. This technology can significantly reduce production time; it is also very simple and cheap. It should also be noted that its advantages include high-precision reproduction of the necessary shapes and details.

Based on the small size requirements, we will set restrictions on the maximum dimensions of the robot being developed: 160mm x 185mm x 80 mm.

To develop a three-dimensional model we use Fusion 360 from Autodesk

Figure 1 shows the layout of the mobile robot main elements, which will be produced by 3D printing, developed in Fusion 360

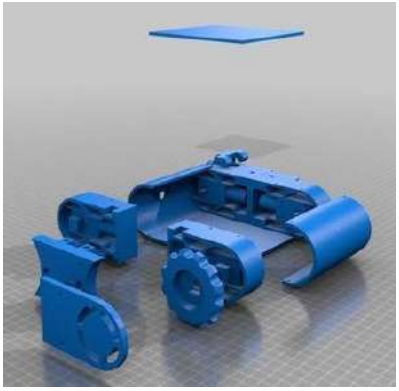

Fig. 1. Layout of the Mobile Robot Main Elements

Figure 2 shows the assembly of the mobile robot motor module, printed on a 3D printer with DC 6V motors installed. The final price for this build is under $2.

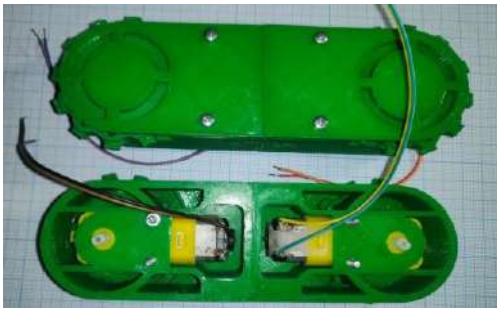

Fig. 2. Mobile Robot Motor Module Assembly

Fig. 3 shows a real robot mobile assembly prototype without a control system. Total cost is about 5 dollars.

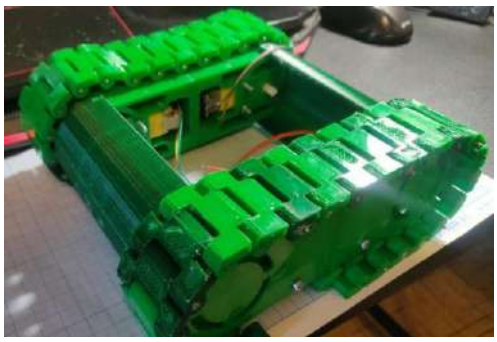

Fig. 2. Mobile Robot Motor Module Assembly

III. CONCLUSIONS

To control this robot, it is planned to use ESP32-CAM [1] for which there is a space provided. The robot will transmit a video stream in real time via Wi-Fi. Remote control will be possible from any mobile device: phone, tablet, etc.

REFERENCES

[1] Nevliudov, I., Yevsieiev, V., Maksymova, S., Demska, N., Kolesnyk, K., & Miliutina, O. Object Recognition for a Humanoid Robot Based on a Microcontroller, in Proceedings of the IEEE XVIII International Conference on the Perspective Technologies and Methods in MEMS Design (MEMSTECH) PP. 61-64, September, 2022