

## PROGRAMMABLE AUTONOMOUS ROBOTS

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**Rezumat.** Această lucrare prezintă avansul tehnologic al micro-controlerelor programabile și cum aceste circuite electronice poți fi „echipate” cu aplicații software complexe în așa fel încât sa poate acționa independent, devenind un așa numit robot autonom sau agent autonom. Pentru a ilustra acest lucru, un robot de tip Pololu 3PI a fost folosit, care are ca sarcina rezolvarea unui labirint (ieșirea din labirint). Pentru a face acest lucru posibil, a fost implementat un algoritm pentru a ajuta robotul să găsească și să memoreze rută corectă de ieșire din labirint.

**Abstract.** This paper aims to present how technology has advanced in terms of programmable microcontrollers and how circuits can be equipped with complex software so they can to act on their own, becoming a so-called autonomous robot or agent. To illustrate this, the 3PI robot is used, which is faced with solving a problem by itself, namely: solving a maze on its own. To make this possible so we had to implement this robot with a computer algorithm that helps it to remember the route that it had just travelled and then find the shortest and fastest way to the destination point.

**Keywords:** autonomous robots, maze-solving robots

### 1. Introduction

According to Wikipedia.com, an **autonomous robot** is a robot which can perform desired tasks in unstructured environments without continuous human guidance and intervention [1]. There are various degrees of autonomy for various existing robots. A high degree of autonomy is particularly desirable in fields such as space exploration, cleaning floors, mowing lawns, etc. A fully autonomous robot has the ability to [1]:

- Gain information about the environment;
- Work for an extended period without human intervention;
- Move either all or part of itself throughout its operating environment without human assistance;
- Avoid situations that are harmful to people, property, or itself unless those are part of its design specifications.

An autonomous robot may also learn or gain new capabilities like adjusting strategies for accomplishing its task(s) or adapting to changing surroundings.

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