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A CRITICAL REVIEW AND IMPROVEMENT METHOD ON BIPED ROBOT

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Abstract. *A behavioral strategy designed for a humanoid robot for the purpose of obstacle avoidance and path correction by using three ultrasonic sensors and one compass sensor is proposed and implemented on an autonomous humanoid robot. A mechanical structure with 4 degrees of freedom is designed so that an implemented small-sized humanoid robot named ARSR is able to accomplish three types of walking motions. One experiment is presented to illustrate the proposed bipedal structure lets the ARSR move forward, turn left and turn right. Three ultrasonic sensors and one compass sensor are mounted on the ARSR to obtain the environment information and detect obstacles, respectively. Based on the information obtained from these sensors, a decision tree method is proposed to decide upon one behavior from three movements: walk forward, turn right left and turn right. An experiment is carried out to show how the robot can autonomously avoid obstacles to effectively arrive at its destination.*

Keywords: Intelligent robot, Autonomous mobile robot, Obstacle avoidance, Path correct, Ultrasonic sensor, Compass sensor, Decision tree, Artificial intelligence

1. **Introduction.** As e-communities grow in quality and quantity, online users require more appropriate tools designed to suit their needs and environments. Such tools are not needed in real-world communities where human beings interact with each other directly. Access to context aware ubiquitous content is facilitated by providing intuitive ways for accessing Web content based on the user's surrounding context [1]. Context, in this case, is any information that can be used to characterize the situation of an entity, where that entity can be a person, place or a physical/computational object [3]. Information can include where and when the web users are, as well as what the web content available nearby is, and so on. It is indeed the context that distinguishes ubiquitous web access from mobile access.

In recent years, there are more and more mobile robots that are proposed to apply in high-risk, high-speed and rough terrain scenarios, such as planetary exploration [1], mining, forestry, hazardous site clean-up and military applications [2]. This environment implies some potential missions including logistics, surveillance, fire rescue missions and soldier assistance. For achieving these important tasks, require a type of robot which can avoid obstacles and correct its walking path. Biped robots are usually ideal for these situations, because it is easier to move about [3-11] in spatially confined areas and evade obstacles than other kinds of robots. A mobile biped robot can provide short-range remote eyes and ears for a variety of potential missions [12], and more excellent mobility