

# Design of a customised BB8 Robot companion

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**Abstract**— In this paper we present the outcome and development of a customized replica of a tv character droid known as “BB8”. The proposed design is using a low-cost Arduino-based hamster drive mechanism which allows to wirelessly control the movement of the robotic body through an app and a HC-08 Bluetooth 4.0 module. The robot’s design also embeds a set of acoustic and visual devices and sensors.

Upon command the robot moves in specific directions or performs specific movements, as well as reacts with acoustic feedback; a light sensor also triggers visual feedback in the head of the robot.

The proposed system is characterized by a simple and low-cost design, and it inherently allows a set of multiple uses, from rehabilitation to Human Robot Interaction applications.

**Keywords**— low-cost robotics, Human Robot Interaction, Hamster drive mechanism

## I. THE APPROACH

BB8 is a famous character from the movie franchise “Star Wars” [1]. The character is made up of a ball shaped body and a domed head.

We propose a design of the robot which can increment the capability of the device with:

- (i) the possibility to control the robot wirelessly
- (ii) the presence of sensors and devices to increment the robot interaction
- (iii) a selection of low-cost components to push forward the use of the robot.

In particular, the proposed system will integrate the 6 elements represented by the blocks in Figure 1 [2,3].

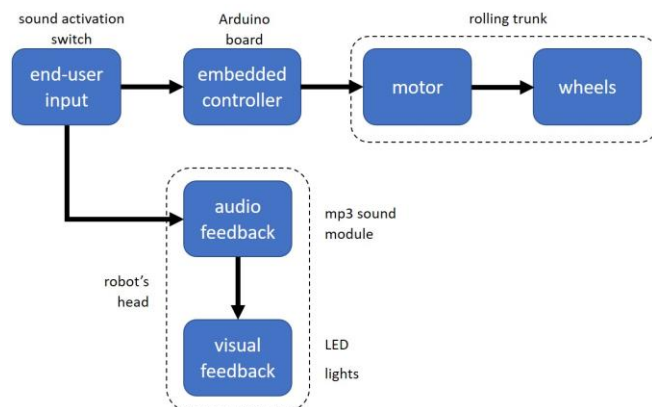


Fig. 1. The system set-up.

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## II. THE ROBOT DESIGN

The body consists of three layers of paper *mache* newspaper, which was placed on a 51 cm beach ball. A layer of cotton canvas and all-purpose filler was then placed over the paper *mache* and sanded down, then coated in layers of varnish. For the electronics in the body, parts of a robotics car kit was used. The robotic car worked by using a downloadable app that sends commands to the Bluetooth module connected to the Arduino uno on the robotic car [4]. Once given a command by the app, the Bluetooth module will then send the command to the Arduino where the code for the command is.



Fig. 2. The final design of the robot embedding an Arduino controller and the acoustic and visual feedback systems.

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