

DESIGN AND BUILD A ROBOT HEAD

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ABSTRACT

Robot head are becoming of increasing interest in the robotics community. A robot head is a subclass of a mobile service robot designed to interact with humans and to behave as a partner, providing entertainment, companion and communication interfaces. It is expected that the morphology and dimensions of social robots allow them to adequately operate in human environments. It is projected that social robots will play a fundamental role in the future as companions for elderly people and as entertainment machines.

Among other abilities, social robots should be able to:

- (1) Interact with humans using human-like communication mechanisms (speech, face emotions), (2) determine the identity of the human user (e.g. "owner 1", "unknown user", "Peter") and its mood (e.g. happy, sad, excited) to personalize its services, (3) store and reproduce digital multimedia material (images, videos, music, digitized books), and (4) connect human with data or telephone networks. In addition, (5) they should be empathic (humans should like them), (6) their usage should be natural without requiring and technical or computational knowledge, and (7) they should be robust enough to operate in natural environments. Robot head with these abilities can assist humans in different environments such as public spaces, hospitals, home settings, and museums. Furthermore, all the robots can be used for educational purposes. [1]

Sometimes robot head is designed for the humanoid robot which is used for vision and communication purposes. Generally, the eyes of the robot head use to detect obstacles or moving objects, and after the detection it could responses with certain actions. For its mouth, robot is used to listen and it could reply with particular sentences or words. It used to communicate with people who try to talk with the robot. In overall, the head of the humanoid robot is design to see, hears and speaks. For the robot head of my project, it will blink eyes when someone tries to poke it. If an obstacle is staying in front of the eyes, the eyes will keep closing until the obstacle is moved away. When the robot is speaking, the mouth will move according to the sentence to perform several shapes for realistic performances. For the eyes part of the robot head, it uses Infrared (IR) sensor to detect obstacle and servo motor o blink the eyes. IR sensor circuit and servo will be connected to the microcontroller PIC16F877a as a central to control the respectively response and moments. For the mouth part of robot head, voices recognition module will be mounted into the mouth position for voice detection as well as recognition. Once voice has been recognized by the module, it wills response by replying certain sentences from an external speaker which connected to the module. Besides that, few servos will be placed inside the robot mouth to complete the mouth movement by performing several shapes of mouth gesture. The servos are works corresponding to the module while sounds are playing back. It is just like the moment when human is talking with people.