

GECKO: An any terrain cylindrical robot for disaster searching operations

¹Tanmay Chakraborty, ²Akash Kumar, and ³Sazid Ali

^{1,2,3} Adamas Robotics and Artificial Intelligence Lab, Adamas University.

Abstract:

Earthquakes are frequent occurring natural disaster. In an year, there are about 20-25 earthquakes taking place in the world that are above the magnitude of 7 [1]. Earthquakes taking place in urban areas have a devastating effect on man made buildings and structures. Often life is trapped under these broken structures and finding the sign of life trapped under them becomes extremely difficult. Which causes a lot of life loss which could be saved if found on time. Small mobile robots are sent into the pile of broken structures to look for life which opens a domain of disaster robotics, for example the robot SnakeBot [2]. Manufacturing and controlling a SnakeBot is difficult. Thus, we propose a novel gecko bot with special wheels and cylindrical structure for this search operations. Gecko bot is an any terrain traversable mobile robot developed for search operations during natural disasters like earthquakes.

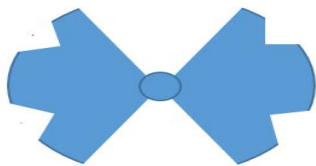


Figure 1: Developed wheel

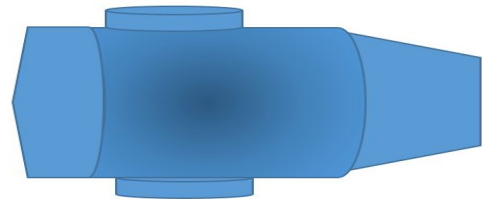


Figure 2: Developed Body Structure

The developed bot is easily controlled by any smartphone. It is equipped with bluetooth connectivity and a cylindrical body. The shape of the bot allows it to pass through tight gaps and rough surfaces. The bot can perform complex maneuvers like right and left hopping besides the common forward, backward, left, right and stop. The wheel design is made in such a way that it does not get trapped in loose surfaces. The 1.8kg/cm torque motors play a significant role in the gecko's movement when stuck in loose ground. The advantage of using the developed structure over commonly build rectangular structure and fully round wheels is that the later gets stuck in tight gaps and cannot maneuver if the ground is loose. Figure 1 shows the developed wheel structure and the developed body structure of gecko bot is given in figure 2. A live camera feed attached on the front of the gecko bot allows the human controller to localize the place where life is trapped. Thus allowing rescue as fast as possible.

Reference:

- [1] <https://topex.ucsd.edu/es10/es10.1997/lectures/lecture20/secs.with.pics/node8.html>
- [2] <https://en.wikipedia.org/wiki/Snakebot>

