Fuzzy Logic Based Navigation Safety System for a Remote Controlled Orthopaedic Robot (OTOROB)

Abstract

Orthopaedic Robot (OTOROB) is a cost effective telemedicine mobile robot that provides tele-presence capability for the specialist on a remote location to virtually meet the patient, perform diagnostics and consult the resident doctor regarding the patient via internet. This paper highlights on the development of a navigation safety system called Danger Monitoring System (DMS) as part of OTOROB's assistive internet based navigation remote control system. Combinations of sensors are place around the robot to provide data on the robot's surrounding during operation. The sensors data are fed into the DMS algorithm. DMS is equipped with fuzzy logic based artificial intelligence system to process the data from all the sensors and user input to decide preventative measures to avoid any danger to humans and the robot in terms of obstacle avoidance and robot tilt angle safety. The navigation safety system is tested by a set of experiments and found to be demonstrating an acceptable performance. This system proved to be suitable to be used in OTOROB