This thesis presents a robot control system for human guidance. The guidance control combines user position information and the robot autonomous navigation to control the robot to guide the user. The navigation system adopts Cartographer SLAM and Adaptive Monte Carlo Localization for robot localization. A laser scanner is used to detect user’s legs. A leg feature filter is used to locate the user legs. The guidance controller constantly adjusts motion commands depending on the user’s position, meanwhile guides the user to the planned destination. The human following controller uses the virtual force generated by user’s information as input and uses the compliance control generates robot following command to follow the user. The proposed design has been successfully verified using hospital health checkup experiment. Experimental results show that all user can fully complete the health checkup task by following the robot.