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a mathematical model of human body dynamics was constructed using spherical pendulum systems to describe a two-link chain of the human body. we show that two independent spherical pendulum systems can be composed to create a behaviorally equivalent double spherical pendulum system. this model was used to describe the human arm system consisting of the shoulder, elbow, and forearm, with the forearm joint angle, total arm moment, and angular velocity as the controlled variables. initial results from using this model to predict arm motions in a group of subjects indicate that the model is a good approximation of the measured data. the predicted human arm motions are in close agreement with those from other models. in addition, we show how the estimated joint angle trajectories can be used to predict the required control inputs for a given arm motion. this control strategy is implemented in a computer model and results in accurate arm motion and control. this study demonstrates the potential of using a mathematical model of human body dynamics as a tool for control of human arm motion. the uncertainty in the plant is an important factor in model-based control. the uncertainty, which is inherent in the measurements and the dynamics of the plant, can be represented by an ellipsoid. for any given desired response, it can be shown that the area of the ellipsoid is smaller than the area of the desired response. the rapid growth in the number of iot devices has led to an increasing need for a way to control these devices. in this paper, we introduce a new type of iot device, called a smart air conditioner. we build a system that controls a smart air conditioner using android smart devices, and present the results of experiments that show the feasibility of this approach. we developed android app that can control smart air conditioner by measuring the room temperature and humidity. we also implemented the temperature controller for the smart air conditioner using the arduino hardware.

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the device-to-implant ratio of the toolface controller is a critical parameter in the fabrication of commercial or consumer products. therefore, we incorporated a robust toolface control in the toolhead design of the new generation of high-speed drill. this novel toolface control provides rotational speed and feed speed stability in a wide range of drilling conditions, even with extreme impact dynamics of the drilling process. 37 this robust toolface control enables the real-time calculation of the toolface using only a single angular encoder. this represents a significant reduction of the cost and complexity of the toolface controller, compared to the previous hardware-based toolface controller. 38 the toolface controller has been designed with current drilling technology in mind. the calculated toolface is integrated in the feedback loop of the drill bit feed mechanism, thereby providing feed speed stability for the drill bit with a wide range of drilling conditions. 37 39 40 41 42 43 in fact, the new-generation fully rotating rss is the first commercially available toolface controller with real-time calculated toolface. 44 45 the new-generation fully rotating rss is the first drilling system capable of controlling the toolface with precision and accuracy while achieving high drilling speed. 46 47 the robot can achieve the precision and accuracy required for the high-speed drilling of highly accurate drilling products, such as turbine engine blade platforms. moreover, the robot can efficiently control the drilling process with various drilling conditions, such as impact dynamics, different drilling materials, and different drilling speeds. 48 49 50 in fact, the robot can achieve the accuracy required for the manufacture of turbine engine blades. 51 52 the robot is the first device that can drill precisely in various drilling conditions without any human intervention, and it can quickly and efficiently mass-produce high-quality turbine engine blades. 5ec8ef588b