Human Following Shopping Cart

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Abstract: - There are tasks where the transportation of heavy load needs to be done manually (E.g.:-Shopping malls). Here we can make use of machines to carry the load. For the convenience of the users, we can make a human following machine, but the pre-existing technologies in the field of human following machines are either non-specific towards the user (E.g.: - Using Ultrasonic sensors ) or rely on algorithms of image processing, Radio Frequency Identification tags, etc making them difficult for implementation in regular life .

Human Following Shopping Cart:-This model proposes a method that exploits the biometrics of the human gait for the proposed idea of Human Following Shopping Cart. The measurements for orientation and movements of the subject's hind limbs are computed by magnetometer, accelerometer and gyro meter. The readings are sent via Bluetooth (present in any ordinary Smartphone) to the microcontroller. The algorithm for computation of the orientation of mobile phone pre-exists in most of the Android devices. The prototype represents the base of a Shopping cart (the picture of the same is present in the e-mail).Calculations and decision-making algorithms are coded inside the Arduino board. This idea puts forward the usability of gait analysis and the various sensors present in mobile phone plus an innovative method to design a Human Following Cart specific to user.

The Automated Cart works by calculating the orientation of the user’s mobile and keeping a track of the relative angles between the user and the Cart. It then uses data from linear acceleration sensor to determine the velocity with which the user is moving. The software used to transmit the data from **Android** device to **Arduino** was **SensoDuino**. The access to Bluetooth is restricted by password. Unlike many other sensor technologies, the proposed model is human specific and there is no chance of following the wrong person.

The use of gait analysis using accelerometers has been on increase. The Human Following Cart uses similar procedures and follows the movements of the user. Using the mobile phone saves the cost of sensors to be implemented. The process is under further development where linear accelerometer values will be integrated to form velocities.

The application of this algorithm can be used in conjugation with Oculus Rift to use the gamer’s steps and move the virtual character.

Thus the proposed technology provides a feasible and cost effective solution for the automated cart model.

# References

1. M. Nowlan,“Human Identification via Gait Recognition Using Accelerometer Gyro Forces”, published
2. Gafurov, et al. "Gait Authentication and Identification Using Wearable Accelerometer Sensor." IEEE Workshop on Automatic Identification Advanced Technologies, 2007.
3. Pieter-Jan Van de Maele, “Reading a IMU Without Kalman: The Complementary Filter”, unpublished

Algorithms and Software

1. Android provides

* Orientation sensor data
* Linear Acceleration data.

1. Hazim Bitar for the SensoDuino app for transmitting data via Bluetooth.