Automated Luggage Carrying System

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Abstract- *Carrying heavy loads at the airport or any other place is always difficult and strenuous. There have been a lot of enhancements and improvisations for luggage carrier system but none have had the potential of ending the perpetuity of problems. Various issues like the high cost for machine parts or the availability of those parts. But with new enhancement, we have made these issues have been solved.*

I. INTRODUCTION

Our Luggage carrier system is specifically designed to ensure there is no load effect on the consumer while carrying their luggage. The carrier system comes with the sophisticated sensor technology which makes the consumer effort minimal. Through this carrier system we have tried to tackle the problem of Luggage tracking in congested or highly crowded places where it is highly difficult to keep track of one's lugaage. The luggage carrier system has been designed with sensor and components which are easily available and are of affordable cost. The carrier system will have a bracelet/smart card which will be used to direct the vehicle from one end to another or till the traversing point. The basic idea of keeping the vehicle with smart card/bracelet ensures the vehicle is being tracked and ease the process of carrying luggage.

The applications of this device also tailor to allowing more freedom to handicapped or elderly individuals who want to assert their independence. Still another use of this device is for laborers/professionals who are often going back and forth on job sites consuming valuable time simply transporting their equipment.The basic design functionality of the stalker entails wireless connectivity to the user. The wireless tethering is accomplished through the use of sensors on a bracelet/strap worn by the user and sensors on the stalker unit. A security feature is also implemented on the stalker an alarm system that will sound if the luggage is tampered with or if the stalker unit falls too far behind the user. A LED will illuminate on the bracelet to alert the operator of low battery power. A flashing light mounted on the stalker will alert the other passers-by of the presence of a moving device. An emergency stop button is also attached to the bracelet in the event of a malfunction.

II. DESIGN

The task at hand is as follows. To build and demonstrate an autonomous luggage carrying device that follows the operator wirelessly. The mechanism is programmed to follow the operator and maintain a certain safe distance (maintaining approximately 3-4 feet).

The device will be outfitted with an onboard battery charger that plugs into a wall outlet for recharge. This is presumably done overnight before use to assure a fully charge battery for uninterrupted usage. A revolving light mounted on the post will alert other pedestrians of the moving device. This will help minimize or eliminate others from walking in the path between the operator and the device.

Key Components

To satisfy the products' intended usage and requirements, a list of the following components were found to be necessary.

- 18 V DC Motor (Fig.3):
    - For cartpropulsion;
- Battery and batterycharger:
    - Plugs into 110 VACoutlet,
    - Recharges 18 VDCbattery,
    - Proposing using 3 18V batteries in parallel for longer operatingduration.

Sensor circuitry

Below is given a diagram of the internal IR Beacon sensor logic. The sensor pair comes as a kit and requires soldering of the components on the circuit boards. The beacons alternate between transmitting and receiving so that they never get confused by reflections of their own transmissions.

The transmit and detect cycle is carried out more than one thousand times per a second, and a small microcontroller monitors all four detectors to decide the direction to the other

beacon. The beacons have four red LEDs that indicate the direction to the other beacon; if you take two beacons and rotate them, the LEDs will always keep lighting up in the direction of the other beacon.

The Beacon has four digital outputs that indicate which of its four sides detects the other beacon in the strongest way. You can establish the direction to another beacon within a few degrees by rotating the beacon back and forth and noting the point where the output switches from one side to another. An enable input lets you select between an active mode and a low-power mode.

III. WORKING

Component layout

Lower view is shown in Fig. 14.

- One clutched DC motor controls the direction of the front wheels similar to a rack and pinion design on anautomobile.
- The drive motor applies a torque to the single large front wheel via friction from a smaller wheel mounted on the drivemotor.
- A rechargeable 18 V battery is mounted under the cart with access to plug in the transformer plug forrecharge.
- The Basic Stamp, siren, and charger are mounted on plexi-glass mounted to the bottom of thecart.
- Both drive and steering controllers are mounted on the bottom of the cart to maintain proper ventilation to preventoverheating.

Steering operation

- Steering is first initialized to by sweeping full left, then full right to determine the centerpoint.
- Steering determined by N, S, E or W direction in relation to a cart indicated on aSensor.
- If East or West of the device is detected, the wheel turns then the drive and waits for the north direction to bedetected.
- Blinders made of plastic added to the north facing receiver to the beacon to narrow the field of a view similar to blinders on ahorse.

In the programming there are several components that were tested separately, and then all brought together into one single program that controls the cart. The distance sensor and the drive motor generally work together, while the steering is dependent upon the Pololu transceivers.

Due to the nature of our distance sensor (Parallax PING sonar sensor), which is extremely accurate for big flat surfaces, but not so accurate when it comes to seeing a person that is in front of it, we were forced to program a buffer into the distance readings. In fact, we take three readings in a row, which are then stored in three different variables. If all three readings are larger/smaller than our distance.

IV. SCOPE OF DESIGN

Targeted consumers

- The elderly,
- Handicap individuals,
- Travelling with young children,
- Pregnant women,
- Injured passengers (e.g., temporary cast),
- Business professionals,
- Outdoor job site workers,
- The elite and the lazy.

The next step

We will develop methods for a group control of mobile luggage carrier and for obstacles detecting and handling.

The following types of group robot control are available:

Following the leader of the group is the easiest task, since only a few include a robot. The first robot accepts the signal from the driver, the second receives the signal from the first, the third from the second, and so on.

Grouping is the next game step. Here each robot can adopt the role of a leader of the others.

After grouping comes, order the so called “Tag” (marking). Here the robots must use strategy to avoid “marking” of the other robots, i.e., they should not be pursued as a bait.

This type of marking is similar to the above said and is known as “Manhunt” (prosecution). Here we have two teams of robots, each one of them trying to select (mark) all members of the other team.

The next step is a game of “Winning the flag”. Here again there are two teams, as in “Manhunt”, but now the aim is to take the flag of the adversary and to bring in the base in their own team.

For management purposes and to achieve “social interaction”, separate tasks are programmed, such as other carriers to follow the operator or the first carrier (Follow the leader and clustering).

V. CONCLUSION

Thus we have tried to tacke the problem of luggage carrying issues for consumers at highly crowded or large consumer areas. We built a model which uses smart card/bracelet to make sure the customer/passenger can track the vehicle and also have his mobility around the area in ease. In the model we tried to implement parts which are easily available and are at affordable cost.Thus making it economic friendly.

REFERENCES

[1] T a m o t s u, M., I. S a t o s h i, K. H i r o a k i, Y. Y o s h i m a s a, N. Y o s h i t o, S. K e n i c h i r o. Remote-Collaboration System Using Mobile Robot with Camera and Projector. – In: Proc. of IEEE International Conference on Robotics and Automation, 15-19 May 2006, Orlando, Florida, USA.

[2] K a r a s t o y a n o v, D. Control of Robots and Another Mechatronical Systems. Prof. Marin DrinovAcademyc Publishing House, 2010.ISBN 987-954-322-415-9 (in Bulgarian).

[3] M e n g, Y., O. Kazee m, J. M u lle r. A Hybrid ACO/PSO Control Algorithm for Distributed Swarm Robots. – In: 2007 IEEE Swarm Intelligence Symposium, 1-5 April 2007, Honolulu, Hawaii, USA.