Portable Multi-Utility Porter System in Android Applications

K.Suriya Krishnan, D.Sivakumar,M.K. Madhumitha, R. Kaayathiry , R.Immanuel Ebenezer

Abstract: ***The main objective is to bring back the porter system. The reason behind that is previously the demand for money increased consequently, the usage decreased. A new concept has been brought to get a reasonable cost and to increase the usage. The cost is calculated by step count and weight. The various parameters used are 1) Accelerometer 2) Bluetooth 3) Load cell. An android application is created interfacing the portable device. In this way, the service of the porter is utilized. This is how the system is carried out.***

Index Terms: step count, weight, short distance, android application.

I. INTRODUCTION:

Bags have been an integral part whether it maybe travel bag or plastic bag which are used for multiple purpose. Carrying the load all over the place happened in the olden days. Thinking of a load which conveys its weight, tracks its location, which follows the user automatically or manually, by the touch of the present technology to the old baggage it may bring out its true potential. This has motivated the project all along so that it is user-friendly and could be operated by a smart phone.The maincause for the porter system is to help the elderly passengers and other passengers carrying heavy luggage. This system will be an added advantage for the modern society and will lead the porter to an advanced level. In this system accelerometer is used to calculate the step count ie, the cost is calculated based on the number of steps the porter walks carrying the load. The angle of device is calculated by the amount of static acceleration due to gravity.

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With the help of amount of dynamic acceleration, the device movement is analyzed. OLED (organic light-emitting diode) display is used in the portable device. It has an advantage of broad color range, lighter weight, flexible to use and is more efficient than LCD.It works without backlight because it emits visible light and has low ambient light conditions.[1] Bluetooth device is a wireless technology which scans over a short distance so that it communicates with the porter nearby. The Bluetooth module is preferred because it is compatible and supports the devices for pairing. Android application is used as it is open source and easy to handle. It is developed where the customer can book the porter nearby; booking comprises of entering the load weight and the service for the porter starts as soon as the porter accepts the service.

II. RELATED WORKS:

A. Arduino based mobile application:

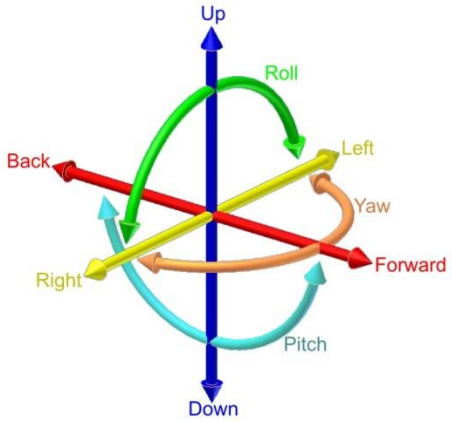
Based on user's mobile number, data base is stored in the server so every time the user accesses the application; he/she is required to enter the number along with the password[2,5]. The server checks whether the password matches with the corresponding number. This is the method of signing for an account so that it will be an easier method for accessibility.

B. Wireless communication:

Bluetooth protocol is standardized for wireless communication and it is perfect for its short range, low cost and low power.[2] The frequency of Bluetooth is about 2402 and 2480MHz or 2400 and 2483.5MHz.Here we use HC 05 Bluetooth protocol; it is a serial port protocol. It is a module which allows full-duplex wireless functionality. The range of the Bluetooth is about 10meters so that the user can book the porter at a nearby distance. The power of the transmitter take governs the Bluetooth device range. The maximum standard range of Bluetooth is around 100meters. The Bluetooth is paired with the porter's device. This is how the process is carried out.

C. Accelerometer:

The accelerometer generally measures the tilting motions. It measures the acceleration force. The accelerometer consists of multiple axes which find outs the 3D positioning. The accelerometer makes use of piezoelectric effect- it gets stressed by the accelerative force which contains[4] microscopic crystal. The dynamic forces include vibrations and movement. The acceleration is measured by the change in velocity.The accelerometer is fixed in the porter's device. The movement of the porter in terms of number of steps is sensed by the accelerometer. It then calculates the distance covered from source to destination.



It has more sensitivity which gives large signal. Due to large signal, measurement is easier and hence accurate readings are obtained. Accelerometer has a bandwidth of 50Hz for slow moving machines and several hundred hertz for fast moving machines. Accelerometer is applicable for maximum swing which ranges around +-1.5g.

D. OLED Display:

OLED has an advantage of illuminating without backlight. It provides its own illumination[6]. Since they do not require the use of backlight, they consume much less power than LCD. OLED makes use of organic molecules which creates organic layers which are thinner lighter and more flexible than the crystalline layers in LED or LCD. Manufacturing cost of OLED is comparatively higher than LCD and LED. As they have a larger field of view of about 170degrees, it makes it more convenient to view the display in different angles. OLED display is fixed in the portable device. It displays the weight of the load, number of steps, and the cost at the end of the service. It is more efficient for the porter when they work during the night.

E. Arduino UNO:

Arduino UNO has a unregulated external power supply of 6-20V (Pin 30) or regulated power supply of 5V (Pin 27). It switches to the highest power source automatically. Here we use ATMEGA-328P which is a single chip micro-controller created by ATMEL. The performance of this is 20MIPS at 20MHz. There is no requirement of USB interface. This micro-controller is used for low-powered, low- cost systems and so Arduino is implemented on this chip.

III. GENERALOPERATION*:*

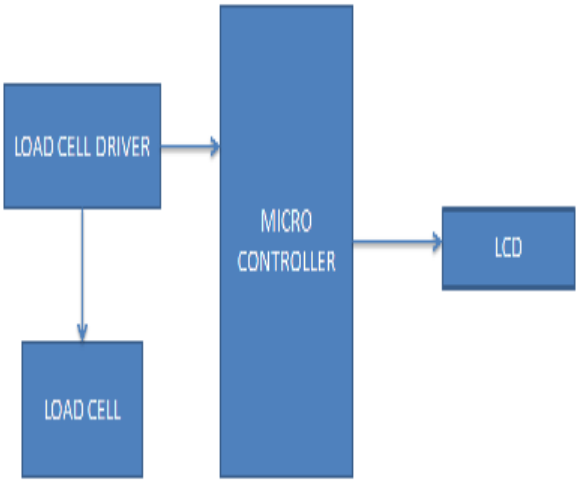


Figure 1: Block diagram of load cell operation.

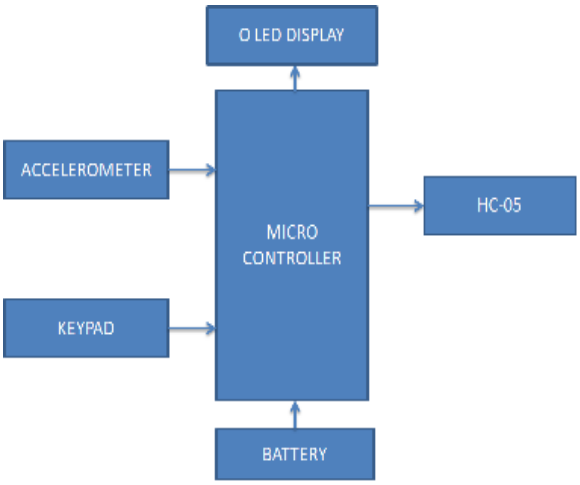
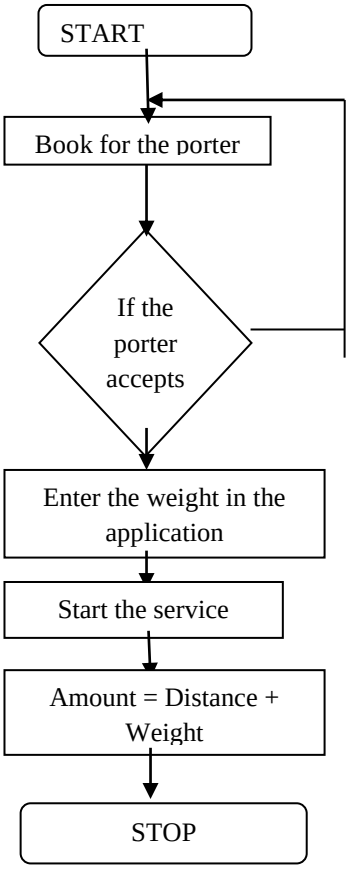


Figure 2: Block diagram of portable device.

FLOWCHART:



The micro-controller used in this project is ATMEGA-328P. This micro-controller is used since it is simple, low-powered, and low-cost. It is implemented on the Arduino Uno[5,3]. The portable device is worn by the porter. This device consists of Accelerometer, Bluetooth, and OLED display. The load cell can be kept in the station or can be carried around by the porter to measure the weight of the luggage. An application is created which is used by the user to book a porter. The user has to enter few details before booking of a porter. The booking of a porter can be done only for a short range which is done with a help of a HC-05 Bluetooth. The porter at a nearby distance will accept the request given by the user. Once the booking of a porter is done, it is signaled in the portable device. The porter will measure the weight of the luggage with the help of a load cell. The weight is then is entered in the application. The accelerometer in the portable device is used to determine the number[7] of steps that the porter takes to calculate the distance. Finally when the destination is reached, the weight and the distance will give a truthful fare.

IV. COLLECTION OF RECORDED DATA:

Here is the collection of sample data which are measured according to the weight and the distance travelled.

TABULAR COLUMN:

S.NO	WEIGHT (Kg)	AMOUNT	NO.OF STEPS
1	5	20.63	50
2	10	30.37	30
3	15	40.61	50
4	20	52.50	40
5	25	64.87	70
6	30	72.68	55
7	35	82.38	31
8	40	92.43	35
9	45	102.40	33
10	50	72.68	55

SAMPLEOUTPUT:

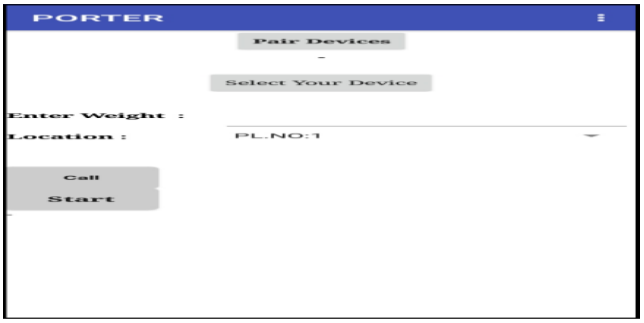


Fig 1: The weight and location is entered to start the service.

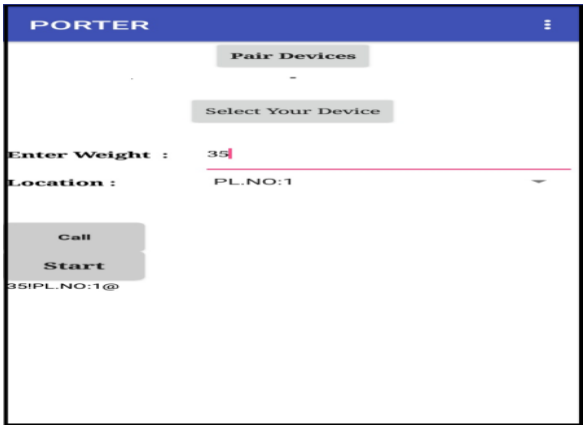


Fig2: For e.g.: consider the weight to be 35 and platform no. as 1

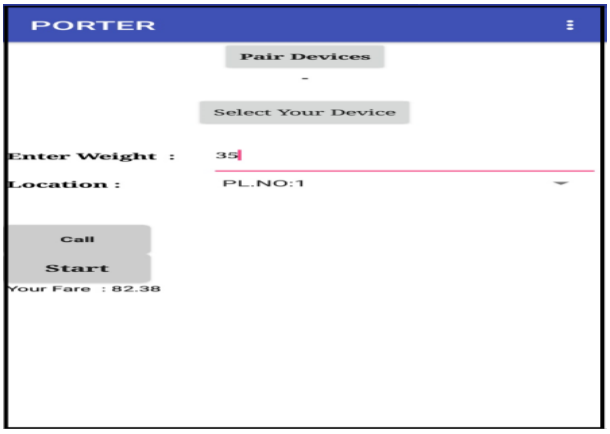


Fig3: after the process is completed, the total fair is said to be Rs.82.38

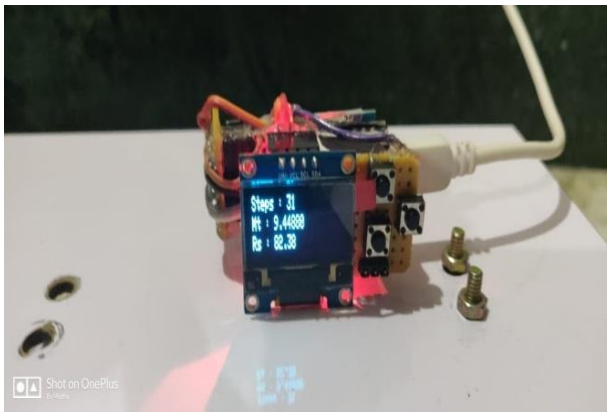


Fig4: The number of steps and amount is visualized on the portable device

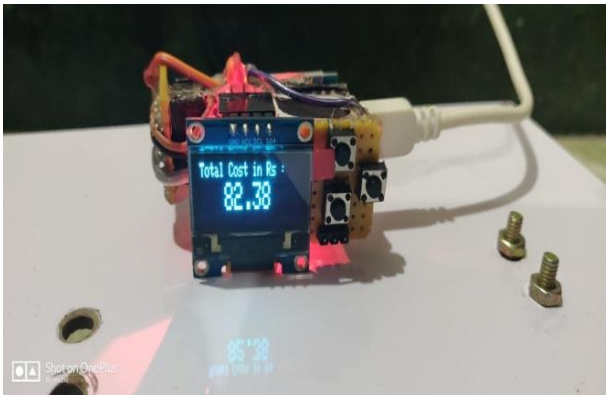


Fig5: The total amount is displayed at the end of the service

V. SAMPLE DATA ENETERED:

Weight entered: 35Kg
No. of steps taken: 31
Amount : 82.32

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