

Artificial Intelligence Using Pick-Toolight System



^{#1}Prof. Mahesh Maindarkar, ^{#2}Digvijay Lavale, ^{#3}Manoj Jogdand, ^{#4}Amit Gadekar

²ldigvijay2@gmail.com

³manoj358@gmail.com

⁴amit.gadekar123@gmail.com

^{#1}Prof. Department of Electronics and Telecommunication

^{#2³⁴}Prof. Department of Electronics and Telecommunication

JSPM's Imperial College of Engineering and Research, Wagholi, Pune

ABSTRACT

Light-directed order fulfillment systems use light indicator modules mounted to shelving, flow rack, work benches, pallet rack or other storage locations. Whenever product is needed from a particular location, the right indicator turns on, drawing attention where action is required. The operator picks the product quantity displayed. The operator then confirms the pick by pressing the lighted button. Pick-to-Light works best in a piece pick or broken case pick environment where there are high density order picking areas. Often a general rule is the 80/20 rule - if 80% of a distributor's item-level picking volume comes from 20% of their SKU base, then Pick-to-Light is an ideal solution to optimize productivity and accuracy. Pick-to-Light can easily be configured to add performance and efficiency to many popular order picking methodologies, including Order, Wave, Zone and Batch picking techniques. Variations on light-directed technologies such as Putto-Light or Pack-to-Light are ideal for high-speed sortation processes, where a batch of orders is sorted to individual customer orders, or used to maximize throughput for retail store order distribution.

Keywords : IR sensor, Keypad, Demux, PIC18f4550.

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I. INTRODUCTION

Globally, roughly US\$1 trillion in goods are distributed from nearly a million warehouse sites each year, and for many businesses such activity represents 20 percent of their logistics costs. Order picking the process of selecting items from inventory racks with pick bins and sorting them into order bins for distribution accounts for about 60 percent of these warehouses' total operational costs. Current robotic systems lack the dexterity to handle the variety of parts on most pick lines, so the vast majority of western European warehouses still use manual picking, which is costly and time consuming. Although manual methods vary, most warehouses still use paper lists that include each item's location, identifying number, and required amount. Such systems are error prone and can cause significant losses, as in auto-mobile manufacturing, where the wrong part can halt an assembly line. In e-commerce, inventory errors can compromise order fulfillment, possibly increasing customer dissatisfaction. Although technologies like parts-to-picker

systems that bring parts bins to warehouse workers can facilitate various parts of the picking process, such systems are expensive and relatively rare. Thus, parts bins are typically stationary, and the picker must rely on a paper list or expensive pick-by-light systems that use displays at each bin to indicate which parts to pick.

II. LITERATURE SURVEY

Order bins for distribution accounts for about 60 percent of these warehouses' total operational costs. Current robotic systems lack the dexterity to handle the variety of parts on most pick lines, so the vast majority of western European warehouses still use manual picking, which is costly and time consuming[1]. Although manual methods vary, most warehouses still use paper lists that include each item's location, identifying number, and required amount. Such systems are error prone and can cause significant losses, as

in auto-mobile manufacturing, where the wrong part can halt an assembly line[3]. In e-commerce, inventory errors can compromise order fulfilment, possibly increasing customer dissatisfaction. Although technologies like parts-to-picker systems that bring parts bins to warehouse workers can facilitate various parts of the picking process, such systems are expensive and relatively rare. Thus, parts bins are typically stationary, and the picker must rely on a paper list picker will scan/input an item and all the locations that need that item will[5].

III. PROPOSED SYSTEM

Pick-To-Light system uses an indicating LED at the position of the demanded product. This position is labelled at the time of putting the product in the cart. Different power supply is used for Microcontroller PIC18F4550 and to LEDs. Power supply used is of bridge type. It uses a step down transformer of 12V output. The transformer will step down the AC supply of 230V to 12V AC. Bridge rectifier is used to remove the negative content in the wave. Capacitor is used for the filtering purpose. 1000uF is used for filtering purpose. This capacitor will remove the ripples in the wave. Then this unregulated output is given to regulator IC 7805. Regulator IC produces the regulated DC voltage.

8 pins Port D pins of microcontroller is connected to LCD data and 3 pins of port E are connected to LCD command. Keypad is used for entering the label of the product. The position is entered by the keypad. Keypad used is of matrix type.

When position of the desired product is entered by the keypad, microcontroller checks the entered position is correct or not. If entered position is not correct microcontroller will ask again for entering the position. When right position is entered microcontroller will check if it is present on which demux. Demux are used for interfacing the LEDs.

Here, we have used one 1:4 demux and four 1:16 demux. Demux are used for maximizing the number of LEDs. 1:4 demux is connected to the microcontroller. It is having one input and four outputs according to two two select lines. We have designed four kits having 16 LEDs each. 1:16 demux is used for each kit. It will produce 16 outputs corresponding to 4 select lines. Thus we can increase the number of LEDs by increasing the number of demux.

If entered position is present in the labeled position microcontroller checks for the product is present or not. It is done by the IR sensor. IR sensor checks the product present or not. If product is present the labeled LED will glow. This will show the position of the product.

LED will glow according to the input given by the keypad and path towards the destination is shown. The LEDs will glow for the time according to the distance from the entrance. If the distance is large, LEDs will glow for more time than that for small distance. Delay will vary according to the distance. We can vary the delay in the program.

We have inserted the path for the fire exit or in case of emergency. This allows the quick exit in case of emergency

such as fire. Switch is present at for the initializing the emergency path.

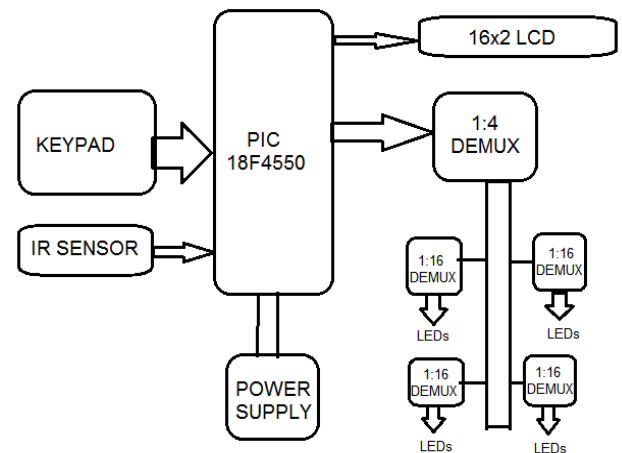


Fig 1. Block Diagram of system

Description:

1) INPUT

Input is in the numeric form. Input may also be given in other forms such that barcode and alphanumeric etc. Input is the description of the position of the product. Database should be produced at the time of putting the product in the cart. At the time of picking the product, this input is used as label of the position of the product.

2) LCD DISPLAY

Display is used to display the position of the product. This displayed position is according to the database entered at the time of putting the item. LCD used is 16X2 LCD display.

3) DEMUX

Demux are used to increase the number of outputs within the minimum use of pins. One 1:4 Demux and four 1:16 Demux are used. By using these Demux we have showed 64 products. If we want to increase the number of LEDs we have to increase the number of Mux used.

4) KEYPAD

Keypad is used to enter the input. Here our input is in the numeric form. Keypad used is of matrix type. According to value entered by the keypad, corresponding output LED are glow showing the position of the product.

5) SENSOR

We have used IR sensor. It is used to know the item is in the rack or pellet is present or not. IR sensor displays the availability of the product. Sensors are used to display the level of the products.

6) MICROCONTROLLER

Microcontroller used is PIC PIC 18F4550. It supports 2.0 USB, 3 power management modes, flexible oscillator circuit, three interrupt structure, enhanced Capture Control PWM, 10 bit 13 channel analog to digital converter.

IV. ADVANTAGES AND APPLICATION

Advantages:

- Pick-to-Light is Fast.
- Pick-to-Light is Accurate.
- Pick-to-Light is paperless.
- Pick-to-Light is simultaneous.
- Pick-to-Light is team based.
- Pick-to-Light is cost effective.

Applications:

- Retail
- Direct Marketing
- High Tech Electronics
- Health & Beauty
- Catalog
- Music/Publishing
- Pharmaceutical

V. CONCLUSION

We have to conclude in this project, The Pick-to-Light system is flexible enough to cope with capacity variances before order peaks become noticeable. Various calculation methods, intelligent order management and integrated additional options ensure that our customers get the maximum from their investment. In a typical Pick-to-Light system, the picking sequence starts at the beginning of a zone where the operator scans a bar coded address label attached to the shipping carton or tote.

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