Artificial Intelligence using Pick-to-Light System

Prof. Mahesh Maindarkar[1], Amit Gadekar[2], Digvijay Lavale[3], Manoj Jogdand[4]
[1, 2, 3, 4] Department of E&TC
[1, 2, 3, 4] 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 perfromance 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.

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 precent 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 precent 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 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 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 precent 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. BLOCK DIAGRAM OF THE SYSTEM

Pick-To-Light system uses an indicating LED at the position of the demanded product. This position is labeled 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 steps 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 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 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.

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.

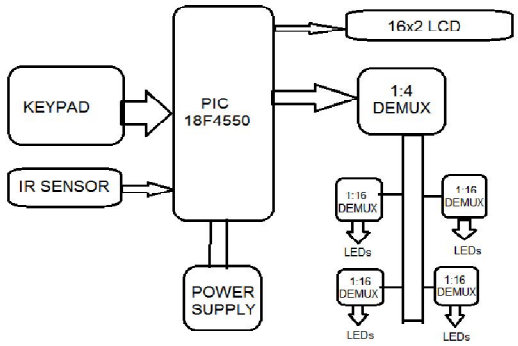
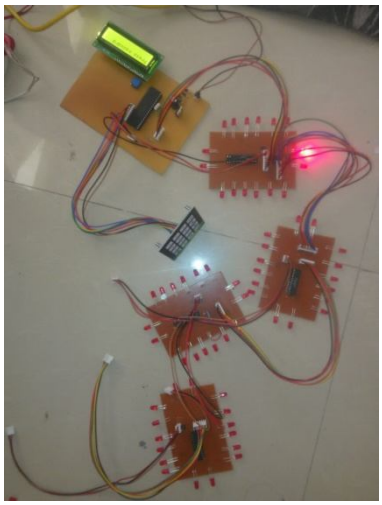


Figure 1 : Block Diagram of Pick-to-Light system

IV. RESULTS

Sr. no	Product	Label	Kit No.	Position
1	**Product 1**	102	A1	2
2	**Product 2**	124	A2	4
3	**Product 3**	147	A3	8
4	**Product 4**	154	A5	5

V. DEVELOPED SYSTEM



VI. ACKNOWLEDGEMENT

It is a great pleasure for us to present a project “Artificial intelligence using Pick-to-Light system” where guidance plays an invaluable key and provides concrete platform for completion of the project.

The hard work and perseverance of our mentor will always be embedded in our memory. Project execution would not have been possible for us without the continued assistance of certain people. We take this opportunity to express our deepest gratitude for all the heartfelt assistance rendered.

We thank Prof. Mahesh Maindarkar our project guide who was responsible for coordinating all efforts and sincerely grateful to him for helping to achieve high standards of performance.

We are very grateful to Prof. P.R Badadapure HOD of ICOER,Wagholi for making available all the facilities required for the successful completion of the project.

VII. 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.

REFERENCES

[1] Wi-Fi Robot for Video Monitoring & Surveillance System By Pavan C & Dr. B. Siva Kumar, International Journal of Scientific & Engineering Research Volume 3, Issue 8, August-2012.

[2] Intelligent Personal Assistant and Surveillance Robot using Zigbee Communication By Krishnaswamy Kannan and Gowtham S, International Journal of Engineering Science and Technology (IJEST), ISSN : 0975-5462 Vol. 4 No.10 October 2012.

[3] The Robot control using the wireless communication and the serial communication, by JONG HOON AHNN, Project Advisor: Professor Mark Campbell, Cornell University May 2007.

[4] W. Lao, J. Han and Peter H.N. de With, "Automatic video-based human motion analyzer for consumer surveillance system", IEEE Trans Consume Electron, Vol. 55, No. 2, pp. 591-598, 2009.

[5] P. Saucy and F. Mondana, KeepOnTheWeb: Open access to a mobile robot on the Internet, IEEE Robotics and Automation Magazine, pages 41-47, March 2000.

[6] Huosheng Hu, Lixiang Yu, Pui Wo Tsui, Quan Zhou, Internet-based Robotic Systems for Teleoperation, International Journal of Assembly Automation, Vol. 21, No.