iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** IV **Month of publication:** April 2019

DOI: https://doi.org/10.22214/ijraset.2019.4470

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

Smart Shopping Trolley

Avadhesh Kumar Sharma[1], Himanshu Mahawar[2], Mohammed Rizwan [3], Manish Kumar Saini [4], Abhishek Awasthi [5]
[1]*Assistant Professor, Department of Electrical Engineering, Swami Keshvanand Institute of Technology Management and Gramothan, Jagatpura, Jaipur 302017*
[2, 3, 4, 5]*UG Student, Department of Electrical Engineering, Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagariya, Jagatpura, Jaipur 302017*

Abstract: ***A shopping trolley is a necessary tool for shopping in supermarkets or grocery stores. However, there are shopping trolleys used in every supermarket which are manually operated. In addition, for some people to drag a trolley can be a tough job. It is known to be an inconvenience and time wasting for customers who are in rush to search for desired products in a supermarket. To overcome the problems which are identified, recent years have seen the appearance of several technological solutions for hypermarket assistance. All such solutions share the same objectives: save consumer's time and money, help the retailers to win loyal clients. Therefore, a smart shopping trolley with a smart shopping system is developed to solve these problems. So this proposed system is to provide a technology oriented, low-cost, easily scalable system for shopping and also to make shopping more easy and comfortable for each and every customer by providing them many facilities right in their trolley. With the use of these trolleys customers can enjoy their shopping and pay more attention on their shopping list without the need of pushing shopping trolley. As we see in a shopping mall or grocery malls like big bazaar and D-marts; there are trolley available but they are manually operated. So we're going to make it operate automatically in a very efficient manner as so, customer does not meet any problem in operating trolley.***
Keywords: ***Motor Driver L293D IC, 8051 Microcontroller, Hc-05 Android Module, DC Motor.***

I. INTRODUCTION

Microcontroller based design, has acquired the status of most happening field in electronics. This is highly specialized field that has the power of integrating thousands of transistors on single silicon chip. This report explores and demonstrates the selection of the Smart Trolley idea through the process of using a microcontroller and Bluetooth android module. Nowadays, in mall for purchasing variety of items it requires trolley. Every time customer has to pull the trolley from rack to rack for collecting items so, to overcome this problem we are introducing a new idea called "Smart shopping trolley". As we see in a shopping mall or grocery malls like big bazaar and D-marts; there are trolley available but they are manually operated. So we're going to make it operate via smart phone in a very efficient manner as so, customer does not meet any problem in operating trolley. In modern era, for automation of mall we are developing a microcontroller based TROLLEY which is totally automatic. It is controlled by the customer while purchasing items and it maintains safe distance between customer and itself. By using this trolley, customer can buy large number of product in very less time with less effort.

II. LITERATURE REVIEW

In today's world shopping is rather a difficult task which is due to the fact that one needs to stand in long queues to get their products scanned and then pay for the same. This long and tedious process results in lots of wasted time and unhappy customer base for the retail stores. Many authors have implemented the RFID technology in shopping mart. Due to some problem in this system it is not implemented in real time. In RFID systems information is stored on an automatic information transfer equipment. This is more or less similar to Smartcard. Although the electrical discharge to the information transfer device and the statistics swap are attained with no use of touch like in smartcards but by using magnetic or electromagnetic scopes. Many authors are discussed about their work and challenges which are listed as follows:

In [1]. The author illustrate that the control centre built with RFID reader module, it is possible to read RFID tags from a greater distance so the card reader guides this message to control centre over fibre optic displays 3-D location. Using GPS technology to find the accurate location of the man is founded.

In [2]. The author proposed "Smart cart with automatic billing", product information, product recommendation using RFID & ZigBee. First scans the barcode of the product using the barcode scanner and places on the cart, a picture of the product is taken and stored in the system's memory. This system uses Microcontroller AT89S52 and the product price and cost will be displayed using LCD display Data transfer between trolley and main computer is done using ZIGBEE transmitter which is fitted at the trolleys.

©IJRASET: All Rights are Reserved

In [3]. The author proposed "A novel Low –Cost Intelligent Shopping Cart" to develop a assembly to scan all types of products at the shopping point using RFID Reader antennas. The details of the product are getting used an RFID tag that are available in the product and that are scanned using a reader that shows the details and they are set priority based on the latest expiry and nearest location. Hence, they have overcome an existing system where these works are done manually and they spilt the dispatch based on the order date.

In [4]. The author proposed "Automated Smart Trolley with Smart Billing" using Arduino. This application creates an automated central bill system for the mall. RFID tags can be interpreted much faster than barcode tag. This will take the overall shopping experience to a different level. Customers can pay their bill through credit/debit cards. In [5]. The author illustrates Combining cloud and sensors in a smart city environment. The main objective is to design an innovative architecture, able of adding new sensing capabilities with ZeroConf approaches, abstracting sensing data and conferring to worldwide system a high reactivity and high level of scalability.

III. PROPOSED SYSTEM ARCHITECTURE

The architecture of this proposed system as shown in Fig.1. We designed the system by using the Microcontroller 8051 on pcb. It provides complete access to functions of microcontroller or microprocessor like to program the controller, to use the input/output pins, to communicate. The system using microcontroller is less bulky and it can easily transfer from one place to another. It requires less power supply and we can easily improve the system, if required, because of its easy programming. The components described in the architecture are Microcontroller 8051, HC05 Bluetooth module, 1-LCD, and 2-L293D, and 4-DC high torque motor 12v, 60 RPM. So, the microcontroller has several pins through which other components are connected such as two motor drives are connected to it so one will connects with two of these motors M1 & M2 so these two motors will be controlled by the motor drive and same as other one will work for two other motors M3 & M4. It will control the movements of the wheels which are instructed by operator and for the controlling part programming are done by using bascom8051.

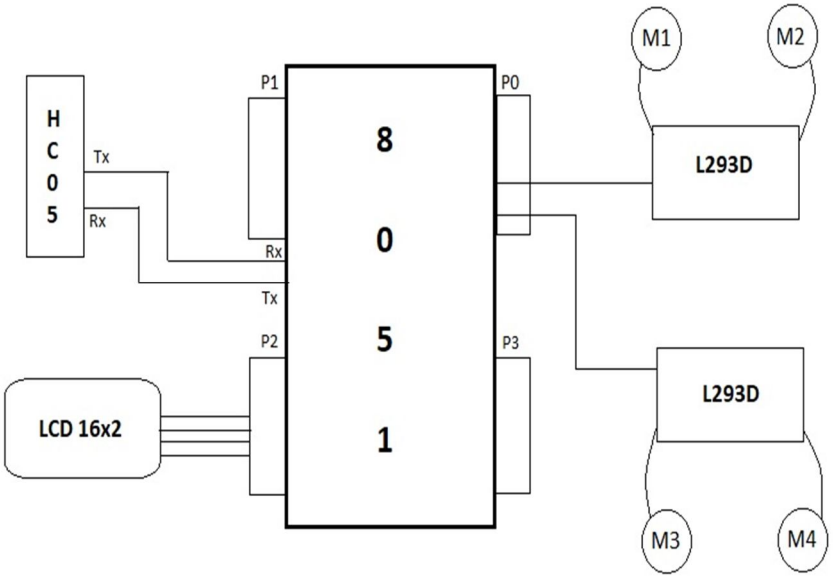


Fig.1: Architecture of the Proposed System

Bluetooth serial module is used for converting serial port to Bluetooth. So one Bluetooth module is connected with this microcontroller so that by using this, connection between trolley and phone can obtain through this the operator can move it in any direction where he wants to move it.

Also one LCD is connected to the microcontroller which displays the movement of the trolley such when operator moves it forward the displays shows "moving forward" like this all other such direction will be displayed as operator moves the trolley. It provides complete access to functions of microcontroller or microprocessor such as to program the controller, to use the input/output pins, to communicate.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

IV. WORKING

As the Bluetooth is turned on in the device (Smartphone's) and it gets connected in the particular range of the trolley via Bluetooth module HC05 which we have connected in the trolley. So by infused the programming in the circuit via basecom8051 software the circuit comes in working mode i.e. controlling mode. So with the help of this software we have defined the instructions to move and control in particular directions. Since a motor driver L293D is connected it makes the interaction between motor and microcontroller. As per the circuit diagram these two motor drives are connected to the microcontroller, so one motor drive can be connected with two motors and these motors are controlled by the motor drives. Also, these motors are connected with trolley wheels which

provide circulating force in wheels which tends to move the trolley. A Voltage regulator is connected, to maintain a constant voltage level hence, it regulates the voltage level in the circuit also, a crystal oscillator is connected in the circuit which provides one pulse to pass one instruction to the motor drive to move in particular direction. So with help of the Bluetooth connection operator can connect the trolley with his device and can be able to control and move the trolley any direction which become an easy task for the operators.

V. HARDWARE DESCRIPTION

A. AT89C2051 Microcontroller

The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2 Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS51instruction set and pin out. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

The AT89C2051 provides the following standard features: 2 Kbytes of Flash, 128 bytes of RAM, 15 I/O lines, two 16-bit timer/counters, five vector two-level interrupt architecture, a full duplex serial port, a precision analog comparator, on-chip oscillator and clock circuitry. In addition, the AT89C2051 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The Power down Mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

The AT89C2051 is an economical and cost-effective member of Atmel's growing family of microcontrollers. It contains 2 Kbytes of flash program memory. These microcontrollers include one or two UARTs, two or three timers. The original 8051 core ran at 12 clock cycles per machine cycle, with most instructions executing in one or two machine cycles. With a 12 MHZ clock frequency, the 8051 could thus execute 1 million one-cycle instructions per second or 500,000 two-cycle per second. 8051 variants may include built in rest timers with brown out detection, flash ROM and on chip oscillators. It is fully compatible with the MCS-51 architecture, and can be programmed using the MCS-51 instruction set. However, there are a few considerations one must keep in mind when utilizing certain instructions to program this device.

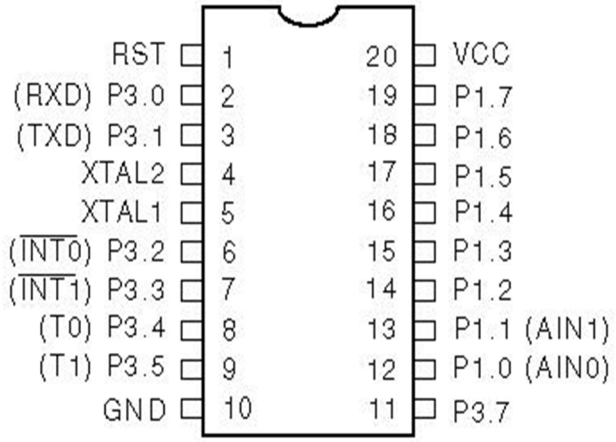


Fig 2: Pin Configuration

©IJRASET: All Rights are Reserved

B. L293D Motor Driver

The L293D is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoids, DC and stepping motors) and switching power transistors. To simplify use as two bridges is pair of channels is equipped with an enable input. A separate supply input is provided form the logic, allowing operation at a low voltage and internal clamp diodes are included.

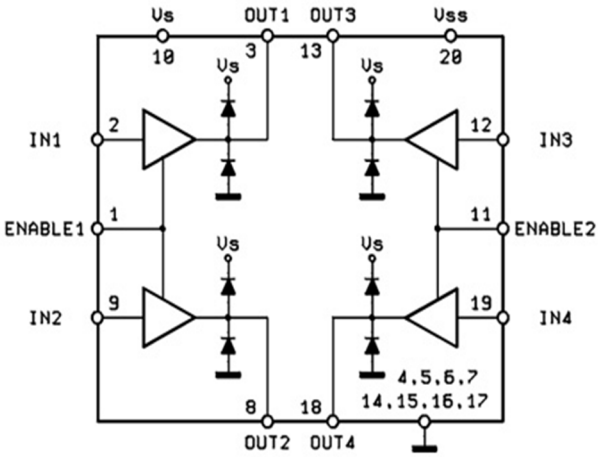


Fig 3: Block Diagram of L293D

Motor driver is used to make an interaction between motor& microcontroller. In this system DC motors are used because DC motor is able to control the speed. This device is suitable for use in switching applications at frequencies up to 5 KHz. The L293D is assembled in a 16 lead plastic package which has 4 centre pins connected together and used for heat sinking.

C. HC Serial Bluetooth Module

This document mainly introduces Bluetooth serial module. Bluetooth serial module is used for converting serial port to Bluetooth. These modules have two modes: master and slaver device. The device named after even number is defined to be master or slaver when out of factory and can't be changed to the other mode. But for the device named after odd number, users can set the work mode (master or slaver) of the device by AT commands.

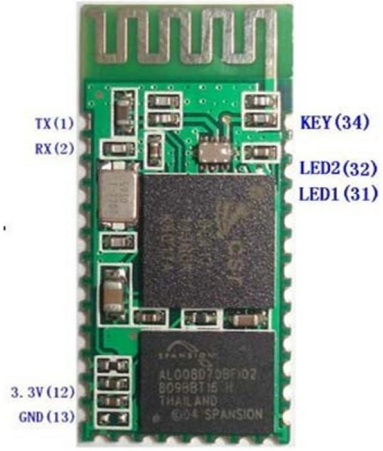


Fig 4: HC-05

There are two MCUs want to communicate with each other. One connects to Bluetooth master device while the other one connects to slave device. Their connection can be built once the pair is made. This Bluetooth connection is equivalently liked to a serial port line connection including RXD, TXD signals. And they can use the Bluetooth serial module to communicate with each other. When MCU has Bluetooth salve module, it can communicate with Bluetooth adapter of computers and smart phones. Then there is a virtual communicable serial port line between MCU and computer or smart phone.

©IJRASET: All Rights are Reserved

D. DC Motor

60RPM Centre Shaft Economy Series DC Motor is high quality low cost DC geared motor. It has steel gears and pinions to ensure longer life and better wear and tear properties. The gears are fixed on hardened steel spindles polished to a mirror finish. The output shaft rotates in a plastic bushing. The whole assembly is covered with a plastic ring. Gearbox is sealed and lubricated with lithium grease and require no maintenance. The motor is screwed to the gear box from inside. Although motor gives 60 RPM at 12V but motor runs smoothly from 4V to 12V and gives wide range of RPM, and torque.



Fig 5: DC Motor

The motor's performance in terms of RPM and no load current as a function of voltage and stall torque, stall current as a function of voltage. For compatible wheels refer to Wheels and Accessories product category. You can also mount this motor on the chassis using Motor Mount for Centre Shaft Economy Series DC Motor. For adding Position Encoder, refer to Encoder Kit for Centre Shaft Economy Series DC Motor.

VI. CONCLUSION

In this paper, we have proposed the Smart Shopping Trolley by which we can be able to reduce human labour which is required to push the heavy trolley. This will take the overall shopping experience to a different level. Thus with the help of the conclusion we can say that-smart shopping trolley by using sensor technique will be more feasible option in the future. The system based on sensors is well planned and reduces human efforts. For smart city point of view we are working on that project and we want to give a smart project like this to our country..

VII. FUTURE SCOPE

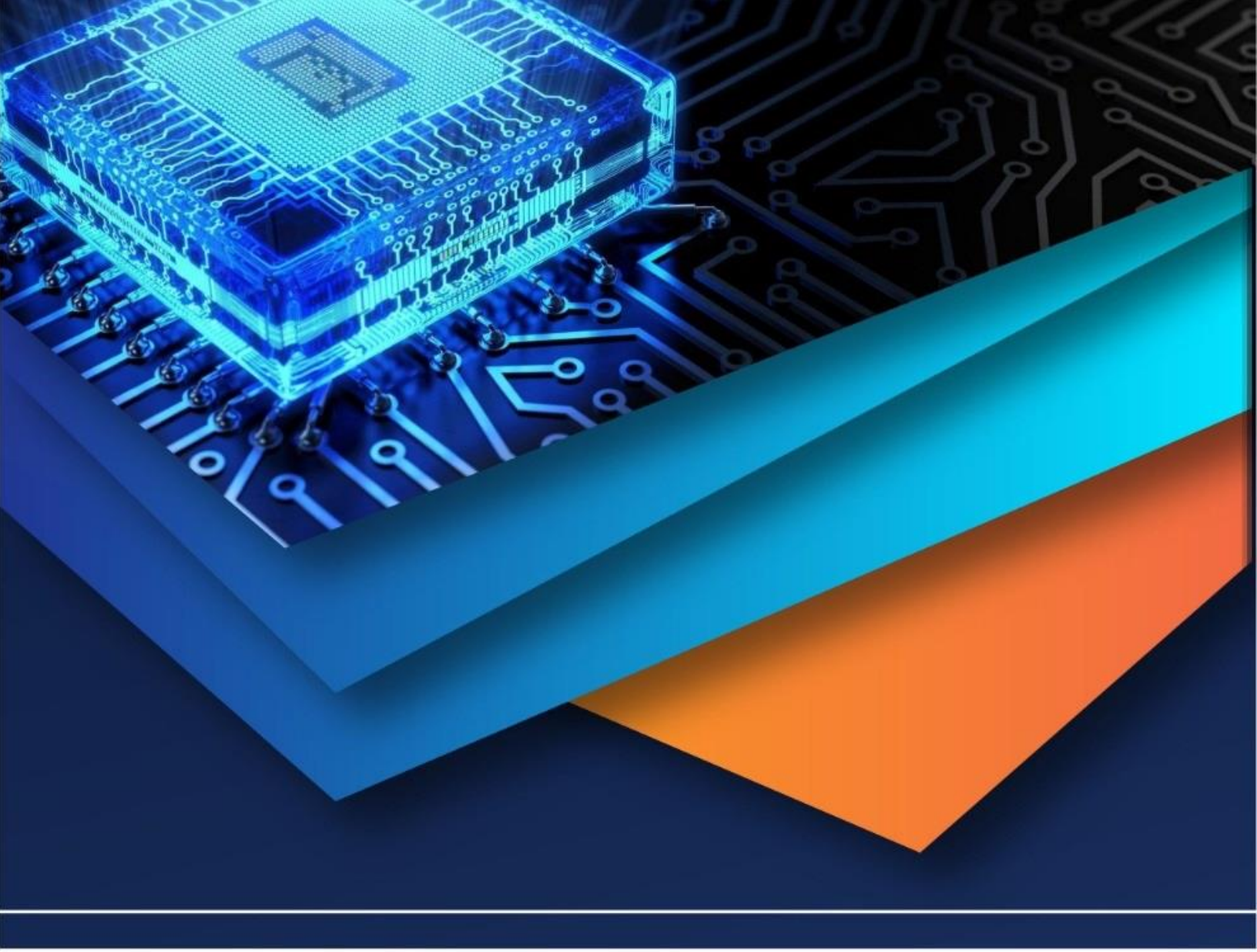
The project has great scope of future enhancement and implementation with different enhancements. With some modifications it could be used for several different purposes in future. Because of low cost of microcontroller it could be used in vast field of technology. We have to update the details of the product items in the memory unit of trolley time to time. We take the help of Internet of Things and some software with the help of which all information will be updated regularly. Also, with the help of optical sensor, motors, and motor drivers, we will make trolley in such a way that it will follow the customer which purchasing items and it maintains the safe distance between customer and itself.
There is lot of scope in the project to be expanded further.

A. The project could be enhanced with a billing system by applying this technique in shopping trolley customer will be able to avoid queue in big shopping malls.
B. A wavelet feature extension can be added which can differentiate the one another's trolley.
C. The system could be further modified by using LCD displays.
D. It could further be modified for uses in places like industries for reducing labour work.

REFERENCES

[1] Awati JS, Awati SB (2012) Smart Trolley in Mega Mall. International Journal of Emerging Technology and Advanced Engineering .
[2] A. Yewatkar, F. Inamdar, R. Singh, A. Bandal et al., "Smart cart with automatic billing, product information, product recommendation using RFID& ZigBee with anti-theft," Procedia Computer Science, vol. 79, pp. 793–800, 2016.
[3] Thangakumar J, Sainath S, Surender K, Vikram Arvind V (2014) "A novel Low –Cost Intelligent Shopping Cart". International Conference on Communication, Computer and Information Technology.
[4] Sachin Satish Kumble, Rahul Meshram (2014) Multitasking Shopping Trolley Based On RFID. International Journal of Soft Computing and Engineering (IJSCE).
[5] Suganya R, Swarnavalli N, Vismitha S, Rajathi GM (2016) Automated Smart Trolley with Smart Billing Using Arduino. Internationl Journal for Research in Applied Science & Engineering Technology.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)