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Editor's Note

The SJEEE students' journal is proud to complete its Third successful year. The journal has strived to contribute more year after year through publication of novel technical articles in thrust areas by the students. By any measurable standard, we have seen a steady growth in readership and articles submission that have fruitfully resulted in obtaining ISSN number for the journal.

Our visibility and reputation continue to broaden and our editorial board constantly reassesses and revises the editorial process to ensure utmost satisfaction to both faculty and authors. It is due to the support of our faculty advisors, the hard efforts of our editorial staff and the interest of our readers, that we are able to successfully publish the articles and sustain.

We hope that this support continues in the future. Their guidance and support make our journal possible and we are deeply indebted to them for the time and their efforts that they put into our journal. We will strive to honor the efforts of the past and pass down the work ethic and appreciations to more and more students encouraging their active participation.

We have constantly been impressed by the number of innovative and thought provoking papers we have received. UG students have been excited by the opportunity to have their work published and hope to continue to broaden the SJEEE's reach in the coming year.

The gradual enhancement of students' ability to convert their work into a technical article and the improvement in their quality of presentation & communicating novel ideas could always build up SJEEE's reputation.

-Dr.D.Kalyanakumar

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Solar Energy Harvesters – A Review on Fundamentals to Recent Advancements

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Abstract—— ***World demand for energy is projected to more than double by 2050 and to more than triple by the end of the century. Incremental improvements in existing energy networks will not be adequate to supply this demand in a sustainable way. Finding sufficient supplies of clean energy for the future is one of society's most daunting challenges. In this regard, energy conversion from solar is spear heading and promising. Over last three decades, the research efforts on system development for solar energy harvesting is highly encouraging. The current report emphasis on the solar energy harvesting technologies, scientific principle, construction and contemporary development in the solar energy harvesting technologies.***

Keywords—Solar energy harvesters; Solar Photovoltaic; Photovoltaic generator; Solar Cell

1. INTRODUCTION

Global energy crisis and threat of environment disorder has become a common concern worldwide. The demand of electrical energy is growing constantly. The conventional sources of energy like thermal are having serious issue of having limited reservoirs which may end in the next few decades [1]. The carbon emissions from the power plants using conventional sources are adding serious threat to the environment. Also other source of energy i.e. Nuclear is possessing serious threat to the safety of human being [2].

To overcome the above concerns the researchers have paid aggressive attention on renewable energy sources in the past few years. Among all renewable energy sources solar energy is the most acceptable solution as it is available in abundant and free of cost worldwide [3]. The sun provides earth with a staggering amount of energy enough to power the great oceanic and atmospheric currents, the cycle of evaporation and condensation that brings fresh water inland and drives river flow, and the typhoons, hurricanes, and tornadoes that so easily destroy the natural and built landscape. Earth's ultimate recoverable resource of oil, estimated at 3 trillion barrels, contains 1.7 × 1022 joules of energy, which the Sun supplies to Earth in 1.5 days

The amount of energy humans use annually, about 4.6 × 1020 joules, is delivered to Earth by the Sun in one hour. The enormous power that the Sun continuously delivers to Earth, 1.2 × 105 terawatts, dwarfs every other energy source, renewable or non renewable. It dramatically exceeds the rate at which human civilization produces and uses energy, currently about 13 TW [4]. The impressive supply of solar energy is complemented by its versatility, as illustrated in Fig.1.

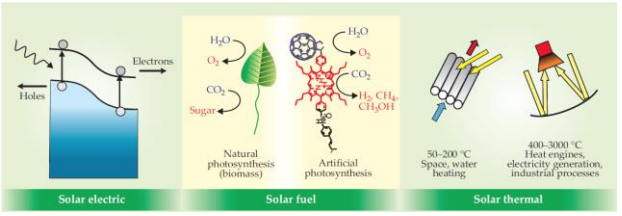

Fig.1. Solar photons convert naturally into three forms of energy—electricity, chemical fuel, and heat—that link seamlessly with existing energy chains [5].

In spite of high specific costs, photovoltaic systems provide an increasingly attractive alternative for electricity supply in particular at remote locations, due to their extremely high reliability, low maintenance requirements, long lifetime and their modularity with flexible system sizing down to very small load demands. The article gives a brief overview over current photovoltaic technology, principle and their applications. In addition, the general components of photovoltaic systems, from the solar cell and the photovoltaic module are also detailed.

2. SOLAR ENERGY BALANCE

More than 99.9% of the energy flow on the earth's surface is due to incoming solar radiation. The rest is from geothermal, gravitational (tidal) and nuclear sources. The sun is an average-size star, with a diameter of 864,000 miles and 93 million miles away from our planet. It is a giant nuclear fusion reactor whose interior and surface temperatures are 35,000,000 and 10,000 °F, respectively. Each second 657 million tons of hydrogen isotopes are converted into 653 million tons of helium. The residual mass of 4 million tons is converted to energy, according to the Einstein equation, E = mc2 [6].

To place this number into perspective, if gasoline were pouring from Niagara Falls, at a rate of 5 billion gallons per hour, and if we had begun collecting it 3.5 million years ago, the combustion of all this accumulated gasoline would liberate the amount of energy equivalent to one minute of the sun's production. Being quite far away from the sun, the earth receives only about half a billionth of this radiation. But it receives it more or less continuously. About 30% of this energy does not reach the surface of the earth because it is reflected from the

atmosphere. Still, the radiation that does reach the surface is four orders of magnitude larger than the total world's energy consumption. In fact, only 40 minutes of sunshine would be sufficient – if available in adequate forms – to supply the entire annual energy demand on earth. Because solar energy spreads out more or less evenly through space, it reaches the surface of the earth in quite diluted form, at a rate of about 220 W/m2. In other words, if one square meter were available for conversion of solar energy to electricity (at 100% efficiency), the energy produced would be sufficient for just two or three light bulbs. The challenge of solar energy utilization is to concentrate it. Practical ways to achieve this are discussed below. They include direct solar heating, indirect production of electricity and direct production of electricity.

3. SOLAR PHOTOVOLTAIC (PV)

Solar photovoltaic (pv) is used to convert solar energy into electrical energy. The complete solar energy conversion system consists of solar pv, power electronics converters and control unit to regulate the power extracted from solar pv. Harvesting of solar energy by photon absorption in metal nanostructures followed by collection of photo-generated hot electrons via the processes of internal photoemission (ipe) has been recently explored as a promising alternative approach to traditional photovoltaics as well as for catalysis and photo-detection. Traditionally, noble metals such as au are considered as good candidates for gapless photon absorbers, which are potentially capable of full spectrum harvesting.

4. THE GENERAL PHOTOVOLTAIC SYSTEM

The special attraction of photovoltaics, as compared to other power generation technologies, lies in the fact that the solar radiation is converted directly into electric power by an electronic solid state process. In general, no moving parts and no specific thermal stresses are involved. Therefore, photovoltaic systems operate quietly and they can offer extremely high reliability, low maintenance requirements and a long lifetime.

Due to the nature of the conversion process, one can utilize direct as well as diffuse radiation, which also allows applications in moderate climates with higher fractions of diffuse radiation. Another important advantage of pv is its modularity, permitting a very flexible system sizing for integration into buildings and for decentral applications down

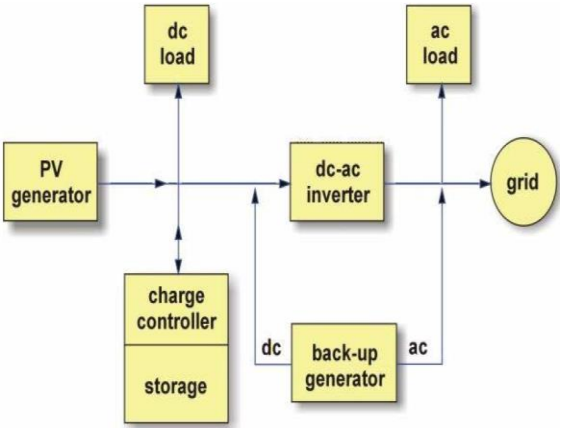

Fig.2. General photovoltaic system [6]

Inverter

For PV systems connected to the public electricity grid an inverter is always required that converts the direct current and voltage produced by the PV generator into an alternating current with appropriate voltage and frequency levels. For stand-alone systems only an inverter is required, if ac-loads are to be operated. This is often the case for larger domestic systems where a variety of loads are connected.

Storage

For stand-alone systems in general a storage battery and/or a back-up generator is required to provide power during cloudy and dark periods. There are however specific applications where storage batteries can be omitted. An example is the photovoltaic pumping system. Here, the pump is operating whenever there is adequate illumination, and storage is achieved by collecting the pumped water in a tank.

PV generator

The principal structure of a PV generator is illustrated in Figure 2. To satisfy a specific power demand by a PV system, a number of solar modules may be electrically interconnected in series and in parallel. The output voltage of the total PV generator is then determined by the number of modules connected in series, and the output current by the number of module strings connected in parallel. The size of PV generators may range from single cells with sub-Milliwatt levels (e.g. in consumer products such as calculators) to single modules and up to module arrays with many Megawatts.

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Solar Energy Harvesters – A Review on Fundamentals to Recent Advancements

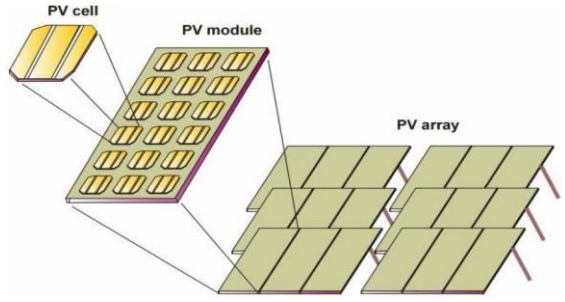

Fig.3. Photovoltaic generator [6]

Solar cell

The smallest independent operational unit of PV systems is the solar cell. The solar cell consists of a specific semiconductor diode, in most cases silicon, with a large aperture area for light absorption. In the photovoltaic conversion process light is absorbed by the semiconductor, and the absorbed photons produce free charge carriers (electrons and holes) which are then separated by the built-in electric field between the n- and p-type region. The charge separation produces a difference in electric potential between the two regions, and an electric current can be drawn through an external load. Depending on the cell efficiency and cell area, the maximum output power for single solar cells is on the order of 1 W, and output voltages are in the range of 0.5-1 Volt. Commercial Silicon cells and modules have conversion efficiencies of 12-16 per cent, high efficiency silicon cellse.g. For concentrator modules have been produced with up to 24 per cent efficiency. For concentrator applications, gaas and related materials are under research, and laboratory efficiencies above 32 per cent have been achieved. Due to the high costs of gaas technology, commercial terrestrial applications however have not yet emerged. The systematic structural representation of solar cell is shown in Fig.4.

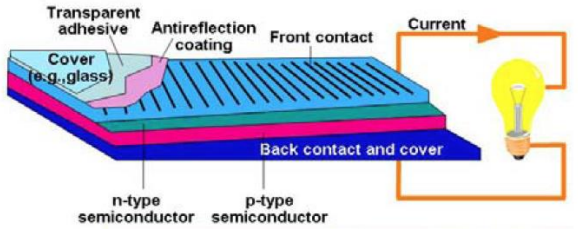

Fig.4. Systematic structural representation of solar cell [7].

Energy of absorbed photons raises the energy of electrons above the Fermi level, creating so-called hot electrons (Fig.5). Photo generated hot electrons typically cool down very fast due to scattering on phonons, lattice defects, and cold electrons. The cooling process occurs on picosecond timescale in most metals. If, however, these hot electrons can be extracted before they cool down, they can contribute to the energy conversion efficiency. Typically, such full-spectrum converters use the Schottky junction that forms at the interface between metal and n-type semiconductor as a frequency-selective filter to extract photo-generated hot electrons (Fig.5). As a result, hot electrons generated by absorption of photons with energies below the semiconductor bandgap can still be harvested by using this approach. This offers the way to potentially increase the conversion efficiency of photovoltaic (PV) cells and to extend the bandwidth of photon detectors. Alternatively, the Schottky junction between metals and p-type semiconductors can be used to harvest hot holes generated by photons absorbed in the metal.

5. SOLAR ENERGY CONVERSION PRINCIPLE

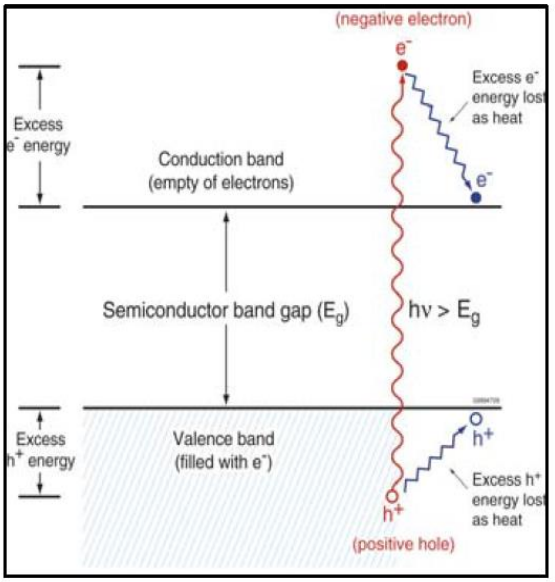

Fig.5. Photovoltaic generator [7]

However, the conversion efficiencies experimentally demonstrated to date have been extremely low. Furthermore, it has been previously shown that the maximum limiting efficiency of the full solar spectrum harvesting and conversion via IPE from noble metals is restricted by the available electron density of states (e-DOS), because their e-DOS favors creation of large population of hot electrons with energies lower than the Schottky barrier height13. Prior theoretical estimate for a model metal with parabolic electron bands found the overall conversion efficiency limit at about 7%. In addition to the limits imposed on the harvesting of high-energy electrons by the available filled and empty electron energy levels, the high dark thermionic current through the Schott KV junction at room temperature prevents the opportunity of lowering the energy barrier to increase the forward current and energy conversion efficiency. Here, we estimate the limiting

efficiency of the solar energy harvesting via hot electron photo-injection by using the realistic Au electron band-structure calculated via the first-principles method. Our data shows that the limiting efficiency reduces to a mere 3.6%, indicating the need to develop new photon-to-hot-carrier energy conversion schemes based on synergistic engineering of both photon and electron DOS in the broad energy range14,15. We further discuss possible ways to increase this limit, which include hot holes harvesting, optical concentration, and partial-spectrum conversion. Figure 6 shows the comparison of band gap and efficiency of PV generator.

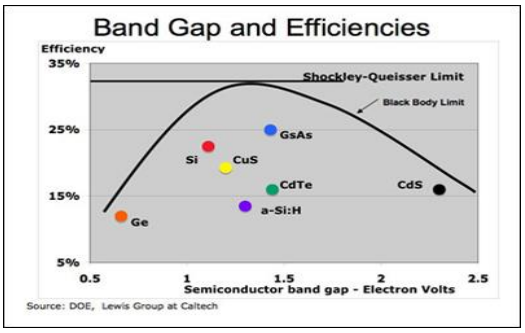

Fig.6. Photovoltaic generator [8]

Inorganic PV and electrochemical PV (EPV) cells operate upon the establishment of an electric potential difference between the n- and p-type regions in an inorganic PV cell or between an n- or p-type semiconductor and redox electrolyte, in the case of an EPV cell. This difference creates an electrical diode structure. The current-voltage behavior of such junctions follows the diode equations, in which the current flow in one direction across the junction is constant with voltage, whereas the current flow in the other direction across the junction increases exponentially with the applied voltage. Hence, the dark current density (J_{dark} [amps/cm^2), as a function of the voltage (V) applied to this diode (assuming ideal diode behavior), is:

$$J_{dark}(V) = J_0(eqV/kT - 1) \quad (1)$$

where J_0 is a constant, q is electronic charge, k is Boltzman's constant, and T is temperature (K).

If a diode is illuminated, additional charge carriers will be created upon absorption of the light. These carriers will create an additional current flow across the junction, and they must be added to the dark current to obtain the total current in the system. For illumination with light comprising many different wavelengths, the total photo-induced current can be calculated by summing (i.e., integrating) the contributions to the current from excitation at each wavelength. Hence, the short-circuit photocurrent density (Jsc) is:

$$J_{sc} = q \int I_s(E)\,(QY)(E)\,dE \quad (2)$$

If a diode is illuminated, additional charge carriers will be created upon absorption of the light. These carriers will create an additional current flow across the junction, and they must be added to the dark current to obtain the total current in the system. For illumination with light comprising many different wavelengths, the total photo-induced current can be calculated by summing (i.e., integrating) the contributions to the current from excitation at each wavelength. Hence, the short-circuit photocurrent density (Jsc) is:

$$Jsc = q \int I_s(E)\,(QY)(E)\,dE \quad (3)$$

where I_s = solar photon flux, E = photon energy (inversely proportional to the wavelength of the photon), and QY = quantum yield (electrons collected per incident photon).

The net current density (J) is:

$$J(V) = J_{sc} - J_{dark}(V) = J_{sc} - J0(eqV/kT - 1) \quad (3a)$$

However, ideal diode behavior is seldom seen. This is accounted for by introducing a non-ideality factor, m, into Equation 3a:

$$J(V) = J_{sc} - J_{dark}(V) = J_{sc} - J0(eqV/mkT - 1) \quad (3b)$$

Because no current flows at open circuit, the open-circuit voltage (Voc) for the ideal device is obtained by setting J(V) = 0,

$$V_{oc} = [kT/q] \ln [(J_{sc}/ J_0) + 1] \quad (4)$$

A plot of the net photocurrent density (J) vs. voltage is provided in the figure, which shows the current-voltage characteristic of a PV cell. The conversion efficiency (η) of the PV cell is determined by the maximum rectangle in the figure that can fit within the net photocurrent-voltage characteristic. The maximum power point of the cell, or so-called operating point, is the values of J and V (Jm and Vm) at which the maximum rectangle in the figure meets the J-V curve. This defines a term called the "fill factor" (FF).

$$FF = J_m V_m / J_{sc} V_{oc} \quad (5)$$

that characterizes the "squareness" of the J-V characteristic. The maximum FF value is 1.0; it occurs when Jm = Jsc and Vm = Voc, but in reality, the diode equation limits the maximum FF to 0.83.

The cell conversion efficiency is the electrical power density (JmVm) (watts/cm2) divided by the incident solar power density (Psun), multiplied by 100 to obtain a percent value.

$$\eta = J_m V_m / P_{sun} = 100 * J_{sc} V_{oc} FF / P_{sun} \quad (6)$$

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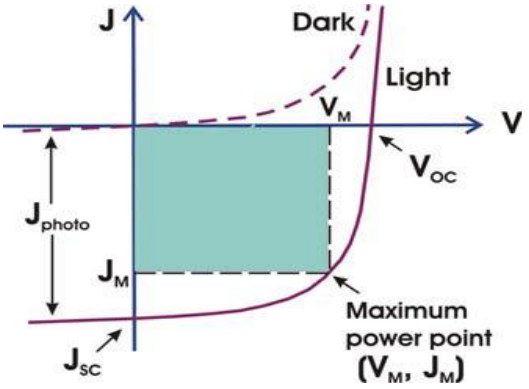

Fig.7. Representation of J-V characteristic of a PV [9]

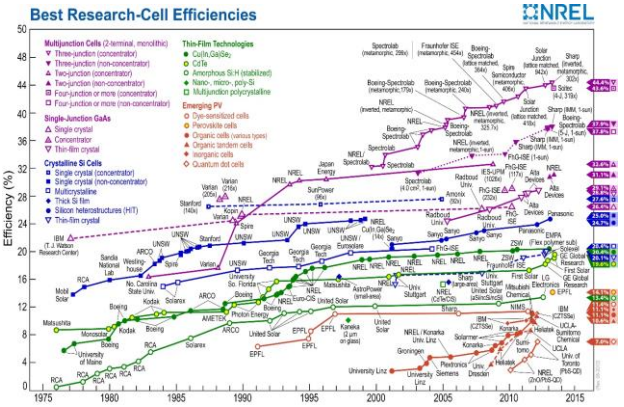

Fig.8. Improvements in solar cell efficiency, by system, from 1976 to 2015 [10]

6.NEED FOR REVOLUTION TO CREATE NEW TECHNOLOGIES

In 2004, the United States consumed approximately 4.0 × 1012 kWh (energy consumed in one year at an average power of 0.46 TW) of electricity (Energy Information Administration [EIA] 2005); this amount represents about 14% of total U.S. energy consumption (EIA 2005). The U.S. electricity produced by solar PV cells currently represents a tiny fraction (<0.02%) of the total electricity supply. The challenge for generators of solar electricity is to produce it at very low cost, ultimately approaching $0.40/Wp, which is equivalent to an energy cost of $0.02/kWh. Achieving this cost would require a reduction in the $/Wp price of about a factor of 15–25 relative to present PV costs. Such a low cost for solar electricity would be expected to result in massive implementation of solar energy systems in the energy infrastructure in the United States and globally. Such a cost breakthrough would also represent a major advance in using solar energy to alleviate the anticipated future problems associated with energy supply, energy security, and unacceptable levels of atmospheric CO2. In addition to satisfying electrical power needs, solar electricity at $0.02/kWh could also contribute to the goal of producing cost-effective non-carbonaceous solar fuels, such as hydrogen (National Academy of Engineering, Board on Energy and Environmental Systems 2004). However, to achieve the latter goal, major advances in suitable and scalable storage and distribution technologies will also be required. Solar electricity can be produced from PV cells or from turbines operating with high-temperature steam produced from concentrated solar power.

This Panel Survey addresses only PV solar cells; the latter method for producing solar power is discussed in the section on Basic Research Challenges for Solar Thermal Utilization.

7. CONCLUSION AND FUTURE PROSPECTUS

Since the 1970s, the PV industry has continually reduced the cost of solar electricity. Over the past three decades, the cost of PV modules has decreased at a rate of 20% for each doubling of module production (see Figure 4). The cost of PV modules per peak watt has declined from about $70/Wp in 1976 to about $3.50/Wp in 2003. The BOS cost (support structures, maintenance, land, etc.) for a grid-tied PV system is about $2.50/Wp. Considering both module and BOS costs, together with present cell efficiencies, the cost of solar electricity has dropped from about $3.65/kWh in 1976 to about $0.30/kWh in 2003. However, if the present learning curve for PV cells is followed, the projected attainment of very-low-cost PV power ($0.02/kWh) and its widespread implementation would lie far in the future (20–25 years depending upon the annual production growth rate; see Figure 5). Therefore, basic research is needed to not only maintain the existing technology path and learning curve in support of evolution, but to also produce a revolution to dramatically change the slope of the historical learning curve and produce dramatic reductions in the PV module cost-to-efficiency ratio (Figure 5). The goal is to reduce the cost per peak watt by a factor of about 15–25 relative to present systems through the use of new designs, materials, and concepts for solar electricity production, and to do so more quickly than would be accomplished by staying on the existing learning curve — thereby materially impacting global energy supply in 10–15 years rather than by the mid-21st century.

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AUTOMATED LIQUID MIXING AND FILLING USING PLC AND SCADA

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Abstract—The aspiration of this endeavor is to design and develop the programmable logic controller based liquid mixing and filling. In our paper "Automatic Liquid mixing and Filling" is controlled using programmable logic controller (PLC) and SCADA. It is used for visualizing the system. This paper proposes a mixing and filling management system for industries which is complete application of automation. It's controlling and monitoring makes the system easily accessible and alert the operator in the case of any fault or errors. This endeavor will provide high exactitude and pliability to the system and at the same time it will provide accurate volume of liquid in bottle by saving operational time. The system sequence of operation is being designed by ladder diagram. The components used in this work are programmable logic controller (PLC), proximity sensor, solenoid valves and DC Motors, which consists of three sections such as the conveyor section, filling section and mixing section. This work will be useful in paint industries and concrete industries.

Keywords—PLC; Proximity; Three tank system; Solenoid valve

I. INTRODUCTION

To withstand the fierce competition, company across the world must employ latest technologies such as automation. The field of automation has an enormous improvement on industries. Automation is an technique used to improve the quality, increase the process speed and to minimize the human interface in the production of goods and services. High degree of pliability is basic necessity of manufacturing. Automation leads to products having consistence quality, perhaps even consistently good quality. Automation is implemented using program of instruction combined with the control system which executes the instruction. It can be controlled by human operators, by computer or else by combination of both. To automate the process power is required to drive the process itself and to operate the program and control system. Automation consists of three basic elements namely 1. Actuators- which does the work 2. Controller- which tells the actuator what to do. 3. Sensors- which provide feedback to the controller so that it knows actuator is doing work. There are two types of automation namely hard automation and soft Automation. Hard automation means, if a controller that are designed to do the specific task which could not be altered according to the need. Soft automation means, it can be reconfigured according to the need and also can be test the changes while they work. In day to day life industries have to handle many challenges like rapid increase in the productivity and economic expenditure even though industries have to function safely. But in previous systems, if there is an continuous increase in the productivity then the maintenance cost will also be high and also it has many disadvantage like high cost, idleness and perilous operation. To overcome this problems automation can be used. The various operation of the system is supervised by plc, which is the soul of the system and controlled according to the program uploaded to it.

New technologies are required that will reduce water usage, increase energy efficiency and minimize the production time for beverage industries. In order to systematize a liquid mixing plant and minimize human intervention, we are using supervisory control and data acquisition system. The scada used for monitoring the plant and helps in reducing the errors caused by humans. For monitoring the internal storage of instruction for the implementing function such as logic, sequencing, timing, counting and arithmetic to control through digital or analog input output modules various types of machines are programmed by plc (programmable logic controller). The automatic filling system based on plc control has advantages of smooth operation, lower catastrophe rate and high filling speed. Filling is controlled by using motor, sensors, conveyor belt, plc and solenoid valve. The plc and scada concept increases the reliability and reduces installation costs by localizing control functions near the process plant, with remote monitoring and supervision. The system is used in chemical and paint industries. In this work there are three sections such as the conveyor section, filling section and mixing section are carried out controlled by the delta plc. The mechanical part of the process consists of mechanical designing and welding process, while electrical part consists of electrical wiring and programming. The software of the delta plc theory includes the electrical and mechanical actuators for the hardware which will be showing a good result to fulfil the required objectives.

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AUTOMATED LIQUID MIXING AND FILLING USING PLC AND SCADA

2.EXPERIMENTAL DETAILS

The following section deals with components used in the liquid mixing and filling process. Table 1 shows the components and specification used for the liquid mixing and filling process.

TABLE I. DESCRIPTION OF COMPONENTS USED

COMPONENTS	SPECIFICATION	REQUIREMENTS
Belt conveyor	length of belt : 80 inch width of belt : 5 inch material : resin	1
Solenoid valve	12 volt 1/2 size valve specification solenoid valve 2.5 mm orifice	1
DC motors	12 V ; 30 rpm	3
Proximity sensor	Detection distance : 4 mm	2
SMPS	230 V input ; 24 to 27 V output	1
Relay		1
Delta PLC	24 V input	1
On-off button		1
Connectors		As Required

PLC (DELTA) is used for ladder logic programming to control the entire process. Proximity sensor is used to sense the obstacle in the path. SMPS- (switched mode power supply) is used to convert 230V input into 24 to 27 V output. Relay is an electromagnetic switch operated by a small electric current to turn on or off the supply. Figure 1 shows the schematic diagram of liquid mixing and filling process.

DC motors are used for the movement of conveyor belt. Two DC motors are used at the two ends of conveyor belt. Proximity sensor are used to sense the presence of bottle in the conveyor for further filling process. Four solenoid valves are used for three storage tanks and one mixing tank. Solenoid valves are used for the on and off of valves electrically. When the supply is given to the valve it opens, if the supply is off then the valve remains closed. Delta PLC is used to control the entire mixing and filling process by ladder logic. The process consists of four tanks, three tanks (tank 1, tank 2 and tank 3)

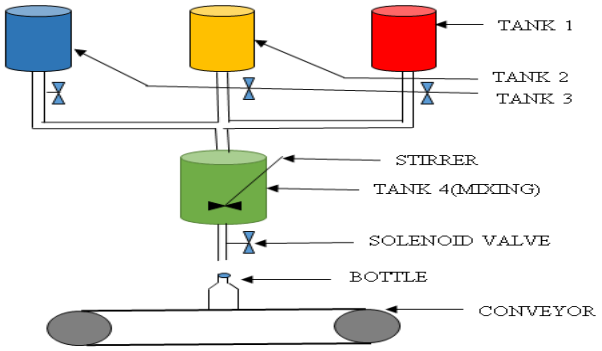

Fig.1. Schematic diagram of liquid mixing and filling process

for three different colors to be filled and one mixing tank for mixing the colors. When the bottle is detected by the proximity sensor, primary color tank opens according to the instruction uploaded to the PLC. Then the PLC operates the mixing motor to start the mixing process and deliver the mixture to the tank depends upon the need, proportion and amount of two different liquids to be filled. PLC consists of an input/output (I/O) unit, CPU (central processing unit) and memory. The I/O unit acts as the interface between PLC and real time systems. All logic and control operations, data transfer and manipulation work is done by CPU. Figure 2 shows the block diagram of Mixing and Filing process consist of two DC motors for the conveyor belt movement. Four solenoid valves are used for the four tanks. Three valves used for storage tank and one for mixing tank. Valve 1,2,3 represents tank 1,2,3 and valve 4 represents tank 4 (Mixing). Stirrer is used in mixing tank for mixing the liquid. One proximity sensor is used to sense the presence of bottle in conveyor. Start and stop buttons are used to start and stop the entire process. PLC is the heart of process to control the entire system by ladder logic programming.

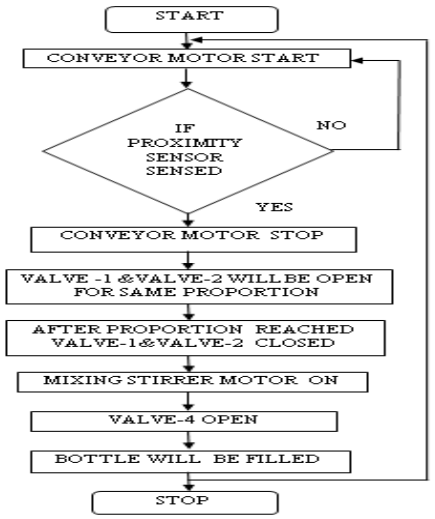

Fig.2. Flow diagram of liquid mixing and filling process

3. DESIGN AND SIMULATION

The following steps used in the liquid mixing and filling process.

Step 1: Switch ON.

Step 2: DC Motor 1 starts and rotate the conveyor belt.

Step 3: Proximity sensor senses the bottle. If the bottle is detected then the conveyor motor stops.

Step 4: If the bottle is detected then valve 1 and valve 2 will be open for same proportion.

Step 5: After proportion is reached valve 1 and valve 2 will be closed.

Step 6: Mixing stirrer motor 2 will be ON and valve 4 will be open for predefined time.

Step 7: After the bottle is filled, valve 4 will be closed.

Step 8: Switch OFF.

4.PLC PROGRAM FOR MIXING AND FILLING PROCESS

The main endeavor of the proximity sensor is to determine whether the bottle is present or not and once the bottle is sensed, the sensor sends the signals to plc. Once the signal is received, the conveyor stops and the solenoid valve is controlled according to the proportion. Here the proportions are given with equivalent timers which is used to fill the bottle. Mixing valve timers can be modified according to the quantity to be filled in the bottle.PLC is operated by 24V given via SMPS and the same supply is also given to relays, solenoid valve and motor. The output of the sensor is given as the input to the PLC. The output of the PLC is given to the corresponding relay slot where the solenoid valve and motors are connected.

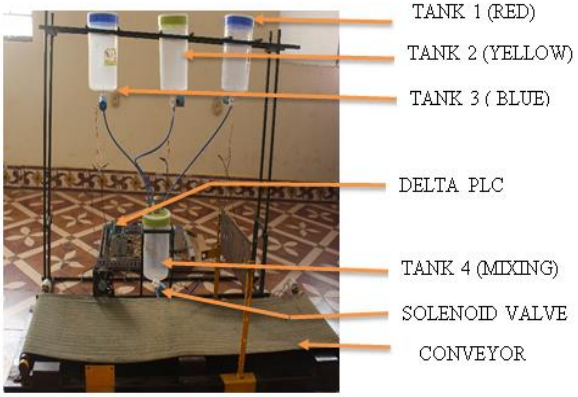

Fig. 4. Photograph of liquid mixing and filling process

The ladder diagram of the liquid mixing and filling process are shown in Figure 5 - 9.

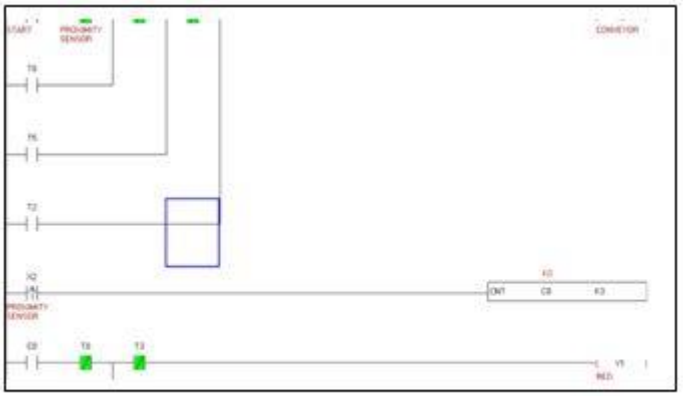

Fig.5. Ladder diagram of liquid mixing and filling process (Part A)

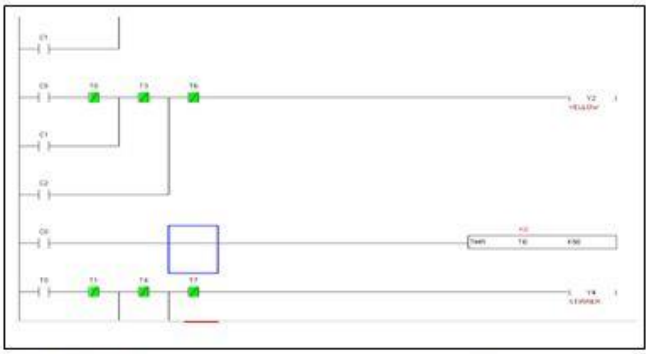

Fig.6.Ladder diagram of liquid mixing and filling process (Part B)

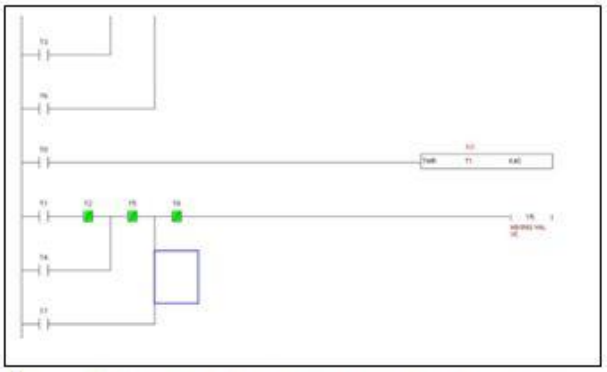

Fig.7.Ladder diagram of liquid mixing and filling process (Part C)

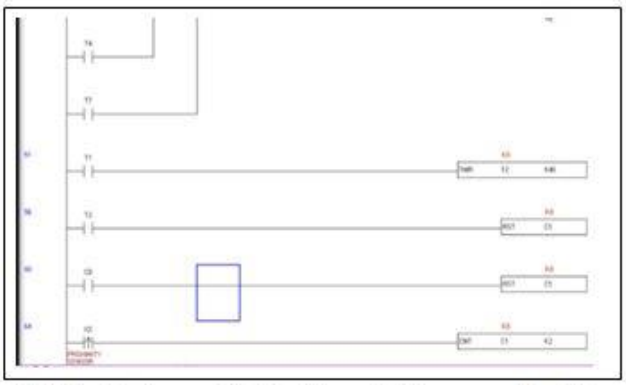

Fig.8. Ladder diagram of liquid mixing and filling process (Part D)

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AUTOMATED LIQUID MIXING AND FILLING USING PLC AND SCADA

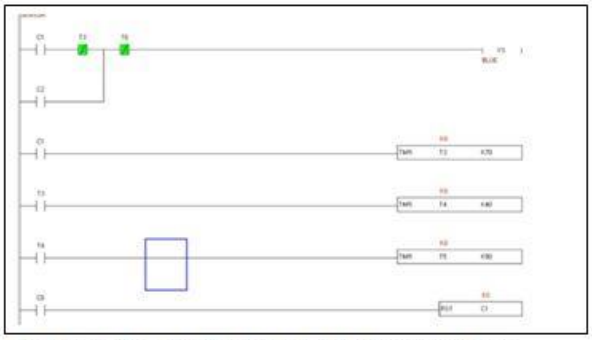

Fig.9. Ladder diagram of liquid mixing and filling process (Part E)

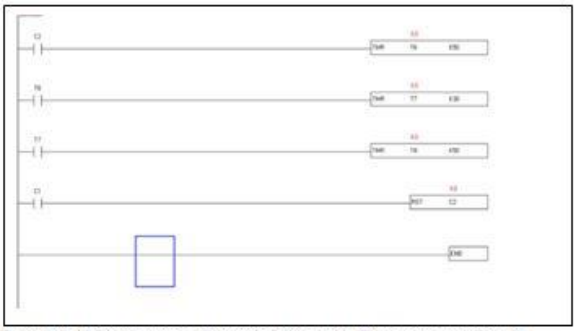

Fig.10. Ladder diagram of liquid mixing and filling process (Part f)

If switch X1 is switched on then the conveyor will start to move on. When proximity sensor senses the bottle, conveyor will stop and the counter C0 is enabled. Then the red valve and yellow valve will be opened for 50s until the timer T0 is enabled. Once the timer T0 is enabled, red valve and yellow valve will be closed and then the stirrer motor will be switched on for 40s. When the timer T1 is enabled, then the stirrer motor will be switched off and the mixing valve will be opened for 80s. when timer T2 is enabled, the mixing will be closed and the conveyor will again start to move on.

In second cycle, when the proximity sensor senses the bottle again, the conveyor stops and the counter C1 is enable, now the red valve, blue valve and yellow valve will be open according to the proportion needed. when the timer T3 is enable all the valve will be closed and stirrer motor will be switched on for given time period. Once the timer T4 is enabled stirrer motor will be switched off and the mixing valve will be opened. When the timer T5 is enabled, mixing valve will be closed and the conveyor starts to move.

In third cycle, when the proximity sensor senses the bottle again, the conveyor stops and the counter C2 is enable, now the blue valve and yellow valve will be open according to the proportion needed. When the timer T6 is enable all the valve will be closed and stirrer motor will be switched on for given time period. Once the timer T7 is enabled stirrer motor will be switched off and the mixing valve will be opened.

When the timer T8 is enabled, mixing valve will be closed and the conveyor starts to move. When the proximity sensor senses each time, different colours are produced.

5.SCADA DESIGN FOR MIXING AND FILLING PROCESS

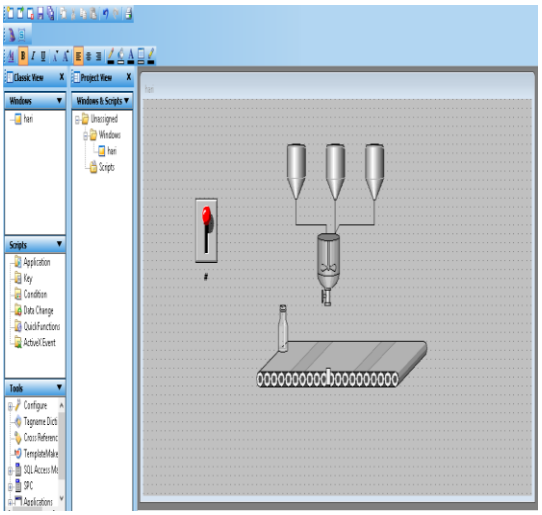

Fig.11. SCADA diagram of liquid mixing and filling process

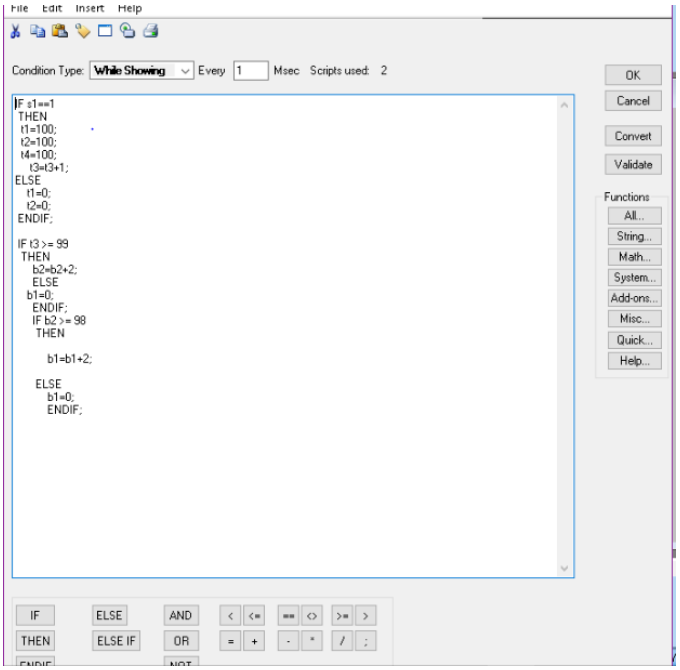

Fig.12. SCADA scripts of liquid mixing and filling process

When the switch s1 is on tank 1, tank 2 and tank 3 will be filled, Liquid from the three tanks will be mixed in tank 4 (Mixer tank). When the bottle is detected by the Proximity sensor in the conveyor, then the conveyor stops.

Liquid from the tank 4 will be filled in the bottle in conveyor. When the level is reached the valve of the mixer tank stops.

6. CONCLUSION

This paper presents the automatic liquid mixing and filling of bottle using PLC and SCADA. We can implement system using ARM7 but it is having Complications to designs as number of pin is more. We cannot control whole process using single microcontroller hence it is useful for small project implementations. Hence system should tread off all the above requirements which are possible if the system is implemented using PLC& SCADA. System implemented using PLC & SCADA overcomes all the drawbacks and will give efficient output as per requirements. The major assumption from such system is the system should be fully automated i.e. system should be capable in mixing and filling the bottles according to the user's requirement by the help of sensors, timers, programmable logics. To overcome the drawbacks, SCADA is implemented to the process and gives efficient output. The system is efficient to monitor the parameters such astemperature, liquid level, quantity, presence of bottle, speed of the system etc.

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HUMAN CONTROL OF PROSTHETIC ARM USING MYOELECTRIC INTERFACE

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Abstract—— Myoelectric controlled interfaces have become a major research area in recent years due to their applications in advanced prostheses, exoskeletons, and robot tele-operation. In this project a prosthetic arm is developed by Arduino programming. The main aim is to replicate the human hand gestures using wireless MEMS and Flux sensors. The wireless communication protocol used is Zigbee. The above two sensors are used to determine the direction of hand gestures under perfect non touching conditions.

Keywords—Arduino; MEMS sensor; Flux sensor; Zigbee;

1. INTRODUCTION

"Myoelectric" is the term for electric properties of muscles. A myoelectric-controlled prosthesis is an externally powered artificial limb that you control with the electrical signals generated naturally by your own muscles. Hand, wrist and elbow myoelectric components are available.

A robotic exoskeleton is a type of orthosis that uses actuators to either assist or resist the movement of a joint of an intact limb; this is not to be confused with a powered prosthesis, which replaces a missing limb. There are four purposes that robotic lower limb exoskeletons can accomplish Enhancement of human performance, which typically deals with increasing strength or endurance Long-term assistance, which aims to provide impaired individuals with the ability to walk by themselves while wearing an exoskeleton Study of human locomotion, which utilizes robotic exoskeletons to better understand human neuromuscular control, energetic, and/or kinematics of locomotion

Post-injury rehabilitation, which is intended to help an individual recover from an injury (such as a stroke, spinal cord injury, or other neurological disabilities) by wearing an exoskeleton for a short time during training in order to perform better later without the use of the exoskeleton Robotic lower-limb exoskeletons can be controlled by several methods, including a footswitch (a pressure sensor attached to the bottom of the foot), gait-phase estimation (using joint angles to determine the current phase of walking), and myoelectric control .

2. ELECTRO MYO GRAPHY

EMG Signal Processing:

Rectification is the translation of the raw EMG signal to a single polarity frequency (usually positive). The purpose of rectifying a signal is to ensure the raw signal does not average zero, due to the raw EMG signal having positive and negative components. It facilitates the signals and process and calculates the mean, integration and the fast fourier transform (FFT). The two types of rectification of signals refer to what happens to the EMG wave when it is processed. These types include full length frequency and half length. Full length frequency adds the EMG signal below the baseline (usually negative polarity) to the signal above the baseline making a conditioned signal that is all positive. This is the preferred method of rectification because it conserves all signal energy for analysis, usually in the positive polarity. Half length rectification deletes the EMG signal below the baseline. In doing so, the average of the data is no longer zero therefore it can be used in statistical analyses. The only difference between the two types of rectification is that full-wave rectification takes the absolute value of the signal array of data points.

Adaptive Human Machine Interface*:*

Adaptive Human Machine Interfaces (HMI) is used to improve the interaction between users and interfaces by taking into account the state of the user and the system. This paper describes a solution that enables the generation of adaptable HMIs applying wireless technologies.

The solution is based on an Adaptive Human Machine Interface Engine, and in this paper one of the main components, called MEMS is presented. The MEMS uses different technologies to retrieve information from the system in order to generate adaptive elements in the HMI. In the scope of the Diesel Reloaded project, we conducted future automotive human-machine interfaces (HMI) with an overview of their relationship to human. Furthermore, we implemented a HMI concept in our prototype hand robot.

This method involves the measurement of the current generated due to the difference in the capacitance between the subject's hand and the measurement electrodes in the MEMS sensor. The above MEMS sensors and flux sensor are capable of detecting the direction of the subject's hand gestures by measuring the time difference of the peak of the electrostatic induction current under perfect noncontact conditions.

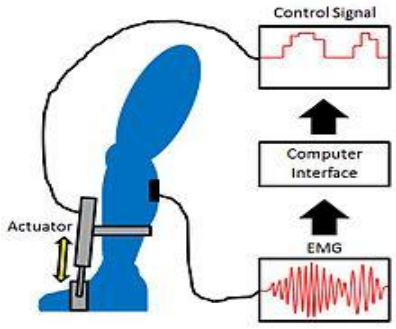

Fig.1 EMG signal conversion

3. PROPOSED HARDWARE SYSTEM

The solution is based on an Adaptive Human Machine Interface Engine and it uses different technologies to retrieve information from the system in order to generate adaptive elements in the HMI. Two sensors are capable of detecting the direction of the subject's hand gestures by measuring the time difference of the peak of the electrostatic induction current. Proposed system is implemented in real time hardware kit. Low power sensor implementation. Easily can adapt Flexible mounting option Quick signal transformation is possible. Measure the time difference of peak electrostatic current. The energy conversion of muscle activity into EMG signals can be represented by the figure given below

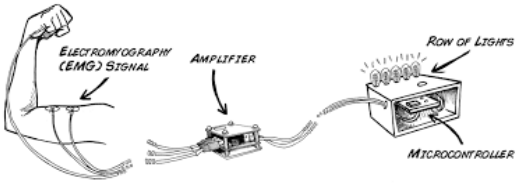

Fig.2. EMG Signals transformation

The signals obtained from muscles are very low and hence they are amplified using the amplifier and then processed. The processed signals then sent as the input for the functioning of the robot.

Proposed system contains two blocks

A. Control section (Transmission unit)

B.Robot section (Receiving unit). Control section(Transmitting unit):

In control unit the components used are,

Arduino controller

MEMS sensor

Flux sensor

Zigbee MEMS sensor and flux sensor outputs are given to the Arduino controller. Controller will compare the given signal to the reference signal. The data is transfer to ZIGBEE wireless module. This section is also known as transmitting unit since the action that is to be done is transmitted from the signals obtained from the hand.

Robot section(Receiving section):

In robot unit the components used are,

Arduino uno controller

Zigbee

Motor driver

Motor

This section is otherwise called as receiving unit .the signals transmitted from the control unit is processed and obtained in this receiving unit, and the action is replicated in this robot. Comment instruction from control unit through wireless module ZIGBEE , instruction is process in robot unit. Motor unit is control by motor driver. Power supply given separately to ZIGBEE, motor, controller.

ZIGBEE is a wireless connection network that is used to connect different devices data frequency of 2.4GHz. For medical applications also this ZIGBEE is widely used. The ZIGBEE can communicate with the devices of about 1km. This can be operated from any distance to any point of control.5v power supply is given to the microcontroller. The receiving unit contains a step down transformer and a bridge rectifier to convert the input 230v ac supply into motors required input of 5 V.

Block Diagram:

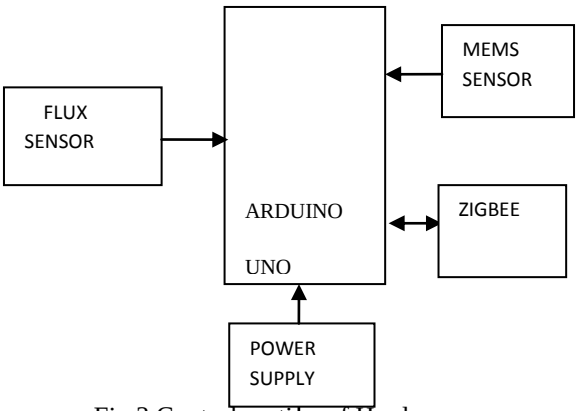

Fig.3.Control section of Hardware

ARDUINO:

Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects

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that can sense and control objects in the physical world The project is based on microcontroller board designs, manufactured by several vendors, using various microcontrollers. These systems provide sets of digital and analog I/O pins that can be interfaced to various expansion boards ("shields") and other circuits. The boards feature serial communications interfaces, including USB on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on the Processing project, which includes support for the C and C++ programming languages. The first Arduino was introduced in 2005, aiming to provide an inexpensive and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits. The hardware design specifications are openly available, allowing the Arduino boards to be manufactured by anyone. Ada fruit Industries estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced, and in 2013 that 700,000 official boards were in users' hands

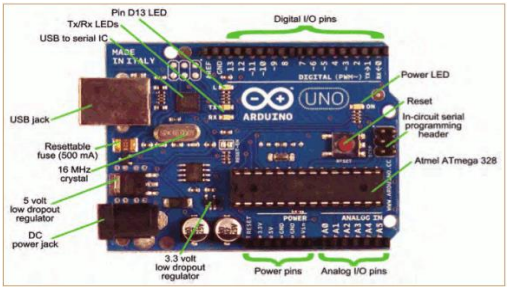


Fig.5.Arduino description

ATMEGA328 MICROCONTROLLER:

Flux sensor:

Heat travels in the forms of conduction, radiation and convection. Heat flow sensor measures amount of convective heat travelling through inside the sensor in a direction perpendicular to its surface. When heat is applied to an object from out- side, it increases temperature that raises internal thermal energy and causes transfer of heat: it is thermal energy and is recognized as heat. Conductive heat flow is identified as amount of heat (J) flowing through a unit area (m 2) in a unit time (s). The unit of heat flow density q commonly called Heat Flux is q=J/s · m=W /m2.

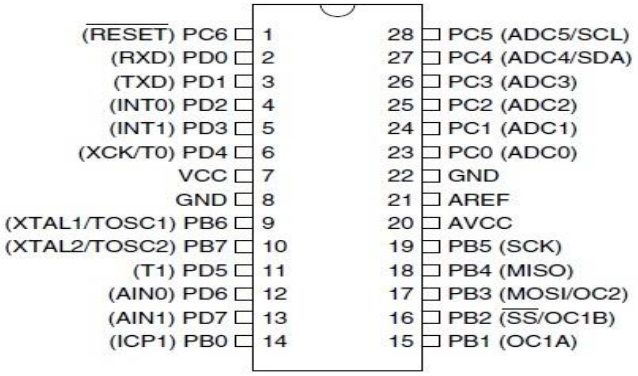


Fig.6. Pin diagram of ATMEGA328

SENSORS

When there is a temperature difference (⊿T) between two sides of a board of a uniform thickness, thermal gradient (⊿T · d-1) and the amplitude of heat flux bear in proportionate relationship. Coefficient of thermal conductivity is material specific, the value calculated by dividing heat flux by thermal gradient, and its inverse is thermal resistivity. In the heat flow sensor, heat flux is detected from temperature difference between two sides of thermal resistive element plate placed across flow of heat. Proportional relationship of the both is verified. As an individual sensitivity constant of the sensor (mV/W/m2), and representative heat flux(W/m2) is shown as the product of output volt-age (mV) and sensitivity constant. The value acquired in practical use is applicable when Ambient heat flow is regarded constant without regard to the size of the sensor. Ego's general purpose heat flow sensor is comprised of a thermopile is configured to which a number of thermocouples connected in series on the both sides of a thin plastic film. With this configuration, heat flow measure.

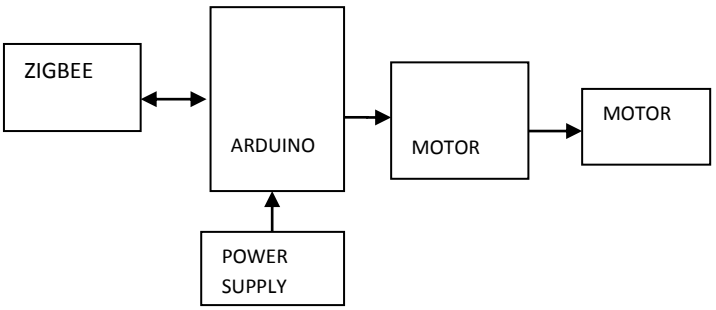


Fig.4.Robot section of Hardware

Fig.7.Flux sensor

Mems

micro-electro-mechanical systems are miniaturized mechanical and electro-mechanical elements, having some sort of mechanical functionality that convert a measured mechanical signal into an electrical signal

Fig.8.MEMS Sensor

The main purpose of using MEMS sensor is

Reduce EMI

Dissipate Heat

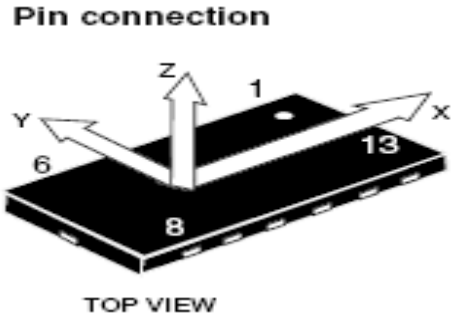
Minimize CTE

Deliver Required Power

Survive Environment

MEMS ACCELEROMETER:

An accelerometer is a device for measuring acceleration and gravity induced reaction forces. Single- and multi-axis models are available to detect magnitude and direction of the acceleration as a vector quantity. Accelerometers can be used to sense inclination, vibration, and shock. They are increasingly present in portable electronic devices.



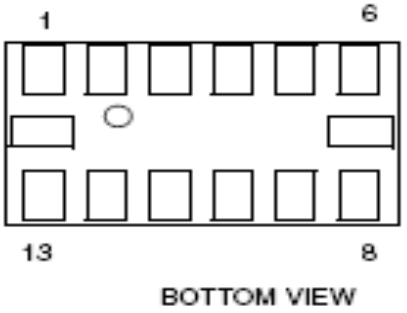


Fig.9.Pin diagram of MEMS

C.ZIGBEE

Zigbee is the name of a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs). Zigbee is targeted at radio-frequency (RF) applications which require a low data rate, long battery life, and secure networking. Zigbee is an established set of specifications for wireless personal area networking (WPAN) i.e., digital radio connections between computers and related devices. Zigbee is one of the global standards of communication protocol formulated by the relevant task force under the IEEE 802.15 Wireless Networking Standards. Zigbee provides specifications for devices that have low data rates, consume very low power and are thus characterized by long battery life

Zigbee operates in the industrial, scientific and medical (ISM) radio bands; 868 MHz in Europe, 915 MHz in the USA and Australia, and 2.4 GHz in most jurisdictions worldwide with Zigbee designed to enable two-way communications, not only will the consumer be able to monitor and keep track of domestic utilities usage, but also feed it to a computer system for data analysis.

Fig.10.Zigbee module

4. CIRCUIT DIAGRAM

RECEIVER CIRCUIT:

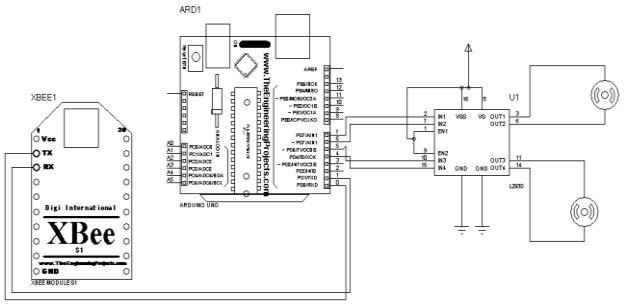


Fig.14.Hardware Receiver circuit

Flux sensor is connected to the subjects (human) hand. Based on Deflections across the muscle area no voltage flows and it is zero and only few micro amps of current is generated. The current thus produced is sensed using sensor. Further the obtained electrical signals are converted into mechanical signals using MEMS. These signals are further send to the Arduino controller to process. Arduino contains controller to control and transmits the signals to the receiving circuit using the Zigbee. Similar to the transmission circuit receiving circuit also contains Arduino, a motor driver, Zigbee, Thus the transmitted signals are received using the Zigbee, and the input is given to the robot hand.

5. CONCLUSION

The recorded muscular activity from sixteen muscles of the forearm and the upper-arm during reach-to-grasp movements towards different objects and object positions in 3D space. Box plot zones were introduced as a novel statistical representation technique capable to give a direct visual estimate of the muscular co-activation patterns. Furthermore an emerging classifier based on Random Forests, not previously used in neuro robotics was used to classify EMG signals in different classes, according to the reach-to-grasp features (i.e. object size and position).Discussed here is able to benefit a switching mechanism that will trigger task-specific (reach-to-grasp strategy) motion and force estimation models improving EMG-based control of robotic arm-hand systems.

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FULLY AUTOMATED RURAL BUS BASED ON RASPBERRY PI

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Abstract— Automated vehicles and drones had become a trending research and project nowadays. They involve assignment of operations and tasks such as movement, turning, obstacle detection and avoidance and other core parametric tasks for which the drone or vehicle get involved. The controller reliability and performance statics, get into account in case of the task or role of the rover or vehicle is bit tedious. The paper involves the design, working, coding and application of an automated vehicle that is been controlled by means of a python based programming with raspberry pi controller.

Keywords— Automated vehicle, Line follower, IR proximity sensor.

1. INTRODUCTION

The project raspberry pi bus deals with the automation technique's involved in accessing a vehicle, in this case a bus. It involves non-human interference in controlling all the variables get involved in a vehical.in this project the variables involved in a bus including wheel movement, speed, door open, stop light, head light is being get controlled without any means of a human's action once it gets turn on and started running. Previously used models involve a robot using IR modules of sensing elements in order to detect the obstacles and other means of detection process. For which the robot need to act in a corresponding manner.in our case this technic gets involved in manner of placing this IR sensing module in effective regions of the vehicle. Such that focussing on the obstacle approaching while turning, obstacle approaching in between the path etc. propagation and movement of the vehicle under the desire path is get controlled in a classic technic of line following. In this project the line following technic is get implemented with the help of basic IR sensor circuit. The vehicle monitoring is an essential process to be performed. When it comes to an unmanned vehicle circumstance. It is done in order to assure that the vehicle is in the track or path under which the user build up in the desire manner. In case of using the raspberry pi as a controller it becomes further move easy to implement such concept in this application due to the early work is done on this technic. There will be a larger fear on using or implementing automation under rural or public sector undergone vehicle control aspect. As it may lead to vehicle collision or any other disaster and accident occurrence.

Thus it is a vital role to take care of proper, accurate and reliable implementation of technic in the process of proper prevention of accident. Were the concept of generating an enable signal that causes. An immediate stop in the case of obstacles occurrence and vehicle intervention. the signal generation action gets implemented by the basic principle working of an IR sensor circuit which is move simpler and efficient that order earlier tedious works been done. Another crucial role is to detect the amount of individual and heavier objects. The array equal to them because of getting this parameter under control may help in controlling the limited mass and individual that the vehicle design can handled. Thus proper and robust action of individual detection while getting inside and outside plays a major role.

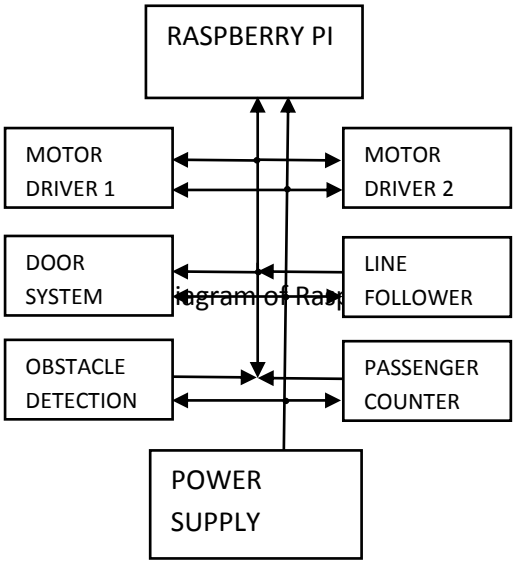
Lohit Ujjainiya and M.KalyanChakravarthi (2015)proposed a vehicle collision avoidance system. They have used Raspberry Pi Camera module is employed to validate the best algorithm suitable for edge detection of images.They use image processing technique The whole system is implemente during Raspberry Pi board. A USB camera is used to detect and capture images. These images are save in system memory and basic edge detection operations are performed on the test images captured by the camera. Open CV serves as the interface on which edge detection algorithms are allowed to run and perform basic image processing functions. The Open CV provides several in built libraries for image processing [1].

S.Raju, K.Sanjay, T.SathishKumar, B.Madhini. They proposed a semi-autonomous vehicle to prevent accident. The proposed system is implemented with the help of ultra sonic sensor ,camera module and raspberry pi .It is work based on when the system detects that the vehicle is headed for a collision or is too close to an obstacle for safety. When hazard is detected, the system will take control of the vehicle, alter the movement and then hand over the control back to driver. We monitor the distance between the obsta clean

PrashantA.Shinde and Y.B.Mane (2015). They proposed advance vehicle monitoring and tracking system. It is designed for monitoring the school vehicle for many location Atolocation Batreal time and provide safety environment to the traveler. The proposed system would make good use of new technology has based on Embedded Linux board namely Raspberry Pi and its advanced feature of storing data base at real time.

Nikhil Ollukaren, Dr.Kevin McFall (2014). They proposed alow cost platform for autonomous ground vehicle research. They design an affordable autonomous ground vehicle platform from the ground up. Using an independent direct drive rear wheel system, thev vehicle can achieve a fixed axis rotation. Using vision algorithms loaded on to a Raspberry Pi ther obot is able to detect are target and send commands to the Arduino. The Arduino controls the motion logic and allows the vehicle to follow the target. The vehicle can also be driven manually using a hand held controller. Using simple and affordable micro controller boards, a vehicle was created that was able to track and follow a specified moving target using visual algorithms to supply motion logic.It uses image processing algorithms to offer obstacle avoidance and detection of road boundaries for steering control[9].

Tohari Ahmad, Hudan Studia wanand Tirta Taru- na Ramadhan (2014). They proposed a monitoring system for detecting and securing an object. It is developed based on raspberry pi. A monitoring system is constructed by a camera along with all related devices for transferring the data. This can be either wireless or wired devices, depending on the nature and requirements of the system. Monitoring certain area sorterritories is needed in order to maintain



II. WHEEL MOVEMENT CONTROL

When it comes to controlling a vehicle the major and prior field of control involve the wheel movement controlling this include direction, speed, enable and disabling. This system involves a driver circuit as the base field od control where the driver board is get feed by the enable high and disable low signal output given from the corresponding controller been used in the overall system. Thus with respect to the signal logic been framed by the user. The wheel movement action control correspondingly. the power supply to the motor functioning is feed through a separate supply source driven through the driver board.

III. OBSTACLE AVOIDANCE

The main area of focus gets involve in the automated vehicle is to respond to the obstacle get interfered in the path way been given by the user where the vehicle gets stop and wait for the obstacle to get moved from the path. Once the obstacle gets moved from the path the vehicle get continued its path from framed in other case with obstacle is a type that it does not get displaced, the vehicle change its path to an alternate path. It also need to monitor or sense for any vehicle is coming on the path or not while the vehicle is under the action of turning.

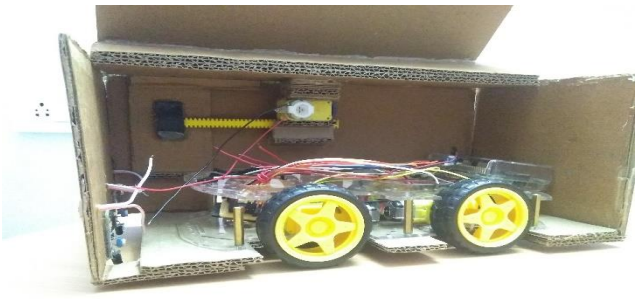


Fig 2. Inter skeleton of Raspberry Pi bus

IV. LINE FOLLOWER

The line follower system is the base mean for the vehicle to be get moved in the path derived route framed by the user for the vehicle to followed the action is achieved by the precise sensing of the line marked route either black or white. This is because of IR radiation will be get reflected only in a bright colour canvas or textured in case of dark colour such as black. the IR radiation will be observed. This process is send as high and low signals corresponding to which the motor driver board is get feed by the controller with respected control signal. Thereby the line follower sensor act as input element to the controller.

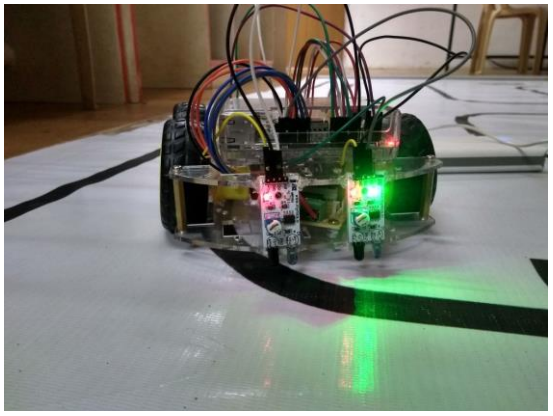


Fig 3. Line follower system test

V. DOOR CONTROL

Door control involve a separate driver circuit to control. This controlling involves open and closing of the door which is done by means of forward and reverse movement of the motor been interface to the door setup for a definite amount of stops calibrated with time this action gets involve during the period of the bus reaching and waiting in the stop. The door is constructed with a basic rack and pinion arrangement with geared motor control approach.

VI. PASSENGER MANAGEMENT

Another main criterion to maintain and control is the amount of passenger aboard in the vehicle this involve detection of passenger step in and out corresponding incrementing and decrementing the count value of the number of passenger. In thatcaseanIRsensor based counter setup arrangement is being get implemented nearer to the door mechanism.

Fig 4. Raspberry Pi bus

VII. HEAD LIGHT AND STOP LIGHT CONTROL

Head light and stop light terminals are interfaced with the action of the movement system. were the high and low input to the lights are transfer corresponding to the action performed by the vehicle movement.

VIII. RESULT

Overall system output such us wheel movement path following, passenger counting and obstacle avoidance or performed successfully and verified by means of the print function generated by the python program in the control prompt for each of the actions been specified.

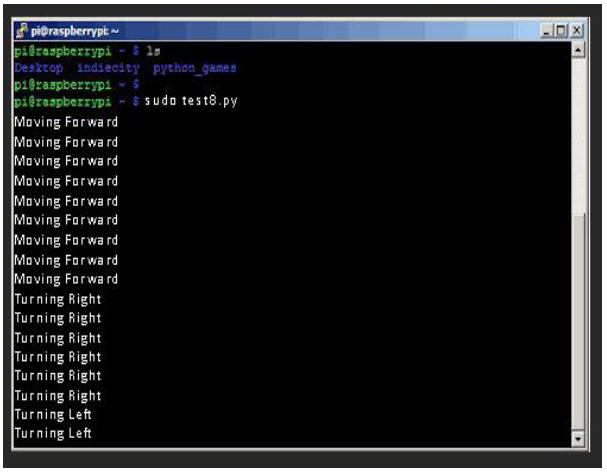


Fig 5. Control prompt output of the system

IX. CONCLUSION

The system basic and prior variables or successfully taken for the desired action specified to the application further parameter like inter vehicle communication and vehicle location feeding and detection are yet to be get added to the system interfacing with networking logic for parallel and efficient controlling of the vehicle also need to be get implemented further.

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HCI APPLICATION FOR PLAYING COMPUTER GAMES

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Abstract— This paper describes a command interface for games based on hand gestures and voice command defined by postures, movement and location. The system uses computer vision requiring no sensors or markers on the user or background. In voice command the speech recognizer, recognize the input from the user . It stores and the command pass through the game , action takes placed.

Keywords— computer vision; gesture recognition; voice command; human computer interaction;

1. INTRODUCTION

Computer games are one of the most successful application domains in the history of interactive systems even with conventional input systems like mouse and keyboard. The existing system, mouse for instance seriously limits the way humans interact with computers. Introduction of HCI techniques to the gaming world would revolutionize the way humans play games. It is a command interface for games based on **hand gestures and voice command** defined by postures , movement and location. The proposed system uses a simple webcam and a PC for recognizing the input from the user and thus uses natural hand movements for playing games. This effectively reduces the cost of implementing HCI in conventional PCs. We propose a simple architecture for performing real time colour detection and motion tracking using a webcam. Since many colours are detected it is important to distinguish the specified colours distinctly. The next step is to track the motion of the specified colours and the resulting actions are given as input commands to the system.

Speech technology is a very popular term right now.And Speech Recognition is the process of automatically recognizing a certain word spoken by a particular speaker based on individual information included in speech waves. Using speech recognition, we can give commands to computer and the computer will perform the given task. The main objective of this project is to construct and develop a system to execute commands of operating system by using speech recognition system that is capable of recognizing and responding to speech inputs rather than using traditional means of input(e.g. computer keyboard, mouse), thus saving time and effort of the user. The proposed system is easier to in.crease the interaction between people and computers by using speech recognition; especially for those who suffer from health problems, for example, the proposed system helps physically challenged persons. This application will help in reduction in hardware requirement and can be implemented in other electronic devices also.In this case, we are using TIC-TAC-TOE GAME.

2. RELATED WORK

A few works have been proposed recently to use free hand gestures in games using computer vision. A multimodal multiplayer gaming system combines a small number of postures, their location on a table-based interaction system and speech commands to interact with games and discusses results of using this platform to interact with popular games.In this study, a colour pointer has been used for object recognition and tracking. Instead of conventional finger tips a colour pointer has been used to make object detection easy and fast.Other tools facilitate the use of gesture recognition for applications in general, not only games.

Speech technology is a very popular term right now. Speech recognition is highly demanded and has many useful applications. Conventional system users use pervasive devices such a mouse and keyboard to interact with the system. Further more people with physical challenges find conventional system hand to use. A good system has minimal restrictions in interacting with its user. The speed of typing and hand writing is usually one word per second, so speaking may be the fastest communication form with a computer. The applications with voice recognition can also be a very helpful to for handicapped people who have difficulties with typing.

3. SPECIFIC REQUIREMENTS

For Hand Gestures, we are Using the Open CV. In this study, a colour pointer has been used for object recognition and tracking. A blue and green colours are used as colour pointers. Colour detection is performed using in build functions in Open CV. Open CV (Open Source Computer Vision) is a Library of programming functions mainly aimed at real-time computer vision. Originally developed by intel's research centre. OpenCV is written in C++ and its primary interface is in C++, but it still retains a less comprehensive though extensive older C interface. Open CV's applications areas include: Facial recognition system, Gesture recognition, Human-computer interaction (HCI), Mobile robotics. Open CV is an open source computer vision and machine learning software library. Open CV was build to provide common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-Licenced products, Open CV makes it

easy for business to utilize and modify the code. It has C,C++,Python, Java and MATLAB interfaces and supports Windows, Linux, Android and Mac OS. Open CV means mostly towards real-time vision applications and takes advantage of MMX and SSE instructions when available. A full-featured CUDA AND Open CL interfaces are being actively developed right now. There are over 500 algorithms and above 10 times as many functions that compose or support those algorithms. Open CV is written natively in C++ and has a template interface that works seamlessly with STL containers.

For Voice Input, we are Using the Sphinx package. **CMU Sphinx**, also called Sphinx in short, is the general term to describe a group of speech recognition systems. SPIHNX the first large-vocabulary speaker-independent continuous-speech recognizer using multiple code books of various LPC-derived features. Two types of HMMs are used in SPHINX : context-independent phone model and function-word-dependent phone model. On a task using bigram grammer, SPHINX achieved a word accuracy. This demonstrates the feasibility of speaker-independent continuous-speech recognition, and the feasibility of approtriateness of hidden Markov models for such a task. These include a series of speech recognizers. The speech decoders come with acoustic models and sample applications. The available resources include in addition software for acoustic model training. These two specific requirements are used in the TIC-TAC-TOE GAME.

4.DESCRIPTION HAND GESTURES

In the TicTacToe Game, the Open CV works :

The user use one color for the movement and another color for click options in their fingers. The user move the hands into the webcam and the images are captured by open CV tool. The captured images go to the segment analysis by BG Removal, and the segmented image is recognizes by the recognizer. The recognized movement is mapped to the mouse tracker, and if the another color will identified the action takes placed.

Both the use of gestures and having games as an application bring specific requirements to an interface and analyzing these requirements was one of the most important steps in designing Gestures. Gestures are most often used to relay singular commands or actions to the system, instead of tasks that may require continuous control, such as navigation. Therefore, it is recommended that gestures be part of a multimodal interface. This also brings other advantages, such as decoupling different tasks in different interaction modalities, which may reduce the user's cognitive load. So, while gestures have been used for other interaction tasks in the past, including navigation. All this leads to the requirement that the vocabulary of gestures in each context of the interface, while small, must be as simply and quickly modifiable as possible. Systems that require retraining for each set of possible gestures, for instance, could prove problematic in this case, unless such training could be easily automated. The interface should also accept small variations for each gesture. Demanding that postures and movements be precise, while possibly making the recognition task easier, makes the interaction considerably harder to use and learn, demanding not only that the user remember the gestures and their meanings but also train how to do them precisely, greatly reducing usability. It could be argued that, for particular games, reducing the usability could actually be part of the challenge presented to the player (the challenge could be remembering a large number of gestures, or learning how to execute them precisely, for instance). While the discussion of whether that is a good game design practice or not is beyond the scope of this paper, Gestures opts for the more general goal of increasing usability as much as possible. This agrees with the principle that , for home and entertainment applications, ease of learning, reducing user errors, satisfaction and low cost are among the most important design goals. The system should also allow playing at home with minimal setup time required. Players prefer games where they can be introduced to the action as soon as possible, even while still learning the game and the interface. Therefore, the system should not require specific background or lighting conditions, complex calibration or repeated training. Allowing the use of the gesture-based interface with conventional games is also advantageous to the user, providing new options to enjoy a larger number of games. From the developer point of view, the system should be as easy as possible to integrate within a game, without requiring specific knowledge of areas such as computer vision or machine learning.

5. THE ABSTRACT FRAMEWORK

Figure 1 shows a UML Activity Diagram representing Gesture object flow model. *It* is responsible for the gesture model, while *Gesture Analysis* and *Gesture Recognition* define the interfaces for the classes that will implement gesture analysis and recognition. To these activities are added image capture and segmentation. *Gesture Capture* provides an interface for capturing 2D images from one or multiple cameras or prerecorded video streams (mostly for testing). The images must have the same size, but not necessarily the same color depth. A device could provide, for instance, one or more color images and a gray scale image to represent a dense depth map. *Gesture Segmentation* should usually find in the original image(s) one or both hands and possibly the head (to determine relative hand position).

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Hci Application For Playing Computer Games

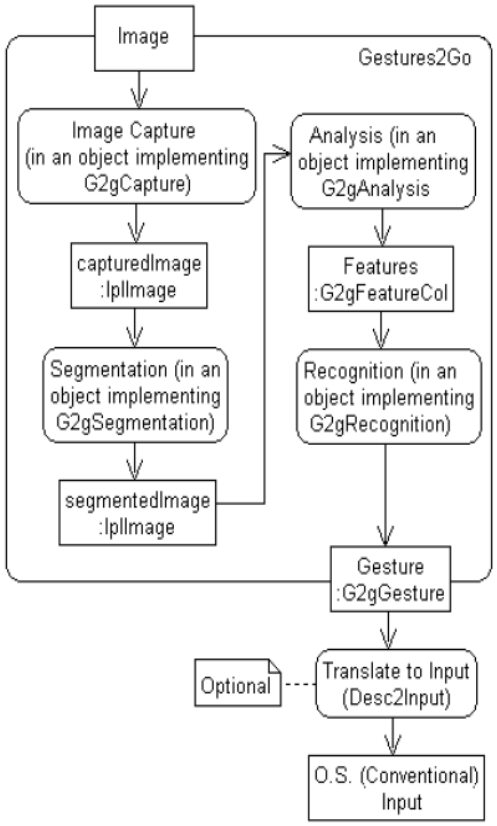
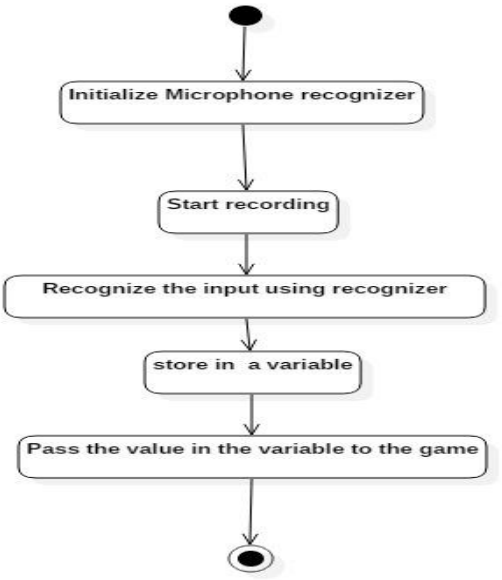


Figure 1 shows that the usual flow of information in Gestures in each time step is as follows: one or more images serve as input to the image capture model, which makes these images available as an OpenCV's Ipl Image object. The segmentation uses this image and provides a segmented image as an object of the same class (and same image size, but not necessarily color depth). Based on the segmented image, the analysis provides a collection of features as a *Gesture Feature Col* object which are in turn used by the recognition to output a gesture.

Gestre Feature Col is a collection of *Gesture Feature* objects. *Gesture Feature* contains a identifier string to describe the feature and either a scalar and an array of values (more often used) or an image (useful, for instance, for features in the frequency domain). *Gesture Feature* already defines several identifiers, for those features most often found in the gesture recognition literature, to facilitate the interface between analysis and recognition, but user-created identifiers may also be used. Input is an optional module that accompanies but is actually separate from Gestures2Go. It is responsible for facilitating, in a very simple way, both multimodal input and integration with games or engines not necessarily aware of Gestures. It simply translates its input, which is a description (a numerical or string ID or a XML description, for instance) that may be supplied either by Gestures2Go or any other system (and here lies the possibility of multimodal interaction), into another type of input, such as a system input (like a key down event) or input data to a particular game engine. In one of the tests, for instance, gestures are used for commands and a dancing mat is used for navigation. Because this architecture consists mostly of interfaces, it is possible to create a single class that, through multiple inheritance, implements the entire system functionality. This is usually considered a bad practice in object orientation (should be avoided) and is actually one of the reasons why aggregation is preferred to inheritance . There are design patterns that could have been used to force the use of aggregation and avoid multiple inheritance, but Gestures opts for allowing it for a reason. Gesture recognition may be a very costly task in terms of processing, and must be done in real time for the purpose of interaction. Many algorithms may be better optimized for speed when performing more than one task (such as segmentation and analysis) together. Furthermore, analysis and recognition are very tightly coupled in some algorithms and forcing their separation could be difficult. So, while it is usually recommended to avoid using multiple inheritance and to implement each task in a different class, making it much easier to exchange one module for the other or to develop modules in parallel and in teams, the option to do otherwise exists, and for good reason.

6. SPEECH RECOGNITION



For Voice Input ,we are Using the Sphinx Library. Sphinx consists of in-build functions which are used to detect the speech input given by a particular user. In this case, we are giving the position number as the input for Tic Tac Toe Game through voice command. The Speech Recognizer, recognize the user input and store it, so that it can be used as a input in Tic Tac Toe game For Voice Input ,human voice which is sampled at rate of 16,000per second. It should be given in live mode .It should be noted that the system would have difficulty in recognizing accented English, hence it is recommended to give input as native English speakers would do. In Speech Recognizer, Platform speed directly affected our choice of a speech recognition system for our work.

Hci Application For Playing Computer Games

It is used to recognize the voice commands as spoken by user. The voice input is supposed to be given from its microphone. The speech recognition process decodes these input files, identifies the command and generates output accordingly. The Dictionary file is a separate file that describes the phonics of each word .It is a collection of pre-defined words that are relevant to various activities. Each word is separated into syllables. The output in from the recognizer (i.e.) Recognition result is cross referenced with the dictionary file and correct word is returned as the result. The Decoder module then parses this word and converts into equivalent text. This text is then used by the command executer to execute the required functions. The decoder module is in build the SPHINX System.

The class Microphone from the sphinx for microphone control using java provides solve the essential functions for working with microphone connected to the system. The Start Recording function in the microphone class can be used to capture the audio from the microphone connected to the system. It returns an object of the result class which can be converted to text command using the recognize function in Recognizer class.

Speech Recognition is the process of identifying the speech in the recorded audio by using the phonetics dictionary .The phonetics for each word is stored in the dictionary file. The recognize function in the recognizer class uses the grammar file to recognize speech if any in the audio recorded by the microphone.

7. CONCLUSION

The System architecture proposed will completely revolutionize the way gaming applications are performed. The system makes use of web camera and which are an integral part of any standard system, eliminating the necessity of additional peripheral devices. Our endeavor foe object detection and image processing in Open CV for the implementation of the gaming console provide to be practically successful. Here a person's motions traced and interpreted as commands .Most gaming application required additional hardware which is often very costly. The motive was to create this technology in the cheapest possible way under a standardized operating system using a set of wearable gesture able interfaces. This technique can be further extended to other services also. In Speech Recognition, the proposed system provides a better performance and experience I user interaction. It reduces potential time involved in conventional interactive methods. Voice recognition is irrefutably the feature of human computer interaction and our study proposes a new approach to utilize this approach for enhanced user experience and extend in ability of computer interaction to motor impaired users.

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AUTOMATION OF SHOPPING CART USING RASPBERRY PI

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Abstract*— specially, it becomes more crowded on holidays. People purchase different items in the malls and puts them in the trolley. At the cash counter billing process is done using bar code scanner. This is very time consuming process. To avoid this we are developed a system which is called as Automation of Shopping Cart using Smartphone. In this system we are using RFID tags instead of barcodes. This RFID tags will be on the product. Whenever the customer puts a product into trolley it will get scanned by RFID reader and product price and cost will be display on LCD display. Like this the process goes on. The trolley follows us without any human effort.We are using a GSM transmitter which will be at trolley which is used to transfer the data to Mobile. In Smart Trolley app, the amount will be sent and the payment will be done using mobile. If a person interrupts other than the user there is collision sensor to indicate.

Keywords—Trolley,LiFi,GSM Module,RFID TAGS,RFID Reader,GSM Transmitter,ZigBee.

1. INTRODUCTION

The barcode system is no longer the best way to business operation. Customers are tired of waiting in long, slowly moving checkout line in departmental stores, especially, in holidays. Now a days people are much attracted by the online trading because of tedious time consuming process at billing counter. People purchase different items in the malls and puts them in the trolley. At the cash counter billing process is done using bar code scanner. With the decrease of prices through efficiencies of technology and large-scale production of semiconductor wireless components, there has been a search for new markets in which semiconductor chips can be used. This has led to the use of RFID also known as smart tags. RFID stands for Radio Frequency Identification. Nowadays, if a consumer would like to buy something at a shopping mall, consumers need to take the particular items from the display shelf and then queue up and wait for their turn to make payment. The time taken for consumers to wait for the customers in front of the queue to scan every single item and then followed by making payment will definitely take plenty of time.

Most consumers will worry the amount of money brought is not enough to pay for all the things that wanted to be bought until it comes to our turn to pay at the cashier. If the technology of RFID is implemented, Consumers will be able to get information of all the items at shopping mall, total up the prices of items as they shop, and save unnecessary time which is wasted unnecessary at the cashier. Currently available method in shopping malls is barcode method. In this method there are barcode labels on each product which can be read through specially designed barcode readers. A barcode reader (or barcode scanner) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain decoder circuit to analyze the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port.

2. LITERATURE REVIEW

Zubin Thomas, Nikil Kumar and D. Jyothi Preshiya(2016) had proposed that Automatic Billing System using Li-Fi Module will be the effective way to reduce the human effort . LiFi is cellular wireless networking (re)using lights. Specifically, light emitting diodes (LEDs) are used in LiFi as visible light transmitters. They proposed about the billing done by the Lifi device. The Lifi is a costly device which is not to be practically implemented in all malls, whereas the RFID is used instead of LiFi.

Mr.P. Chandrasekar and Ms.T. Sangeetha(2014) proposed that automated billing system using RFID and ZigBee communication. Here, each product of shopping mall, super markets will be provided with a RFID tag,to identify its type. Each shopping cart is designed or implemented with a Product Identification Device (PID) that contains microcontroller, LCD, an RFID reader, EEPROM, and ZigBee module. Purchasing product information will be read through a RFID reader on shopping cart, mean while product information will be stored into EEPROM attached to it and EEPROM data will be send to Central Billing System through ZigBee module. From this, the idea of using a PIC Microcontroller instead of Zigbee has been utilized.

Udita Gangwal, Sanchita Roy, Jyotsna Bapat(2013) proposed that Smart Shopping Cart for Automated Billing Purpose using Wireless Sensor Networks. In that, WSN for developing a Smart Shopping System which automates the entire billing procedure. The system which is developed is highly reliable, fair and cost-effective. It is reliable and fair because of the effectiveness of WSN combined with a highly Image Processing technique. The system also has energy constraint as it uses a passive sensor and it reduces the communication requirement. The GSM technique is made use from this proposed.

S.Nandhini,P.Premkumar(2014) proposed that Automatic Toll Gate System Using Advanced RFID and GSM Technology. In that, the frame composing and working flow of the system is described and data information is also easily exchanged between the motorists and toll authorities, thereby enabling a more efficient toll collection by reducing traffic and eliminating possible human errors. Here the vehicle information is got through the RFID whereas we use RFID for the scanning of products.

H.G.Rodney Tan,C.H.Lee,V.H.Mok proposed that Automatic Power meter reading using GSM network. In that, GSM Power Digital Meter (GPM) is installed in every consumer unit and an electricity ebilling system at the energy provider side. The web portal is used in the power meter reading wherein we use a mobile application for the trolley.

3.HARDWARE IMPLEMENTATION AND DESIGN OF TROLLEY

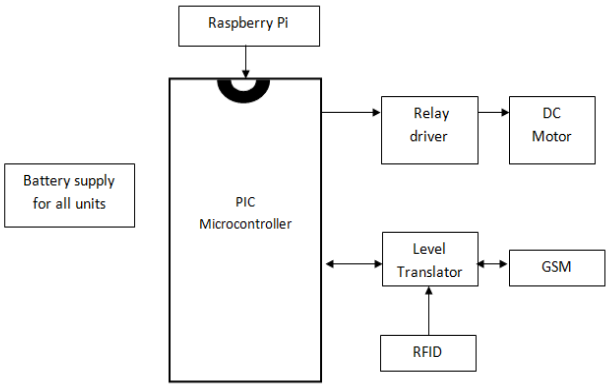

Fig.1.Hardware Implemetation

The Fig.1 consists of the PIC Microcontroller with the specification of 16F877A.It also consists of Ultrasonic Sensor,Relay driver,Collision Sensor,RFID Reader and a battery for all the units.The microcontroller is connected to the keypad for the user.A relay driver connected with the dc motor is interfaced with the microcontroller. And the RFID reader to the level translator for the identification. There isa collision sensor connected with microcontroller for the indication of any interruption.The battery supply is given to the respective circuits.

RASPBERRY PI

Raspberry Pi is a low-cost, basic computer that was originally intended to help spur interest in computing .The Raspberry Pi computer is essentially a wireless Internet capable system-on-a-chip (SoC) with 1 GB RAM, connection ports, a Micro SD card slot, camera and display interfaces and an audio/video jack. The Raspberry Pi Foundation offers several versions of Raspberry Pi, including the Raspberry Pi Zero, a $5 model

Fig.2. Raspberry Pi

PIC Microcontroller

A PIC microcontroller (Fig.3) is a processor with built in memory and RAM and can be used to control the projects (or build projects around it). So it saves building a circuit that has separate external RAM, ROM and peripheral chips

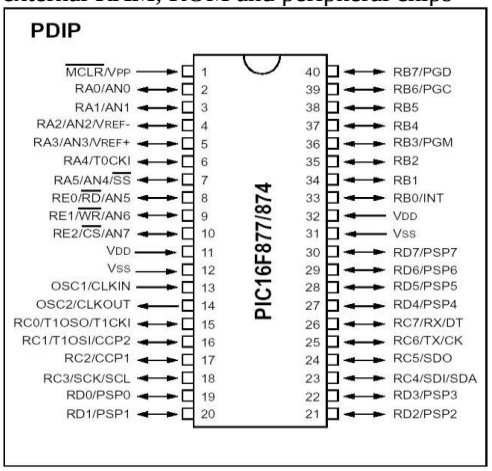

Fig.3.PIC Microcontroller

RFID Reader

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items

Fig.3.RFID Reader

RFID Tagger

RFID tagging is an Identification system that uses small radio frequency identification devices for identification and tracking purposes. An RFID tagging system includes the tag itself, a read/write device, and a host system application for data collection, processing, and transmission. An RFID tag (as shown in Fig.4) sometimes called an RFID transponder. It consists of a chip , some memory and an antenna.

Fig.4. RFID Tagger

GSM Module

In GSM SIM800C (Fig.6), the Modem is with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply.

Fig.6. GSM Module

4. ARRANGEMENT ARCHITECTURE

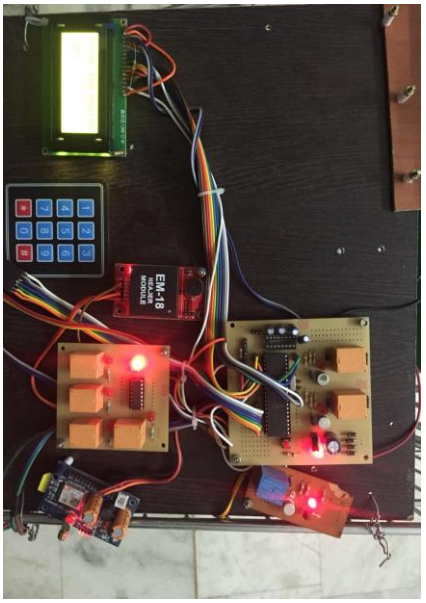

Fig.8 .Arragement Architecture

The arrangement consists of the parts which are explained in the above Design of Trolley. The main part is the PIC microcontroller which is connected to the keypad, relay driver, and a GSM module for the process.

5.FEATURES OF THE PROPOSED SYSTEM

The inconveniences caused by the existing system is such as the working staff is needed to bill each item , the need to push the trolley throughout the mall etc., can be overcome by using Smartphone based Trolley(Fig.9) the trolley has a RFID technology which scans the product while the product gets into to the trolley, the user gets a confirmation through the Mobile app and confirms it. In the trolley if any product needs to be removed from the trolley , the user just by pressing the star(*) button can take away the product. A message will be sent to the Smartphone confirming the product has been taken. For this kind of removing we have kept a sliding door like structure. Whenever the user presses the star(*) button the door opens slowly, so that we can take that product.

6. RESULT AND DISCUSSION

The fig.9 shows the real time implementation of the trolley. The project has been successfully finished. The trolley follows the user continuously, if another person interrupts there is a collision sensor to indicate there is an interruption.

Fig.9. Result

7. CONCLUSION

The automation of shopping cart is a technique by which the user can be hassle-free during shopping's on a crowded time. Also, the trolley can be used in airports where the heavy luggage's need not be pushed all along whereas it will follow us so that human power can be reduced.

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ANDROID BASED GESTURE CONTROLLED ROBOT

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Abstract— ***In this wireless gesture controlled robot project we are going to control a robot using hand gestures. This is an easy, user-friendly way to interact with robotic systems and robots. An accelerometer is used to detect the tilting position of your hand, and a microcontroller gets different analogue values and generates command signals to control the robot. The gestures can be interpreted from any kind of physical movement or condition, but usually arise from a person. Gesture recognition can be explained as a method by which a computer can understand the language of the human body, thereby creating a communication bridge between humans and machines than normal text based or a terminal user interfaces or even graphical user interfaces (GUIs) that still restrict most of the mouse and keyboard inputs.This concept can be implemented in a robotic arm used for welding or handling hazardous materials, such as in nuclear plants. Detailed description of the project is discussed below.***

Keywords-accelerometers;gesture recognition;keyboards;microcontrollers;mouse controllers (computers);telerobotics;3-axis accelerometer;ATmega16 microcontroller;Electronics & Communication;computer science;terminal user interfaces.

1.INTRODUCTION

Nowadays, robotics is becoming one of the most advanced fields in the modern era of technology. The robotics mainly involve in the automobile industry, medical industry, construction works, defense and even used as a fire fighting robot to help people from fire accidents. But, controlling the robot with a remote or a switch is quite complicated. So, a new project is developed that is, an accelerometer based gesture control robot. The main goal of this project is to control the movement of the robot with hand gesture using accelerometer present in android phones.

2..PROBLEM FORMULATION

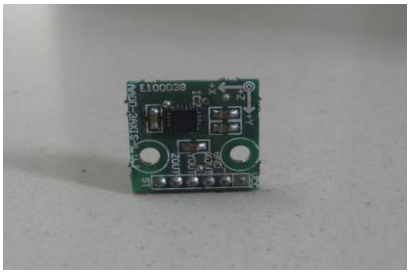
We cant always depend on Remote consoles or controllers to control robots. We had to come up with some special idea inorder to make the robot use more effieciently. Voice controlled robots were opted but they were not effective in Loud and noisy areas. So we required a process where the robot would respond quickly and at the same time, save us both time and money. boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

Microcontroller:

The **ATmega328** is a single chip microcontroller created by Atmel in the mega AVR family. The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages),programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

Accelerometer:

An accelerometer is a three-axis acceleration measuring device. The accelerometer used here is ADXL335 and it has 3 axis (X Y Z).Almost all smart phones now have accelerometers (even though we are not going to take it from a smart phone). You definitely played motion games in your mobile (E.g Temple run) where the character in the game moves left and right when you tilt your phone left and right respectively it is done by the accelerometer.



IC HT12D:

HT12D is a decoder integrated circuit that belongs to 2^{12} series of decoders. This series of decoders are mainly used for remote control system applications, like burglar alarm, car door controller, security system etc. It is mainly provided to interface RF and infrared circuits. They are paired with 2^{12} series of encoders. The chosen pair of encoder/decoder should have same number of addresses and data format.In simple terms, HT12D converts the serial input into parallel outputs. It decodes the serial addresses and data received by, say, an RF receiver, into parallel data and sends them to output data pins. The serial input data is compared with the local addresses three times continuously. The input data code is decoded when no error or unmatched codes are found. A valid transmission in indicated by a high signal at VT pin.HT12D is capable of decoding 12 bits, of which 8 are address bits and 4 are data bits. The data on 4 bit

latch type output pins remain unchanged until new is received.

IC HT12E:

HT12E is an encoder integrated circuit of 2^{12} series of encoders. They are paired with 2^{12} series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format. Simply put, HT12E converts the parallel inputs into serial output. It encodes the 12 bit parallel data into serial for transmission through an RF transmitter. These 12 bits are divided into 8 address bits and 4 data bits. HT12E has a transmission enable pin which is active low. When a trigger signal is received on TE pin, the programmed addresses/data are transmitted together with the header bits via an RF or an infrared transmission medium. HT12E begins a 4-word transmission cycle upon receipt of a transmission enable.

This cycle is repeated as long as TE is kept low. As soon as TE returns to high, the encoder output completes its final cycle and then stops.

IC 7805:

A voltage regulator is designed to automatically

maintain a constant voltage level. A voltage regulator may use an electromechanical mechanism, or electronic components. Depending on design, it may be used to regulate one or more voltages. 7805 voltage regulating IC is used to provide the voltage 5V dc.

L293D Motor Driver:

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor.

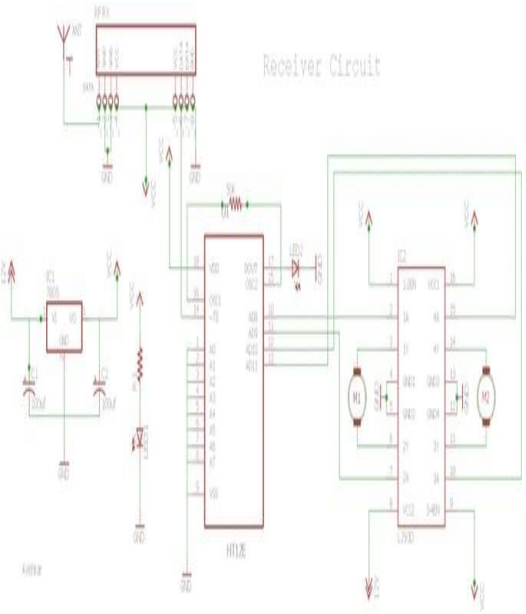
In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor,

the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch circuit *(*IC*).*

DC Motors:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

3.CIRCUIT DIAGRAM



V.WORKING

In this paper, the working is divided over two sections. First one is transmitter unit and second one is receiver unit.

The transmitter section consists of an accelerometer which detects the hand gesture and sends the data to the Android app. Later the Android app sends the obtained data to the Bluetooth module present in the receiver section connected to the Arduino. Before that the internal encoder in mobile encodes data and then transmits to Bluetooth. The Bluetooth module in receiver section transfers the data to decoder and hence the decoded data is sent to
Arduino that has the Atmega328 microcontroller. The microcontroller then controls the L293D motor driver and drives the robot accordingly.

4. ADVANTAGES

- Improves ease of access.
- Robust and efficient.
- Low Cost and Small in size.
- Fast speed of response.

5.APPLICATIONS

- Military.
- Inaccessible Radioactive areas.
- Baggage lifting airports and trains.
- Using as low cost worker drones.

6.CONCLUSION

It can work just by connecting our android phone with the module in the receiver so that one can control the bot just by using hand gestures.

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SMART STREET LIGHT ENERGY CONSUMPTION

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Abstract: This paper is a start for street light energy conservation by control mechanism. This gives immense advantages for the demanding energy problems .This is recently implemented in New Zealand .

CONTENTS

I. INTRODUCTION

As a matter of fact trending demand of alternative source of energy is required to the growing demands of the people .This can be achieved in two ways:

1. Finding an alternative resource to supply the power .2. By reducing the energy consumption of the present resources available .

This project here by ,supports the second statement .This document provides details about the study and implementation of street lights controlled either using sensors or microcontrollers .Illumination is done through LED's. Roads under construction are illuminated continuously at night. And the LED's get brightened while it senses either vehicle or human.

PURPOSES:

- The soul purpose of this project is consumption of energy across a street .
- To minimise the frequency of accidences.

This kind of project can be implemented in urban cities where most of the power is wasted in lighting up the streets when there is minimum traffic flow during night.

II. OBJECTIVE

To provide lighting to the street such that minimum power is consumed during nights and to manage traffic flow efficiently at night.

Components Used:

- IR sensors
- Aurdino
- LED's
- Relays
- LDR

IR SENSORS

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and\or detecting infrared radiation .Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.

AURDINO

It is a programming device.

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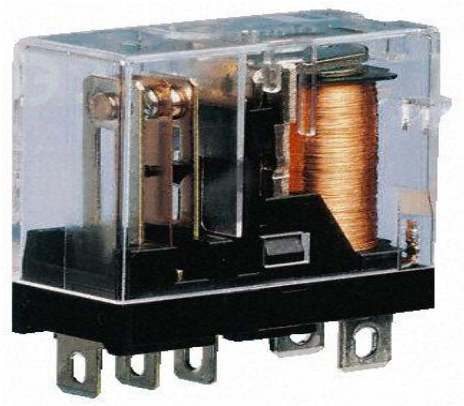
RELAYS

It is an electrically operated switch.

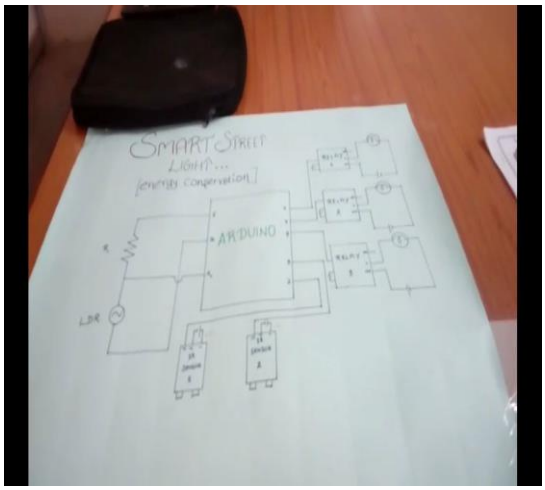


LDR

An LDR is a component that has a resistance that changes with the light intensity that falls upon it.

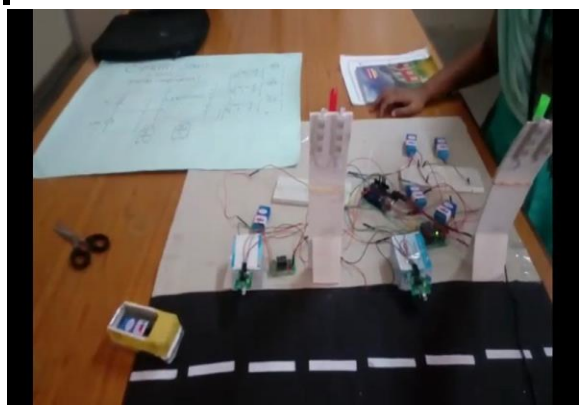
III. WORKING

The controlling of light is done with the help of aurdino programming ,ir sensors and relays .The street light illuminates continuously at night time as LDR's are used, when vehicle or human is sensed by the sensor the LED's get illuminated more brightly.



IV. CONCLUSION

This project is a step forward to allot the power generated in much better and systematic fashion across the roads. We have tried it in practice and was successful with the project. Our management has encouraged our outcome by allowing us to implement our project in the college .This is a sincere effort in managing the traffic flow at night and reducing the amount of energy wasted in this procedure.



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