FABRICATION OF ANDROID BASED MOVING ROBOT FOR PICK AND PLACE APPLICATIONS

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ABSTRACT--- In recent years, the definition of a robot is generally used to mean an unmanned system or automation, as often seen in industrial applications, deep sea planetary probes. Historically speaking, a robot used to be shaped like humans, and referred to as machines and electric systems that were capable of performing similar actions as humans. It is these robots that play active roles in comic magazines, animation and science fiction. Because they are artificially created, they are called "artificial man". And since they look like humans in appearance, they are often called "androids" or "humanoids."

In this highly developing society; time and man power are critical constrains for completion of task in large scales. the automation is playing important role to save human efforts in most of the regular and frequently carried works e.g. most of the industrial jobs like welding, painting, assembly, container filling etc. one of the major and most commonly performed work is picking and placing of jobs from source to destination. For this purpose, 'pick and place robot 'maybe used.

The pick and place robot is a mechatronics system that takes the object according to the commands given by user, picks that object from source location and places at desired location as per the instructions. This project uses LPC2148 MCU as its controller for performing different operations by the robot.

This robot is controlled by an Android mobile. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions. This project uses LPC2148 MCU as its controller.

The Bluetooth module takes the commands and makes the robot move accordingly. This project uses 12V battery. This project is much useful for mines detection and surveillance applications. It also uses a wireless camera to record and take pictures. Wireless camera does not use a video cable. Instead, it wirelessly transmits the video signal to a wireless receiver that is connected to your recording or viewing device. Hence this project becomes easy for the user to operate the robot.

Keywords--- LPC2148 MCU, Bluetooth, Android mobile, Wireless camera.

I. INTRODUCTION

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. As everyone in this competitive world prefers to make the things easy and simple to handle, this project sets an example to some extent.

In recent years, the definition of a robot is generally used to mean an unmanned system or automation, as often seen in industrial applications, deep sea planetary probes. Historically speaking, a robot used to be shaped like humans, and referred to as machines and electric systems that were capable of performing similar actions as humans. It is these robots that play active roles in comic magazines, animation and science fiction. Because they are artificially created, they are called "artificial man". And since they look like humans in appearance, they are often called "androids" or "humanoids."

In this highly developing society; time and man power are critical constrains for completion of task in large scales. the automation is playing important role to save human efforts in most of the regular and frequently carried works e.g. most of the industrial jobs like welding, painting, assembly, container filling etc. one of the major and most commonly performed work is picking and placing of jobs from source to destination. For this purpose, 'pick and place robot 'maybe used. The pick and place robot is a mechatronics system that takes the object according to the commands given by user, picks that object from source location and places at desired location as per the instructions. This project uses LPC2148 MCU as its controller for performing different operations by the robot**.** This project we are using wireless camera. Wireless security cameras are closed circuit television (CCTV) cameras that transmit a video and audio signal to a wireless receiver through a radio band. Many wireless security cameras require at least one cable or wire for power; "wireless" refers to the transmission of video/audio. However, some wireless security cameras are battery-powered, making the cameras truly wireless from top to bottom.

This robot is controlled by an Android mobile. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions. This project uses LPC2148 MCU as its controller. The Bluetooth module takes the commands and makes the robot move accordingly. This project uses 12V battery. This project is much useful for mines detection and surveillance applications.

II. METHODLOGY

ANDROID MOBILE: Android is mobile operating system developed by google based on the Linux Kernal and designed primarily for touchscreen mobile devices such as smart phones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely corresponds to real-world actions, such as swiping, taping and pinching to manipulate on-screen objects,along with a virtual keyboard for text input. In addition to touch screen devices, google has futher developed android TV televisions, android auto for cars, and

android wear for wrist watches each with a specialized user interface. Variants of google are also used on game consoles, digital cameras, PC's and other electronics.

Here in this project we are using android mobile to operate the robot. An app is developed in the phone which is linked with the robot. The programming is done by keil software for developing an app. The robot is operated by giving commands through phone.

WIRELESS CAMERA: Wireless cameras are proving very popular among modern security consumers due to their low installation costs (there is no need to run expensive video extension cables) and flexible mounting options; wireless cameras can be mounted/installed in locations previously unavailable to standard wired cameras. In addition to the ease of use and convenience of access, wireless security camera allows users to leverage broadband wireless internet to provide seamless video streaming over internet. Here we are using SP-007AS model. The camera is with 1.2GHZ, with Audio and CMOS and receiver unit with manual frequency adjustment. This wholesale product is already popular with ChinaTronic customers because of consistent high quality. It has,

- Linear Transmission Distance: 50-100m
- Transmission Signal: Audio, Video
- Receiving Signal: Audio, Video

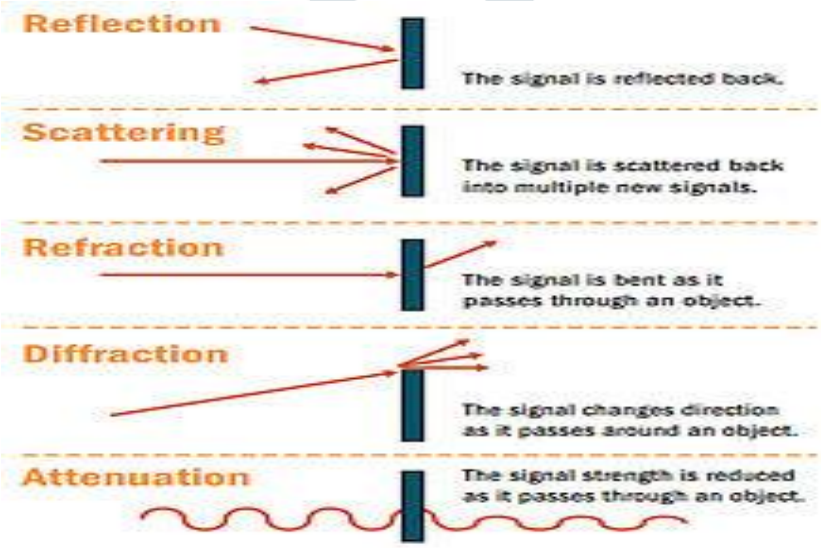
wireless camera does not use a video cable. Instead, it wirelessly transmits the video signal to a wireless receiver that is connected to your recording or viewing device. Although the typical digital wireless camera is priced slightly higher than a wired camera, wireless cameras can provide cost savings compared to standard wired setups. For example, wireless cameras do not require cabling to be run between the camera and the viewing / recording device, which reduces installation time and cost. Wireless cameras require two power sources: one connected to the camera, and the other to the receiver.

About Digital Wireless Technology: Digital wireless is the transmission of audio and video analog signals encoded as digital packets over high-bandwidth radio frequencies. The Digital Wireless signal transmission type used by the Lorex LW2275 Series is also known as FHSS—Frequency Hopping Spread Spectrum. This type of signal results in a private, interference-free signal. The 2.4GHz (2.400-2.480GHz) band is divided into sections or paths of 2MHz per section, and each second, the transmission signal hops hundreds of times in a specified sequence within this frequency range. The overall bandwidth required for frequency hopping is much wider than 2MHz; however, because transmission occurs only on a small section of this bandwidth at any given time, the signal being transmitted does not suffer from greatly reduced signal degradation and also avoids paths blocked by other devices that act as sources of competing signals. The strength of the signal being transmitted is set to be from 13.5-16dBm, which is much higher than the analog transmission signal allowed by authorities around the globe. When an image is captured by the camera, it is instantly converted from an analog to a digital signal and is packaged into small packets. With each successful transmission via the 2 MHz paths discussed above, the packets of information containing images are delivered to the receiver and decoded into analog information. The information can then be displayed on devices that are connected to the wireless receiver (RX). A device pairing process is required to synchronize the transmitter (TX, Camera) and the receiver (RX). This allows the transmitter and receiver to be on the same frequency and use the same algorithm for frequency hopping. This ensures that only the paired transmitter and receiver can maintain communication signal by hopping to the same frequency paths at the exact same time. As a result, the chance that other devices within the same frequency range are on the same frequency, at the same time and in the same order is vastly reduced. Note that the pairing process is already done at the factory for products that ship within the same packaging.

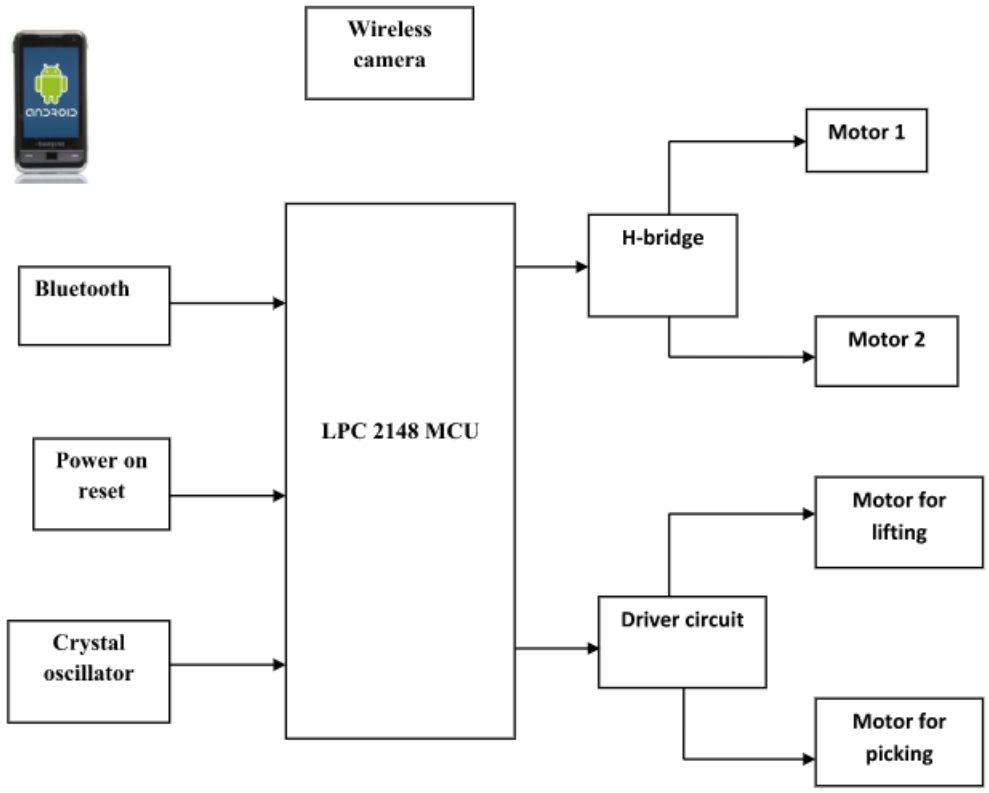
Uses and applications:

Wireless security cameras are becoming more and more popular in the consumer market, being a cost-effective way to have a comprehensive surveillance system installed in a home or business for an often less expensive price. Wireless cameras are also ideal for people renting homes or apartments. Since there is no need to run video extension cables through walls or ceilings (from the camera to the receiver or recording device) one does not need approval of a landlord to install a wireless security camera system. Additionally, the lack of wiring allows for less "clutter," avoiding damage to the look of a building.

A wireless security camera is also a great option for seasonal monitoring and surveillance. For example, one can observe a pool or patio in summer months and take down the camera in the winter.



BLOCK DIAGRAM



LPC2148 MCU: Increasingly, embedded system developers and system on-chip designers select specific microprocessors cores and family of tools, libraries and off-the shelf component to quickly to develop new microprocessor based products and applications. ARM is one of the major options available for embedded system developer. Over the last few years , the arm architecture has become the most pervasive 32-bit architecture in the world, with wide range of IC's available from various IC manufactures. ARM 7 is one of the widely used micro controller family in embedded system application.

LPC2148 MCU is the widely used IC from ARM 7 family. It is manufactured by Phillips and it is preloaded with with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developers. It has following features,

1) 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory.128 bit wide interface/accelerator enables high speed 60 MHz operation.

2) In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software.Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms

3) Single 10-bit D/A converter provides variable analog output.

4) Two 32-bit timers/external event counters (with four capture and four comparechannels each), PWM unit (six outputs) and watchdog. Low power real-time clock with independent power and dedicated 32 kHz clock input.

5) The main feature is that it consumes less power.

BLUETOOTH: Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices and building personal area networks In this project, we are using HC05 bluetooth model. The Bluetooth module HC-05 is a MASTER/SLAVE module.By default the factory setting is SLAVE.The Role of the module (Master or Slave) can be configured only by AT COMMANDS.The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections.Master module can initiate a connection to other devices. The connections are given as that Vcc and Gnd of the module goes to Vcc and Gnd of Arduino.The TXD pin goes to RXD pin of Arduino and RXD pin goes to TXD pin of Arduino i.e(digital pin 0 and 1).The user can use the on board Led.But here,Led is connected to digital pin 12 externally for betterment of the process. The main advantage of using this Bluetooth model is that it can connect to any android mobile and it can fastly transmit and receive the data. the bluetooth module acts as an interface between our mobile and Arduino board.Before getting into the execution process,follow the given procedure:

1) First of all,the user should install an application called BLUETOOTH SPP PRO from the playstore which is a free application.

2) After installation,pair the bluetooth module to your mobile as like connecting one device to other using bluetooth.The default pairing code is **1234**.

3) Upload the given program to the Arduino Uno board.After uploading the code,unplug the USB from the arduino.

4) Now use external power adapter to power the Uno board.

5) The Bluetooth SPP PRO has three types of communication mode.Here Byte stream mode is used to communicate.So select that mode and give the input as **1**,as soon as the input has given the led will turn on and for **0** led will turn off.

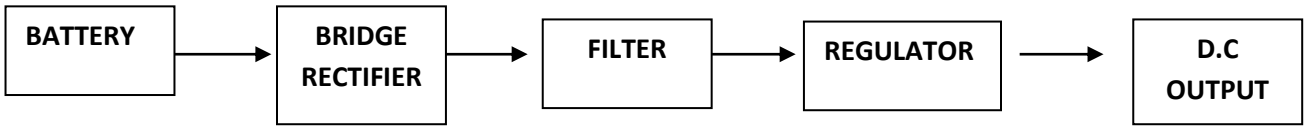
CRYSTAL OSCILLATOR: Crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electric signal with a precise frequency. This frequency is commonlu used to keep track of time, as in quarz wrist watches, to provide a stable clock signal for digital integrated circuit, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is quarz crystal, so oscillator circuits incorporating them became known as crystal oscillator. It works by being distorted by an electric field when voltage is applied to an electrode near or on the crystal. This property is known as piezoelectricity. When the field is removed, the quarz- which oscillates with a precise frequency –generates an electric field as it returns to its previous shape, and this can generate a voltage. The result is that a quartz crystal behaves like an RLC circuit.

POWER ON-RESET: In electronics and technology, a reset button is a button that can reset a device. The reset button clears the memory and reboots the machine forcibly. Reset buttons are found on circuit breakers to reset the circuit. This button can cause data corruption so this button often doesn't exits on many machines. Usually in computers and electronic devices, it is present as a small button, possibly recessed into the case or only accessible by a pin or similar thin object, to prevent it being pressed accidently.

H-BRIDGE: An h-bridge is an electronic circuit that enables a voltage to be applied across a load in opposite direction. These circuits are oftenly used in robotics and other applications to allow DC motors to run forward and backward. Most DC-to- AC converters , most AC/AC converters, the DC-to- DC push- pull converter, most motor controllers, and many other kinds of power electronics use H-bridge. In particular, a bipolar stepper motor is almost invariably driven by a motor controller containing two H-bridges. It is basically used to reverse the polarity/direction of the motor, but can also be used to brake the motor, where the motors come to sudden stop, as the motor terminals are shorted, as the motor is effectively disconnected from the circuit.

DRIVER CIRCUIT: In electronics, driver is an electrical circuit or other electronic component used to control another circuit or component, such as a high-power transistor, liquid crystal display and numerous others. They are usually used to regulate the current flowing through a circuit or to control other factors such as other components, some devices in the other circuit. The term is often used , for example, for a specialized integrated circuit that controls high-power switches in switched-mode-power converters. An amplifier can also be considered a driver for loudspeakers, or a voltage regulators that keeps an attached component operating within a broad range of input voltages. Typically a driver stage(s) of a circuit requires different characteristics to other circuit stages. For example in a transistor power amplifier circuit, typically a driver circuit requires current gain, often the ability to discharge the following transistors bases rapidly, and low output impedance to avoid or minimize distortion. This driver circuit operates two circuits one for picking and lifting.

BLOCK DIAGRAM



BATTERY: An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smartphones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device. When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver energy to the external circuit. It is the movement of those ions within the battery which allows current to flow out of the battery to perform work. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved additionally to include devices composed of a single cell. Batteries convert chemical energy directly to electric energy. A battery consists of some number of voltaic cells. Each cell consists of two half cells connected in series by a conductive electrolyte containing anions and cations.

Batteries are classified into primary and secondary forms:

- Primary batteries are designed to be used until exhausted of energy then discarded. Their chemical reactions are generally not reversible, so they cannot be recharged. When the supply of reactants in the battery is exhausted, the battery stops producing current and is useless.
- Secondary batteries can be recharged; that is, they can have their chemical reactions reversed by applying electric current to the cell. This regenerates the original chemical reactants, so they can be used, recharged, and used again multiple times.

Some types of primary batteries used, for example, for telegraph circuits, were restored to operation by replacing the electrodes. Secondary batteries are not indefinitely rechargeable due to dissipation of the active materials, loss of electrolyte and internal corrosion.

BRIDGE RECTIFIER: Bridge rectifier are the circuit which convert alternating current into direct current using the diodes arranged in the bridge circuit configuration. They usually comprise of four or more number of diodes which cause the output generated to be of the same polarity irrespective of the polarity at the input. bridge rectifier composed of four diodes D_1, D_2, D_3 and D_4 in which the input is supplied across two terminals A and B in the figure while the output is collected across the load resistor R_L connected between the terminals C and D. Now consider the case wherein the positive pulse appears at the AC input i.e. the terminal A is positive while the terminal B is negative. This causes the diodes D_1 and D_3 to get forward biased and at the same time, the diodes D_2 and D_4 will be reverse biased. As a result, the current flows along the short-circuited path created by the diodes D_1 and D_3 (considering the diodes to be ideal), as shown by Figure 2a. Thus the voltage developed across the load resistor R_L will be positive towards the end connected to terminal D and negative at the end connected to the terminal C.

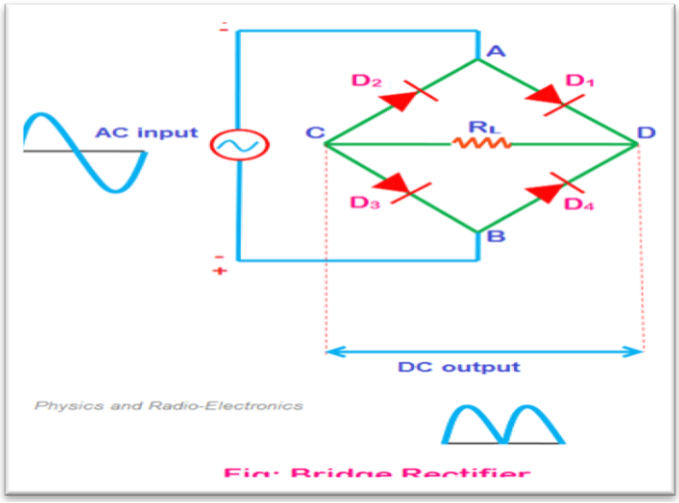


Fig: Bridge Rectifier

Next if the negative pulse appears at the AC input, then the terminals A and B are negative and positive respectively. This forward biases the diodes D_2 and D_4, while reverse biasing D_1 and D_3 which causes the current to flow in the direction shown by Figure 2b. At this instant, one has to note that the polarity of the voltage developed across R_L is identical to that produced when the incoming AC pulse was positive in nature. This means that for both positive and negative pulse, the output of the bridge rectifier will be identical in polarity. However it is to be noted that the bridge rectifier's DC will be pulsating in nature. In order to obtain pure form of DC, one has to use capacitor in conjunction with the bridge circuit. Further, the bridge rectifiers can be majorly of two types, viz., Single-Phase Rectifiers and Three-Phase Rectifiers. In addition, each of these can be either Uncontrolled or Half-Controlled or Full-Controlled. Bridge rectifiers for a particular application are selected by considering the load current requirements. These bridge rectifiers are quite advantageous as they can be constructed with or without a transformer and are suitable for high voltage applications. However here two diodes will be conducting for every half-cycle and thus the voltage drop across the diodes will be higher. Lastly one has to note that apart from converting AC to DC, bridge rectifiers are also used to detect the amplitude of modulated radio signals and to supply polarized voltage for welding applications.

FILTER: In signal processing a filter is a device or process that removes some unwanted components or features from a signal. Filtering is a class of signal processing, the defining feature of filter being the complete or partial suppression of some aspect of the signal. Most often, this means removing some frequency bands. However, filters do not exclusively act in the frequency domain; especially in the field of image processing many other targets for filtering exists. Correlations can be removed for certain frequency components and not for others without having to act in the frequency domain. Filters are widely used in electronics and telecommunication in radio, television, audio,computer graphics etc.

There are many different bases of classifying filters and these overlap in many different ways; there is no simple hierarchical classification. Filters may be:

- linear or non-linear.
- Time invariant or time variant also known as shift invariance. If the filter operates in a spatial domain then the characterization is space invariance.
- Causal or not-causal: A filter is non-causal if its present output depends on future input. Filters processing time-domain signals in real time must be causal, but not filters acting on spatial domain signals or deferred-time processing of time-domain signals.
- analog or digital
- discrete time (sampled) or continuos time
- passive or active type of continuous-time filter
- infinite impulse response (IIR) or finite impulse response (FIR) type of discrete-time or digital filter.

REGULATOR: A voltage regulator is an electronic circuit that provides a stable dc voltage independent of the load current, temperature and ac line voltage variations. A voltage regulator may use a simple feed-forward design or may include negative feedback. It may use an electro mechanical mechanism, or electronic component. Depending on the design, it may be used to regulate one or more AC or DC voltages.

Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power station system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line.

The circuit consists of following four parts.

- Reference voltage circuit
- Error amplifier
- Series pass transistor
- Feedback network

D.C OUTPUT: Direct current is the unidirectional flow of electric current. A battery is a good example of a DC power supply. Direct current may flow in a conductor such as a wire, but can also flow semiconductor,insulators, or even through a vaccum as in electron or ion beams. The

electric current flows in a constant direction, distinguishing it from alternating current (AC). A term formely use for this type of current was **galvanic current**.

The abbreviations *AC* and *DC* are often used to mean simply alternating and direct, as when they modify current or voltage. Direct current may be obtained from an alternating current supply by use of a rectifier, which contains electronic elements (usually) or electromechanical elements (historically) that allow current to flow only in one direction. Direct current may be converted into alternating current with an inverter or a motor-generator set. Direct current is used to charge batteries and as power supply for electronic systems. Very large quantities of direct-current power are used in production of aluminium and other eletro chemical processes. It is also used for some railways, especially in urban areas. High voltage direct current is used to transmit large amounts of power from remote generation sites or to interconnect alternating current power grids. Here we will obtain the output, so it is called D.C output.

KEIL SOFTWARE: Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

STEPS TO WRITE AN ASSEMBLY / C LANGUAGE PROGRAM IN KEIL AND HOW TO COMPILE IT:

1. Install the Keil Software in the PC in any of the drives.
2. After installation, an icon will be created with the name "Keil uVision3". Just drag this icon onto the desktop so that it becomes easy whenever you try to write programs in keil.
3. Double click on this icon to start the keil compiler.
4. A page opens with different options in it showing the project workspace at the leftmost corner side, output window in the bottom and an ash coloured space for the program to be written.
5. Now to start using the keil, click on the option "project".
6. A small window opens showing the options like new project, import project, open project etc. Click on "New project".
7. A small window with the title bar "Create new project" opens. The window asks the user to give the project name with which it should be created and the destination location. The project can be created in any of the drives available. You can create a new folder and then a new file or can create directly a new file.
8. After the file is saved in the given destination location, a window opens where a list of vendors will be displayed and you have to select the device for the target you have created.
9. The most widely used vendor is NXP. So click on NXP and now the family of microcontrollers manufactured by NXP opens. You can select any one of the microcontrollers according to the requirement.
10. When you click on any one of the microcontrollers, the features of that particular microcontroller will be displayed on the right side of the page. The most appropriate microcontroller with which most of the projects can be implemented is the LPC21XX. Click on this microcontroller and have a look at its features. Now click on "OK" to select this microcontroller.
11. A small window opens asking whether to copy the startup code into the file you have created just now. Just click on "No" to proceed further.
12. Now you can see the TARGET and SOURCE GROUP created in the project workspace.
13. Now click on "File" and in that "New". A new page opens and you can start writing program in it.
14. After the program is completed, save it with any name but with the .asm or .c extension. Save the program in the file you have created earlier.
15. You can notice that after you save the program, the predefined keywords will be highlighted in bold letters.
16. Now add this file to the target by giving a right click on the source group. A list of options open and in that select "Add files to the source group". Check for this file where you have saved and add it.
17. Right click on the target and select the first option "Options for target". A window opens with different options like device, target, output etc. First click on "target".
18. Since the set frequency of the microcontroller is 11.0592 MHz to interface with the PC, just enter this frequency value in the Xtal (MHz) text area and put a tick on the Use on-chip ROM. This is because the program what we write here in the keil will later be dumped into the microcontroller and will be stored in the inbuilt ROM in the microcontroller.
19. Now click the option "Output" and give any name to the hex file to be created in the "Name of executable" text area and put a tick to the "Create HEX file" option present in the same window. The hex file can be created in any of the drives. You can change the folder by clicking on "Select folder for Objects".
20. Now to check whether the program you have written is errorless or not, click on the icon exactly below the "Open file" icon which is nothing but Build Target icon. You can even use the shortcut key F7 to compile the program written.
21. To check for the output, there are several windows like serial window, memory window, project window etc. Depending on the program you have written, select the appropriate window to see the output by entering into debug mode.
22. The icon with the letter "d" indicates the debug mode.
23. Click on this icon and now click on the option "View" and select the appropriate window to check for the output.
24. After this is done, click the icon "debug" again to come out of the debug mode.
25. The hex file created as shown earlier will be dumped into the microcontroller with the help of another software called Proload.

CODING :

```
//<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< DIRECTIVES >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
#include<LPC214x.h>
#include<stdio.h>
#include<ctype.h>
#include<stdlib.h>
#define Fosc   12000000
#define Cclk   Fosc*5
#define Pclk   Cclk /4
#define ip1  4
#define ip2  5
#define ip3  6
#define ip4  7
#define h1  20
#define h2  21
#define h3  22
#define h4  23
unsigned char Key,i;
/*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< Code Begins Here >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>*/
//<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< Delay SubRoutine >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
void DelayMs(long ms) { long i,j;
            for (i = 0; i < ms; i++ ) for (j = 0; j < 6659; j++ ); }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void Delay() {
unsigned int i,j; for(i=0;i<50;i++) for(j=0;j<700;j++); }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void Wait() { Delay();Delay();Delay(); Delay();Delay();Delay(); Delay();Delay(); Delay(); }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void Init_UART1 (unsigned int baud_rate) {  unsigned int Divisor;  PINSEL0 = 0x00050000;  Divisor=Pclk/(16*baud_rate);  U1LCR = 0x83;
U1DLL = Divisor;    U1LCR = 0x03; }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void forward(void) {
  IOCLR0 |= (1<<ip1);  IOSET0 |= (1<<ip2);  IOCLR0 |= (1<<ip3);  IOSET0 |= (1<<ip4); }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void backward(void) {  IOCLR0 |= (1<<ip2);  IOSET0 |= (1<<ip1);  IOCLR0 |= (1<<ip4); IOSET0 |= (1<<ip3);}
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void right(void) {   IOCLR0 |= (1<<ip1);  IOSET0  = (1<<ip2);  IOCLR0 |= (1<<ip3);  IOCLR0 |= (1<<ip4); }

//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void left(void) {  IOCLR0 |= (1<<ip3);  IOSET0 |= (1<<ip4);  IOCLR0 |= (1<<ip1); IOCLR0 |= (1<<ip2); }
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void stop(void)     {  IOCLR0 |= (1<<ip1);  IOCLR0 |= (1<<ip2);  IOCLR0 |= (1<<ip3); IOCLR0 |= (1<<ip4);}
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
void main(void) { Init_UART1(9600); LCD_init();
IO0DIR |=          (1<<BUZZ); IOCLR0 |= 1 << BUZZ;  IO0DIR          |=          (1<<ip1);
IO0DIR |=          (1<<ip2);  IO0DIR           |=          (1<<ip3); IO0DIR           |=          (1<<ip4);
IO0DIR |=          (1<<h1);  IO0DIR            |=          (1<<h2); IO0DIR|=          (1<<h3);
IO0DIR |=          (1<<h4);
while(1) { while (!(U1LSR & 0x20)); Key = U1RBR;
if(Key=='A') {  forward(); } if(Key=='B') {  backward(); } if(Key=='C') { right(); } if(Key=='D') {  left(); } if(Key=='E') {  stop();
  IOCLR0 |= (1<<h1); IOCLR0 |= (1<<h2);  IOCLR0 |= (1<<h3);  IOCLR0 |= (1<<h4);  }
////////////////////////////////////////////////////////////////////////////////////////////////////////
 if(Key=='a') {  stop();
  IOCLR0 |= (1<<h1);  IOSET0 |= (1<<h2);  DelayMs(1000); IOCLR0 |= (1<<h1)   IOCLR0 |= (1<<h2); }
 if(Key=='b') {  stop();
   IOSET0 |= (1<<h1);  IOCLR0 |= (1<<h2);  DelayMs(1000); IOCLR0 |= (1<<h1);  IOCLR0 |= (1<<h2);  }
 if(Key=='c') {  stop();
  IOCLR0 |= (1<<h3);  IOSET0 |= (1<<h4);  DelayMs(1000); IOCLR0 |= (1<<h3);  IOCLR0 |= (1<<h4); }
 if(Key=='d') {  stop();
   IOSET0 |= (1<<h3); IOCLR0 |= (1<<h4);  DelayMs(1000);  IOCLR0 |= (1<<h3);  IOCLR0 |= (1<<h4); }
}
}
```

III RESULTS AND DISCUSSIONS:

This robot can be used in manufacturing industries to pick and place the objects from one place to another place. This robot is operated by an android mobile which gives the commands to the robot. It also uses an wireless camera, through which the user can record or take the pictures. We are using LPC2148 MCU which has less consumption of power. HC05 bluetooth is used to transfer the data from android mobile to robot, through which the robot is operated. So this robot plays an major role in man's life in various ways and makes things faster and easier.

AVANTAGES:

- Speed - Pick and place robots allow for faster cycle times.
- Accuracy - Robotic systems are more accurate and consistent than their human counterparts.
- Production - Work cells create more because they perform applications with more accuracy, speed and tirelessness. The consistent output of a robotic system along with quality and repeatability are unmatched
- Reliability - Robots can work 24 hours a day, seven days a week without stopping or tiring.
- Flexibility - Pick and place robots can be reprogrammable and tooling can be interchanged to provide for multiple applications.
- Savings - Managers are realizing the long term savings with a pick and place robotic work cell rather than the operation they are currently doing. An increase in output with a material handling robotic system has saved factories money.
- Affordability - With the advancements in technology, and affordable robotics becoming available at less cost, more pick and place robotic cells are being installed for automation applications.

APPLICATIONS:

The machine will be of great use to perform repetitive tasks of picking and placing of small parts in an industrial production line.

1) Its use can be extended and exploited by few modifications to do difficult and hazardous tasks for nuclear applications.
2) As a basic tool for automation.
3) It can be used to do small assembly work effectively due to its great added accuracy for placement of parts.

The machine provides motion to the end effectors in the theta and Z directions. The end effectors can be a pair of pneumatic grippers, a set of multiple grippers, magnetic pick-up, vacuum pick-up etc. The device has its own in-built logic and all the movements of the device are controlled by the combination of control valve and reversible valve which form the vital part of the machine. A single pulse of air given to the control valve activates the reversible valve and admits air alternately to the two pneumatic cylinders during one cycle. This causes to and fro linear motion of the common rack which is converted into the rotary motion of the pinion and ultimately imparts angular sweep (theta) and vertical motion (Z) at the end of each stroke to the head carrying the pick up arm with the end effectors. Angular sweep (theta) as well as the vertical motion (Z) is adjustable by means of mechanical stoppers. The operating speed of the pick up arm can be varied to suit the requirement by operating the flow control valves provided on the two cylinder heads. During one operating cycle the pick up arm carrying the end effectors starts from its home position, goes to the other end, picks up the part and returns to its original home position. The picked up part is delivered to the home position when the next cycle is triggered.

HISTORY AND FUTURE: Given the definition of embedded systems earlier is this chapter; the first such systems could not possibly have appeared before 1971. That was the year Intel introduced the world's first microprocessor. This chip, the 4004, was designed for use in a line of business calculators produced by the Japanese Company Busicom. In 1969, Busicom asked Intel to design a set of custom integrated circuits-one for each of their new calculator models. The 4004 was Intel's response rather than design custom hardware for each calculator, Intel proposed a general-purpose circuit that could be used throughout the entire line of calculators.

The microcontroller was an overnight success, and its use increased steadily over the next decade. Early embedded applications included unmanned space probes, computerized traffic lights, and aircraft flight control systems. In the 1980s, embedded systems quietly rode the waves of the microcomputer age and brought microprocessors into every part of our kitchens (bread machines, food processors, and microwave ovens), living rooms (televisions, stereos, and remote controls), and workplaces (fax machines, pagers, laser printers, cash registers, and credit card readers).

It seems inevitable hat the number of embedded systems will continue to increase rapidly. Already there are promising new embedded devices that have enormous market potential; light switches and thermostats that can be central computer, intelligent air-bag systems that don't inflate when children or small adults are present, pal-sized electronic organizers and personal digital assistants (PDAs), digital cameras, and dashboard navigation systems. Clearly, individuals who possess the skills and desire to design the next generation of embedded systems will be in demand for quite some time**.**

IV. CONCLUSION:

This project presents a moving robot with pick and place arm using Wireless communication with video transmission and it is designed and implemented with LPC2148 MCU in embedded system domain. This project is used for lifting objects and it can place the objects wherever required. This robot moves its full body with which it becomes easier for it to do the movement easily. Experimental work has been carried out carefully.

The result shows that higher efficiency is indeed achieved using the embedded system. The proposed method is verified to be highly beneficial for the security purpose and industrial purpose.Embedded Systems plays a vital role in our day today life. They are used for household appliances like microwave oven to the satellite applications. They provide good man to machine interface.

Automation is the further step in the world of Embedded Systems, which includes the elimination of the human being in the applications. They are cost effective, accurate and can work in any conditions and round the clock.

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