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Design and Analysis of Automatic Forklift

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I. INTRODUCTION

The Forklift is a motorized industrial cart available in different shapes, sizes and forms. The forklift may be referred to as a pallet jack, ride-on forklift, or forklift. However, the ultimate purpose of the forklift is the same as the, to allow one person to lift and move large loads safely and effortlessly.

A. Block Diagram and Specifications

The architecture of the system is shown in Figure 1. shows 1.1. The robot communicates its data via an arduino board connected to a host computer. Hardware Specifications

1) Arduino UNO
2) Motor Driver
3) DC Motor and Bluetooth Module



II. METHODOLOGY

A. Arduino UNO

This is an Atmega328-based microcontroller board developed by Arduino.cc . The electronics have become compact, flexible and inexpensive, capable of performing many more functions than its predecessor , the . Take up more space, less functionality and become expensive. Microcontrollers are widely used in embedded systems and enable the device to perform according to our needs and requirements. We have discussed controllers such as 8051, Atmega16, Atmega328 and PIC16F877. The Arduino Uno is a valuable addition to electronics, consisting of a USB interface, 14 digital I/O pins, 6 analog pins, and an Atmega328 microcontroller. It also supports serial communication using the Tx and Rx pins. You should also check out the UNO for beginners.Some people confuse the microcontroller with the Arduino. While the former is just a 40-pin chip on the system with an onboard microprocessor, the is a board with the microcontroller in the , a base for the board, a bootloader, and simple dongles. .feet access I/O, making downloading or programming very easy.

1) Arduino Uno Introduction

- Arduino Uno is a microcontroller board developed by Arduino.cc, it is an open source electronic platform, mainly based on the AVR Atmega328 microcontroller.
- The current version of the Arduino Uno has a USB interface, 6 analog input pins, 14 digital I/O ports for connecting external electronics Of the 14 I/O ports, 6 pins are available for PWM output.
- It allows the designer to control and perceive external electronic devices in the real world.

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2) Characteristics of the Arduino Uno board

- Arduino Uno has a USB interface, ie a USB port is added on the board to develop the serial communication with the computer.
- Atmega328 microcontroller is placed on board, it has many functions like timer, counter, interrupt, PWM, processor, I/O pins and based on 16 clock MHz, which helps generate more frequency and instruction count per cycles.

3) Pin Description

There are several digital and analog I/O pins on the board that operate at 5V. These pins have standard operating ratings ranging from 20mA to 40mA. Internal pull-up resistors are used in the board to limit the current beyond the given operating conditions. However, increasing the current too much will render these resistors ineffective and damage the . LED device.The Arduino Uno has a built-in LED connected to the via pin 13. If you supply a high value to the , the pin will turn it on and a low value will turn it off. flippers. This is the input voltage supplied to the Arduino bs different from the 5V supplied by the USB port. If the power connector provides voltage, you can get through this pin. 5V. The board has the ability to provide voltage regulation.

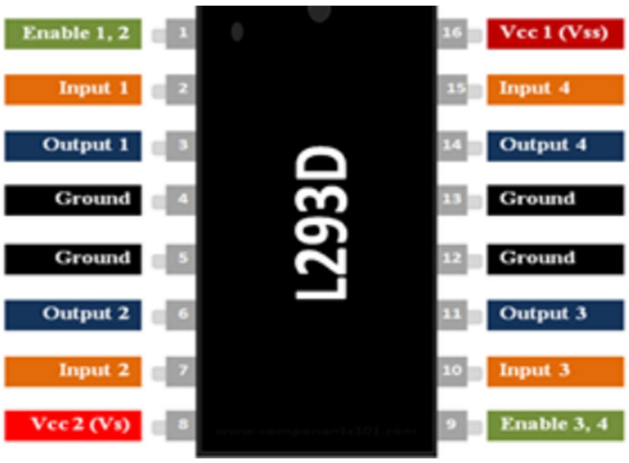
B. Communicate and Program

The Arduino Uno has the ability to interface with other Arduino boards, microcontrollers and computers. An Atmega328 placed on a board provides serial communication using pins such as Rx and Tx. The Arduino Uno is programmed using Arduino software, a cross-platform application written in Java called the IDE.

1) Applications of the Arduino Uno

A wide range of applications. More and more people are using the Arduino board to develop sensors and instruments for scientific research. Below are some of the committee's top 4,444 nominations.

• Embedded systems • Security and defense systems • Digital electronics and robotics • Parking meters • Scales • Traffic light countdowns



2) Features

• Can be used to run two DC motors with the same IC. • Speed and direction control possible • Motor voltage Vcc2 (Vs): 4.5V to 36V • Maximum motor peak current: 1.2A • Maximum continuous motor current: 600mA • Supply voltage (vsVs) at Vcc1: 4.5 Against. at 7V • Transition time: 300ns at 5V and 24V • Provides automatic thermal shutdown • Available in 16-pin DIP, TSSOP, SOIC packages

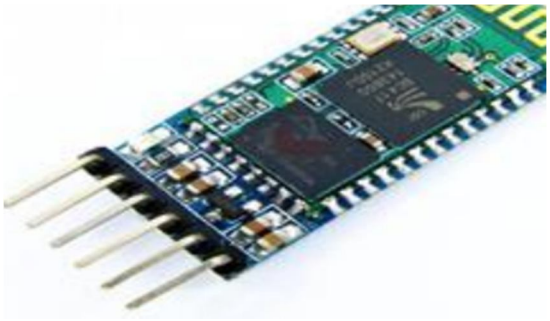
C. DC Motor

DC Motor The DC motor converts electrical energy in the form of direct current into mechanical energy in the form of rotational motion of the motor shaft. The speed of a DC motor can be controlled by applying a variable DC voltage; while the direction of rotation of the motor can be modified by reversing the direction of the current flowing through it. For variable voltage applications, we can use the PWM technique. To reverse current we can use H-bridge circuit or motor driver IC using H-bridge technology.



D. Bluetooth Module

Figure HC 05 Module Specifications HC-05 • Serial Bluetooth module for Arduino and other microcontrollers • Operating voltage: 4V to 6V (typical +5V) • Operating current • < 40 mA • Operating current: • Uses serial communication (USART) and TTL compatible • Complies with IEEE 802.15.1 standardized protocol • Uses Frequency Hopping Spread Spectrum (FHSS) • Can be in master, slave or master/slave 4/ mode is valid. Easily connect to laptop or mobile phone Bluetooth • Baud rate support: 9600, 19200, 38400, 57600, 115200, 230400, 46080 0.



1) How to use HC-05 Bluetooth module

HC-05 has two working modes, one is Data mode, which can send and receive data from other Bluetooth devices, and the other is AT Commandmode, the Can the device's default setting of be changed? As mentioned in the description of the pin, we can operate the device in either of two modes of the using key pins. The HC-05 module interfaces very easily with the microcontroller because it uses the Serial Port Protocol (SPP). Just use +5V to power the module, and connect the Rx pin of the module to the Tx of the MCU, and connect the Tx pin of the module to the Rx of the MCU, as shown in the figure below During power on, the key pin The pin can be grounded to enter in command mode, if left open it will default to in data mode. After starting the module, you should be able to discover the Bluetooth device "HC-05", then connect to it using the default password 1234 and start communicating with it.Default settings such as name and password can be changed in

III. HARDWARE COMPONENT

DC GEAR MOTOR Gear DC motors can be defined as the extension of DC motor, and the mystery of its Insight details has been unveiled. The DC gear motor has a set of gears attached to the motor. Motor speed is measured in shaft revolutions per minute, which is called RPM. The gear set helps increase torque by and reduce speed.By using the correct combination of gears in the geared motor, its speed can be reduced to any desired number. This concept of a gear reducing a vehicle's speed but increasing its torque is known as gear reduction. This overview will examine the in all details and major details that make up the gearbox and thus verify the operation of the DC gear motor.

IV. CONCLUSIONS

Mature electronic prototyping methods and systems need to be established, this will enable faster verification of ideas and products will enter the markets on time. In this article, I summarize

V. FUTURE SCOPE

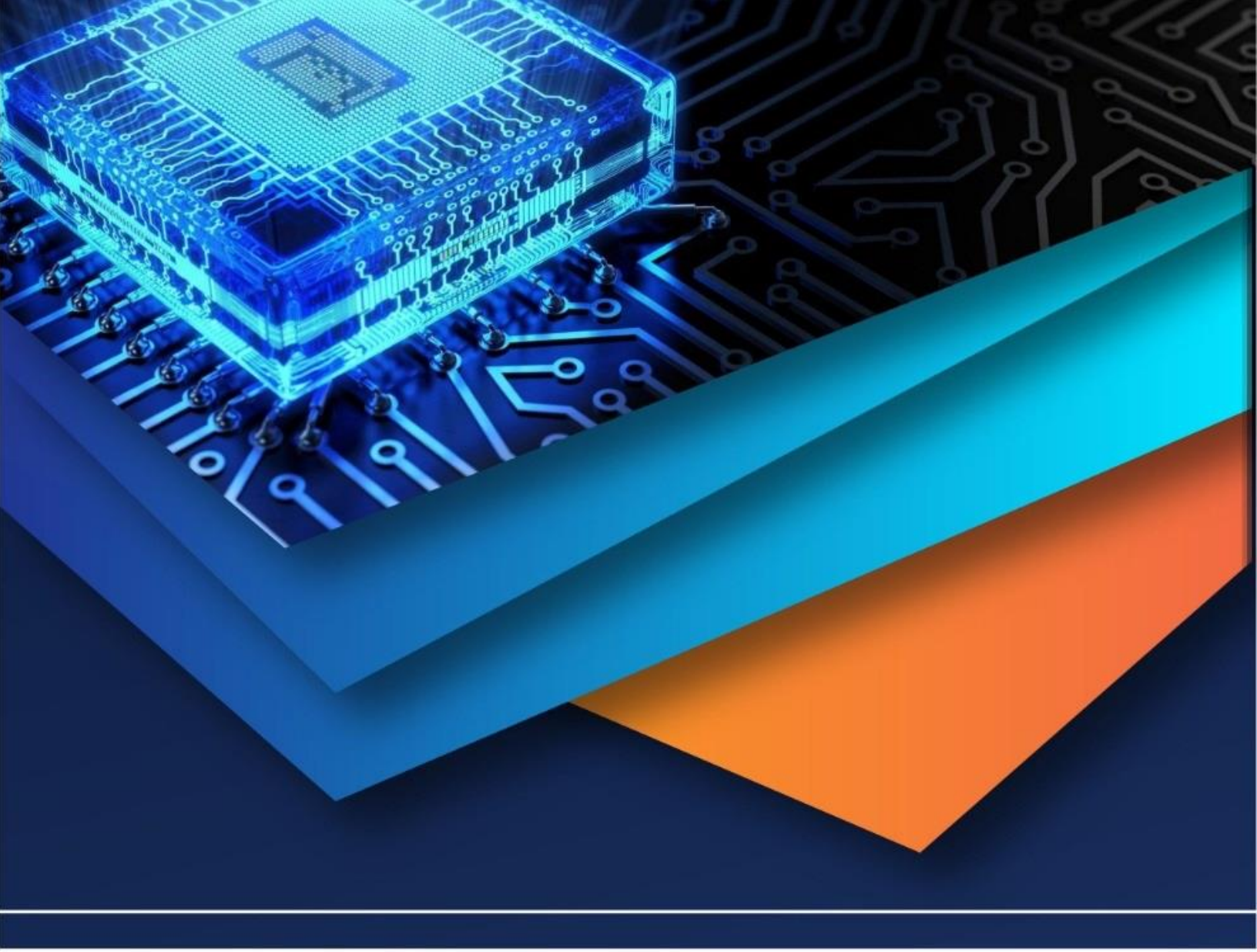
The digital revolution has now reached a stage Without this technology, we will not be able to lead a normal modern daily life.

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