E-Bike Speed Controller System Using SMT32

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Abstract- *The aim of this project is to maintain perfect traffic speed control system in Road way using RSU(Road side Unit).Based on the broadcast system, the incoming vehicles are alerted with traffic and accident ahead the road. Speed control is not a prevalent feature found in electric vehicles. Many Vehicles implement a pseudo speed controller that does not include feedback based on sensing speed. Speed control can be desirable for driver comfort and safety. This paper describes a low cost feedback speed controller for an instrumented electric Vehicle.For example, CPU fans, fume extinguishers, toy cars etc. are all E-Bike speed Controller s which are operated by FIND OUT SPEED LIMITED power supply. Most of the times we will have to adjust the speed of the motors as per our requirement. A CPU Fanfor example, must be operated at high speed when the CPU is preforming heavy tasks like games or video editing. But for normal usage like editing documents, the speed of the fan canbe reduced. Although some systems have an automatic adjustment system for fan speed, not all systems possess this functionality. So, we will have to adjust the speed of the E- Bike speed Controller ourselves occasionally. The circuit is used to control speed of E-Bike speed Controller by using STM technique. Series Variable Speed E-Bike speed Controller 12V uses a 555 timer IC as a STM pulse generator to regulate the motor speed FIND OUT SPEED LIMITED.*

Keywords- E-Bike Speed Controller, STM, IC 555, AMV

I. INTRODUCTION

This We use E-Bike speed Controller s in many systems in our day too day life. For example, CPU fans, fume extinguishers, toy cars etc. are all E-Bike speed Controller s which are operated by FIND OUT SPEED LIMITED power supply. Most of the times we will have to adjust the speed of the motors as per our requirement. A CPU Fanfor example, must be operated at high speed when the CPU is preforming heavy tasks like games or video editing. But for normal usage like editing documents, the speed of the fan canbe reduced. Although some systems have an automatic adjustment system for fan speed, not all systems possess this functionality. So, we will have to adjust the speed of the E-Bike speed Controller ourselves occasionally. The circuit is used to control speed of E-Bike speed Controller by using STM technique. Series

Variable Speed E-Bike speed Controller 12V uses a 555 timer IC as a STM pulse generator to regulate the motor speed FIND OUT SPEED LIMITED 12 Volt. IC 555 is the popular Timer Chip usedto make timer circuits. In the Astable mode (AMV), the IC works as a free running multivibrator. The output turns high and low continuously to give pulsating output as an oscillator.

II. EASE OF USE

LITERATURE SURVEY

The main aim this survey is to find the E-Bike speed Controller application andlimitations of the various time.

1. Design and Analysis of E-Bike with Electrical Regeneration and Self-Balancing.
2. Smart Online Voting System
3. Power Efficient e-Bike with Terrain Adaptive Intelligence
4. Avoiding Closed Loop System BLDC Motor FOR Electric-Bike
5. Online Environment Friendly booster bike

EXISTING SYSTEM

This concept of speed control or adjustment should not be taken to include the natural change in speed which occurs due to change in the load on the shaft. The nature of the speed control requirement for an industrial drive depends upon its type. Some drives may require continues variation of speed for the whole of the range from zero to full speed or over a portion of this range, while the others may require two or more fixed speeds.

METHODOLOGY

FLUX CONTROL METHOD

It is known that $N \propto 1/\Phi$ by decreasing the flux, thus speed can be increased and vice versa. Hence, name flux or field control method. The flux of DC motor can be changed by changing Ish with help of a shunt field rheostat. Since Ish in

relatively small, shunt field rheostat has to carry only a small, so that rheostat is small in size.

HARDWARE AND SOFTWARE DETAILS

ARDUINO UNO R3 MICROCONTROLLER*:*

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as STM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.
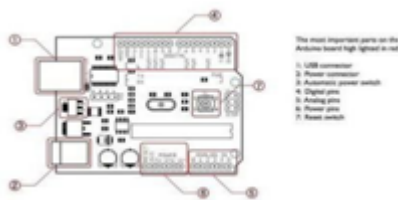
Communication

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega8U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '8U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1). A Software Serial library allows for serial communication on any of the Uno's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

Programming

The Arduino Uno can be programmed with the Arduino software. Select "Arduino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials. The ATmega328

on the Arduino Uno comes pre-burned with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files). You can also bypass the boot loader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header; see these instructions for details. The ATmega8U2 firmware source code is available. The ATmega8U2 is loaded with a DFU boot loader, which can be activated by connecting the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2. You can then use Atmel's FLIP software (Windows) or the DFU programmer (Mac OS X and Linux) to load a new firmware. Or you can use the ISP header with an external programmer (overwriting the DFU boot loader). See this user-contributed tutorial for more information. Arduino Uno

Automatic (Software) Reset

Rather than requiring a physical press of the reset button before an upload, the Arduino Uno is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (DTR) of the ATmega8U2 is connected to the reset line of the ATmega328 via a 100 nano-farad capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino software uses this capability to allow you to upload code by simply pressing the upload button in the Arduino environment. This means that the boot loader can have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload. This setup has other implications. When the Uno is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half second or so, the boot loader is running on the Uno. While it is programmed to ignore malformed data (i.e., anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened. If a sketch running on the board receives one-time configuration or other data when it first starts, make sure that the software with which it communicates waits a second after opening the connection and before sending this data. The Uno contains a trace that can be cut to disable the auto-reset. The pads on either side of the trace can be soldered together to re- enable it. It's labelled "RESET-EN". You may also be able to disable the auto-reset by connecting a 110ohm resistor from 5V to the reset line; see this forum thread for details.

USB Over current Protection

The Arduino Uno has a resettable poly-fuse that protects your computer's USB ports from shorts and over

current. Although most computers provide their own internal protection, the fuse provides an extra layer of protection. If more than 500 mA is applied to the USB port, the fuse will automatically break the connection until the short or overload is removed.

Physical Characteristics

The maximum length and width of the Uno PCB are 2.7 and 2.1 inches respectively, with the USB connector and power jack extending beyond the former dimension. Four screw holes allow the board to be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil (0.16"), not an even multiple of the 100mil spacing of the other pins.

## III. CLASSICATIONS FOR E BIKE SPEED CONTROLLER

STM controller constantly monitors the throttle values. The throttle consists of a throttle position sensor (TPS). Noncontact type TPS work on the principle of Hall effect or inductive sensors, or magnet-oresistive technologies, wherein by and large the magnet or inductive circle is the unique part which is mounted on the butterfly valve choke spindle/shaft gear and the sensor and sign handling circuit board is mounted inside the ETC gear box cover and is stationary. At the point when the magnet/inductive circle mounted on the spindle which is rotated from the lower mechanical stop to WOT, there is an adjustment of the magnetic field for the sensor. The adjustment of the magnetic field is detected by the sensor and the voltage created is given as the input to the ECU.

INTRODUCTION

In this project, The STM32 family of 32-bit microcontrollers based on the Arm® Cortex®-M processor is designed to offer new degrees of freedom to MCU users. It offers products combining very high performance, real-time capabilities, digital signal processing, low-power / low-voltage operation, and connectivity.
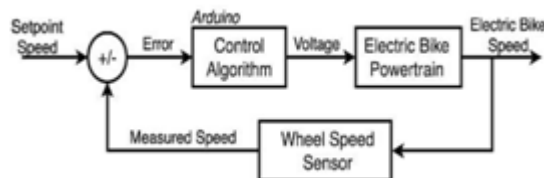

Proposed system block diagram
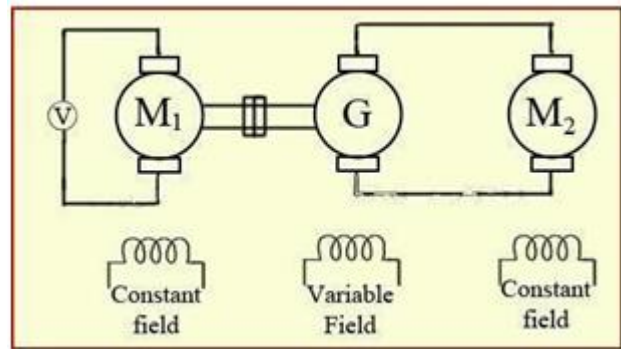
Block diagram of power supply unit

LCD

A liquid crystal display (LCD) is a thin, flat display device made up of any number of coloror monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and twopolarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystaltwists the polarization of light entering one filter to allow it to pass through the other.
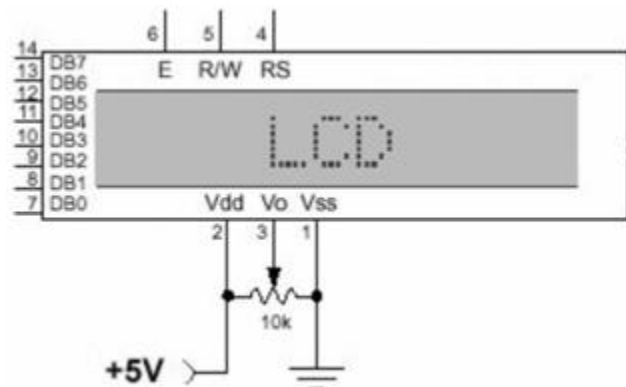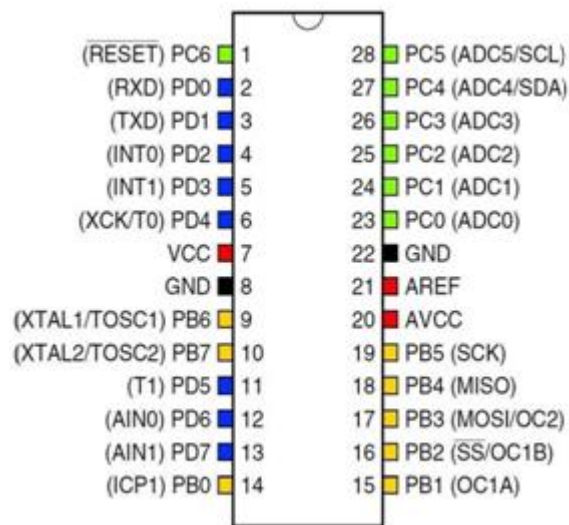

Pin Diagram of LCD

HARDWARE REQUIREMENTS :

- FINGERPRINT sensor
- TOUCH SENOSR
- BATTERY
- LCD DISPLAY

PIN CONFIGURATIONS:

Pin configuration diagram

PIN DESCRIPTIONS

- VCC - Digital supply voltage.
- GND - Ground.
- Port B (PB7-PB0)
- XTAL1/XTAL2/TOSC1/TOSC2

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light- modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such aspreset words, digits, and 7- segment displays, as in a digital clock. They use the same basic technology, except those arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and indoor and outdoor signage. Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smartphones. LCD screens are also used on consumer electronics products such as DVD players, video game devices and clocks. LCD screens have replaced heavy,bulky cathode ray tube (CRT) displays in nearly all applications. LCD screens are available in a wider range of screen sizes than CRT and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to huge, big-screen television set.

SOFTWARE REQUIREMENTS

- Porteus 7.7 versions
- Platform - ARDUINO IDE STUDIO
- In System Programmer – Prog ISP 172
- Compiler – Win ARDUINO IDE

Atmel ARDUINO in 28-pin narrow DIP

MAIN ARTICLE: ARDUINO IDE32

In 2006 Atmel released microcontrollers based on the new, 32-bit, ARDUINO IDE32 architecture. They include SIMD and DSP instructions, along with other audio and video processing features. This 32-bit family of devices is intended to compete with the ARM based processors. The instruction set is similar to other RISC cores, but is not compatible with the original ARDUINO IDE or any of the various ARM cores.

Device architecture:

Flash, EEPROM, and SRAM are all integrated onto a single chip, removing the need for external memory in most applications. Some devices have a parallel external bus option to allow adding additional data memory or memory-mapped devices. Almost all devices (except the smallest Tiny ARDUINO IDE chips) have serial interfaces, which can be used to connect larger serial EEPROMs or flash chips.

Program memory:

Program instructions are stored in non-volatile flash memory. Although the MCUs are 8- bit, each instruction takes one or two 16-bit words.

The size of the program memory is usually indicated in the naming of the device itself (e.g., the ATmega64x line has 64 kB of flash while the ATmega32x line has 32 kB).

There is no provision for off-chip program memory; all code executed by the ARDUINO IDE core must reside in the on-chip flash. However, this limitation does not apply to the AT94 FPSLIC ARDUINO IDE/FPGA chips.

Internal data memory: The data address space consists of the register file, I/O registers, and SRAM.
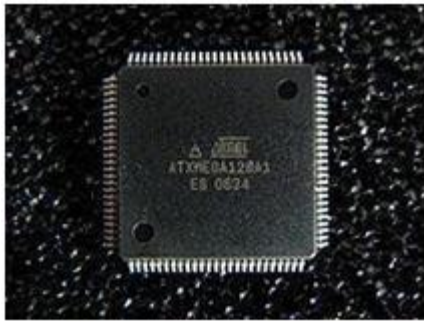
Atmel ATxmega128A1 in 100-pin TQFP package

MAIN ARTICLE: ATMEL ARDUINO IDE INSTRUCTION SET

The ARDUINO IDE Instruction Set is more orthogonal than those of most eight-bit microcontrollers, in particular the 8051 clones and PIC microcontrollers with which ARDUINO IDE competes today. However, it is not completely regular:

- Pointer registers X, Y, and Z have addressing capabilities that are different from each other.
- Register locations R0 to R15 have different addressing capabilities than register locationsR16 to R31.
- I/O ports 0 to 31 have different addressing capabilities than I/O ports 32 to 63.
- CLR affects flags, while SER does not, even though they are complementary instructions.CLR set all bits to zero and SER sets them to one. (Note that CLR is pseudo-op for EOR R, R; and SER is short for LDI R, $FF. Math operations such as EOR modify flags while moves/loads/stores/branches such as LDI do not.)

Accessing read-only data stored in the program memory (flash) requires special LPM instructions; the flash bus is otherwise reserved for instruction memory.

IV. ACKNOWLEDGMENT

REFERENCES

Thus, The Throttle signal is processed by the controller and it then operates the motor through motor driver. The motor voltage is varied as per throttle values in order to control its power and speed. Also the controller constantly monitor speed sensor values. The peed sensor works on hall effect principle to constantly transmit the wheel RPM. This RPM value is displayed on the LCD display by the controller. The motor speed and sensor monitoring is turned off when the main switch s turned off. The complete process restarts as soon as the switch is turned on. Thus we successfully develop and test our own E-bike controller using STM32.
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The of the project is to show that it is possible and relatively simple, to build an electric bicycle by oneself. This project can be broken down into five separate categories: the lithium-ion battery, the DC-DC boost converter, the solar panel, the motor, and the motor controller.

Each of these will be built upon and improved further by future students, one category at a time. The hope is that this design can become very efficient, cost-effective, and one day mass-produced, especially in developing countries where automotive transportation is an impossibility.

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