Design of Automatic Vehicle Tracking Based On STM32

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Abstract. In the electronic design competition and practical applications, there are often a variety of smart cars. Its performance and requirements are constantly improving. Automatic tracking is one of the basic problems to be solved. The black and white line tracking is a commonly used way. In the black and white line tracking, photoelectric reflection sensor, according to the reflected light intensity is black or white judgment. But this way is affected by natural light. To effectively attenuate this interference, a photosensor is introduced to determine the current light intensity. And set the appropriate threshold, to realize intelligent control of black and white line tracking. The car to achieve automatic tracking.

Introduction

With the progress of society, the automobile industry has developed rapidly. The car has become an essential means of travel for every family. With the improvement of people's living standard, the performance requirements of automobiles are higher and higher. Intelligent is an important direction of the future automotive industry.

Cruise control, automatic parking and other technologies have been widely used. Research on automatic driving technology is also ongoing. Automatic tracking is a problem that must be solved. Can use various sensors to achieve, such as infrared sensor, according to the reflected light intensity can be realized on the black and white line tracking.

Hardware Design

Tracking Circuit Design

The tracking circuit shown in figure 1. In Fig. 1, a photoelectric reflective sensor is used to reflect the light intensity when the light emitting diode is irradiated to the white line; when the black line is irradiated, the reflected light is reflected. When a light is reflected, the photoelectric transistor is turned on and the outputs of T1 and T2 are low. When no reflected light is returned, the photoelectric transistor is not switched on, and the T1 and T2 outputs high level. According to the above principle, you can judge black line or white line.
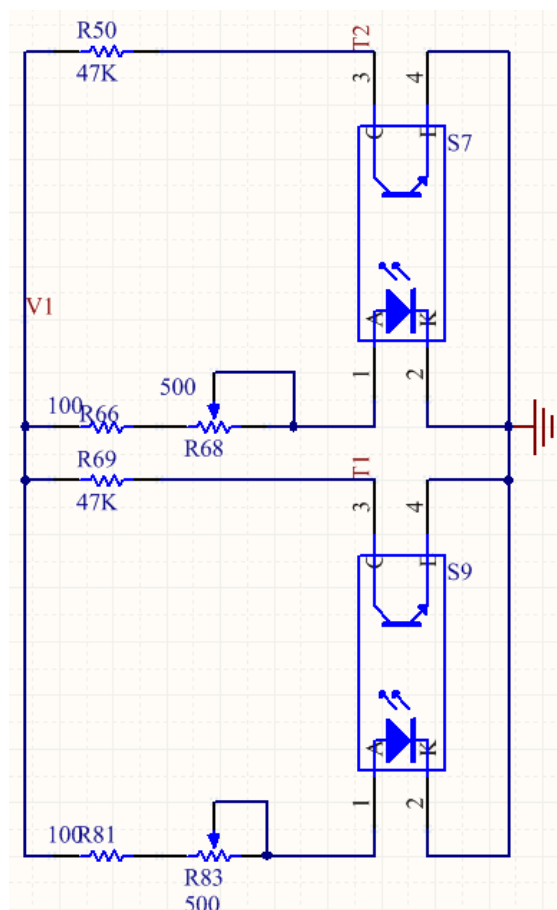
Figure 1 photoelectric sensor circuit diagram

Shown in Figure 2 is a photosensitive detection circuit, in figure R52 and R54 is a photosensitive resistor, the maximum resistance is 10K ohms, when the light is shining, the resistance value of the resistor changes, the light intensity is stronger, the resistance value is smaller. It is connected in series with a resistor of 10K ohm, and the voltage change of the center tap is detected to show the change of illumination. The threshold of black and white line detection can be set according to illuminance, and the sensitivity of black and white line detection can be improved.
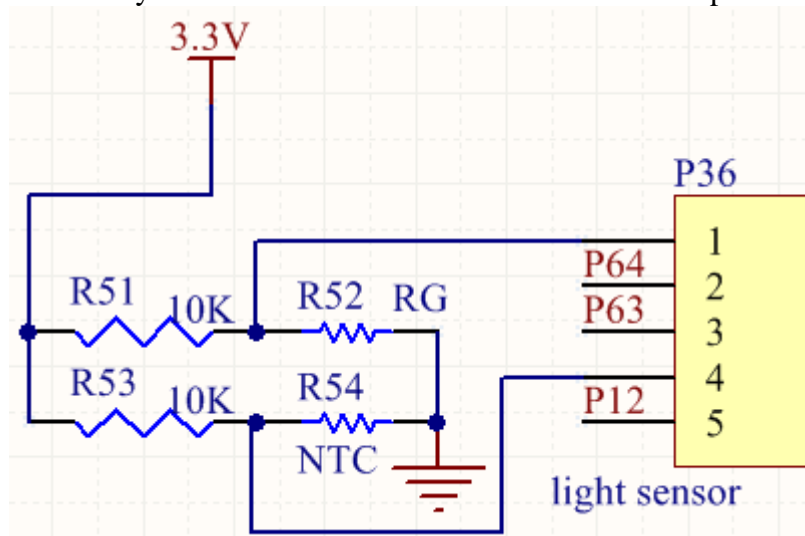

Figure 2 photosensitive detection circuit diagram

Software Program

In this design, under KEIL 5, programming with C language. Complete the motor control, part of the code is given below:

```
void motor_init(void)
{     GPIO_InitTypeDef    GPIO_InitStructure;
  RCC_APB2PeriphClockCmd(RCC_APB2Periph_GPIOA|RCC_APB2Periph_GPIOB,
ENABLE);
        GPIO_InitStructure.GPIO_Pin = GPIO_Pin_11|GPIO_Pin_12;
        GPIO_InitStructure.GPIO_Mode = GPIO_Mode_Out_PP;
        GPIO_InitStructure.GPIO_Speed = GPIO_Speed_50MHz;
        GPIO_Init(GPIOA, &GPIO_InitStructure);
        GPIO_ResetBits(GPIOA,GPIO_Pin_11);
        GPIO_ResetBits(GPIOA,GPIO_Pin_12);
        GPIO_InitStructure.GPIO_Pin = GPIO_Pin_11|GPIO_Pin_12;
        GPIO_InitStructure.GPIO_Mode = GPIO_Mode_Out_PP;
        GPIO_InitStructure.GPIO_Speed = GPIO_Speed_50MHz;
        GPIO_Init(GPIOB, &GPIO_InitStructure);
        GPIO_ResetBits(GPIOB,GPIO_Pin_11);
        GPIO_ResetBits(GPIOB,GPIO_Pin_12);  }
void motor_go(void)
{ AIN1=1;
  AIN2=0;
  BIN1=1;
  BIN2=0;       }
void motor_stop(void)
{ AIN1=0;
  AIN2=0;
  BIN1=0;
  BIN2=0;       }
```

The above code has realized the initialization and the forward or stop programming control of the DC motor.

Summary

This paper expounds the realization of the black and white line tracking using photoelectric sensor, the hardware circuit design is given, its working principle is described. In KEIL MDK using C language program, the realization of motor initialization, can control the car according to the black and white line forward and stop, to realize the automatic tracking function. It has certain practical value.

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