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foydalanish imkoniyatlari kengaydi, mijozlar bilan ishlash tizimi o'zgarmoqda, zamonaviy bank xizmatlari turlari ko'paytirildi va raqamlashtirilmoqda,banklarni aholiga yanada yaqinlashtirish va qulayliklar yaratish maqsadida bank xizmatlari markazlari tashkil etilmoqda.

Biz yuqoridagi ma'lumotlar asosida quyidagi xulosalarga keldik:

1. Banklarning ish faoliyatidan tashqari yuklamalar hali hanuzgacha davom etmoqda. Banklarning faoliyatiga aralashuvlar ham davom etmoqda.
2. Tashkilotlar hamda mahalliy hokimyat organlariga banklarni ham tadbirkorlik subyektlaridan biri ularning asosiy vazifalari esa tijorat ekanliklarini sindirish qiyin bo'lmoqda.Banklarning rivojlanishi uchun mos tijoriy loyihalar moliyalashtirilmayapti.
3. Bank xodimlarining huquq va majburiyatlari va huquqiy ongini yanda oshirish uchun tushuntirish ishlarini amalga oshirish va shuningdek ish vaqtida majburiy yuklamalarga qonuniy yo'l bilan qilmaslikni tushuntirish.
4. Aholini ham moliyaviy savodxonligini kuchaytirish hamda turli xil firibgarlarga aldanib qolmasliklari uchun tushuntirish ishlarini amalga oshirish.

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2. I.Aliqulov, Z.Davronov. Innovatsion faoliyat davlat tomonidan tartibga solishning xorijiy davlatlar tajribasi." Iqtisodiyot va innovatsion texnologiyalar" ilmiy electron jurnali.№ 3, may- iyun, 2015

WIRELESS TRAFFIC LIGHT CONTROLLER USING ESP8266 BOARD

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***Abstract**: The increasing numbers of transportations are forcing to build new roads and traffic lights. Traditional traffic light implementation cost a lot of money. Traditional traffic light implementation contains the all four traffic lights must connect to traffic light control by wire [5]. And in some cases those connecting wire come through ditches which will cost extra spending. Another issue with traditional traffic light controller is it works with 220 voltages AC current which life threatening to human. Based on those issues, this paper proposes two main goals for modern traffic light controller. The development of traffic light that works wireless connection and traffic light work on DC current 24 voltages. In order to achieve this traffic light controller we use esp8266 microcontroller which it has wireless signal on up to 300 meter radius.*

Keywords: esp8266, DC current, wireless, microcontroller

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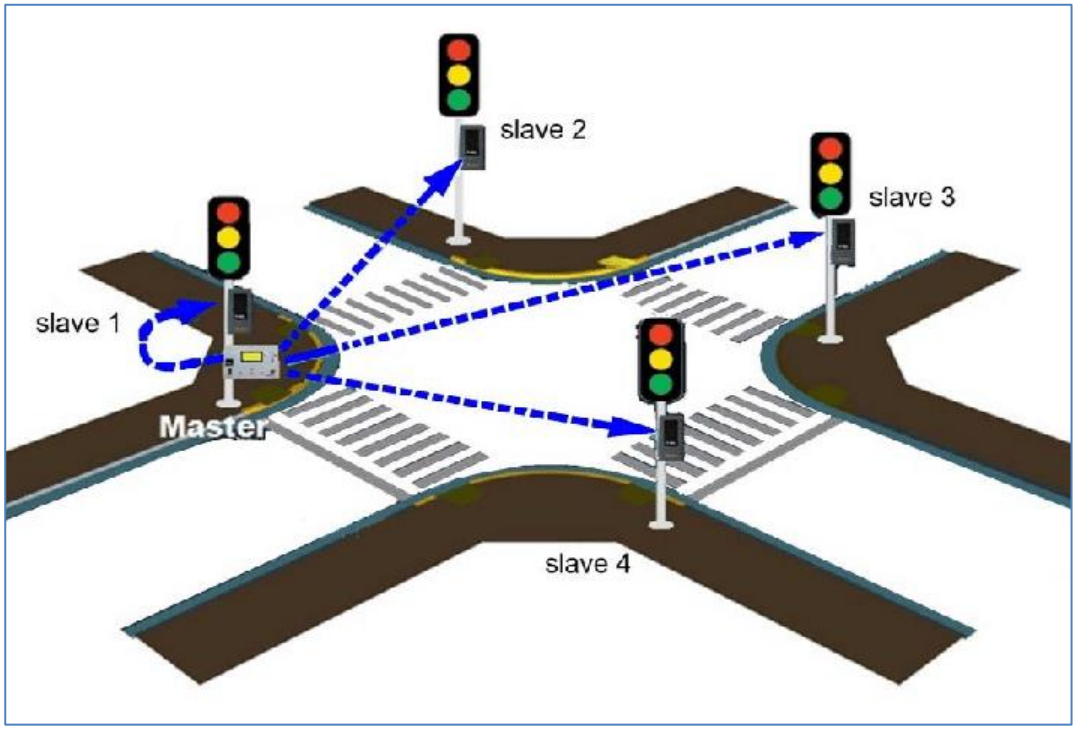
1. **Introduction:** The car transportation has become important part of our life. The number car is increasing as world developing. This causing the modernization of roads and traffic light controllers. Most of the countries are still using traditional traffic light systems. The traditional traffic light system contains all 4 traffic lights connected to controller via wire. This causes the increasing of cost of traffic light system. The average cost of traditional traffic light is 15-20 USD in Uzbekistan in 2020 [1]. And main disadvantage of traditional traffic light system is it works on 220 voltages AC. The above 42 voltage 3 ampere is harmful for human life. Next chapter explains proposed system followed by results and discussions and at last we conclude the paper.
2. **The proposed method:** The proposed system is wireless controlled traffic light system. The each traffic light has its own controller. One of the controllers is server which means it controls the other three controllers by sending signal. We call the main controller a server and other controller as slaves as you can see below image. The esp8266 can host or can connect to host Wi-Fi. In this paper we create one host which server controller and 3 slave controllers connect to server controller.

Benefits:

a) Main benefits of the proposed traffic light system are it works on DC 24 volt maximum which is safe for electrician to work. And since it works on DC you power up the controller using battery. It may help to build traffic light in rural areas where electricity shortage problems.

b) Financial benefit also very important. Because this proposed traffic light reduces the cost of traffic light implementation for 50%. Since proposed traffic light do not need wires to connect to main controller.

c) In emergency moment traffic policeman can change cycle of traffic light using his/her mobile phone. The esp8266 can receive order if mobile phone connected to esp8266 server controller.



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Figure 1. Wireless traffic light

3. **Hardware:** The hardware for this system using some components includes: Phone/Device, ESP8266, MOSFET transistor, Resistors, LED etc.
   For hardware, we use esp8266 microcontroller [2]. ESP8266 is a microcontroller designed for Expressive Systems. ESP8266 is a solution for Wi-Fi networks from existing Micro Controllers to Wi-Fi and is also capable of running standalone applications. Connection with PC using the micro USB cable and there are 17 GPOI, with a consumed current of 10uA ~ 170mA and RAM of 32K + 80K [3]. It is designed for wireless location-aware devices, wireless positioning system signals, industrial wireless control. Esp8266 can be powered up by 5 volt. Esp8266 microcontroller can produce up 3.3 voltages. We use D4184 MOSFET transistor to connect 3.3 volt to 24 volt [4].



Figure 2. D4184 MOSFET transistor

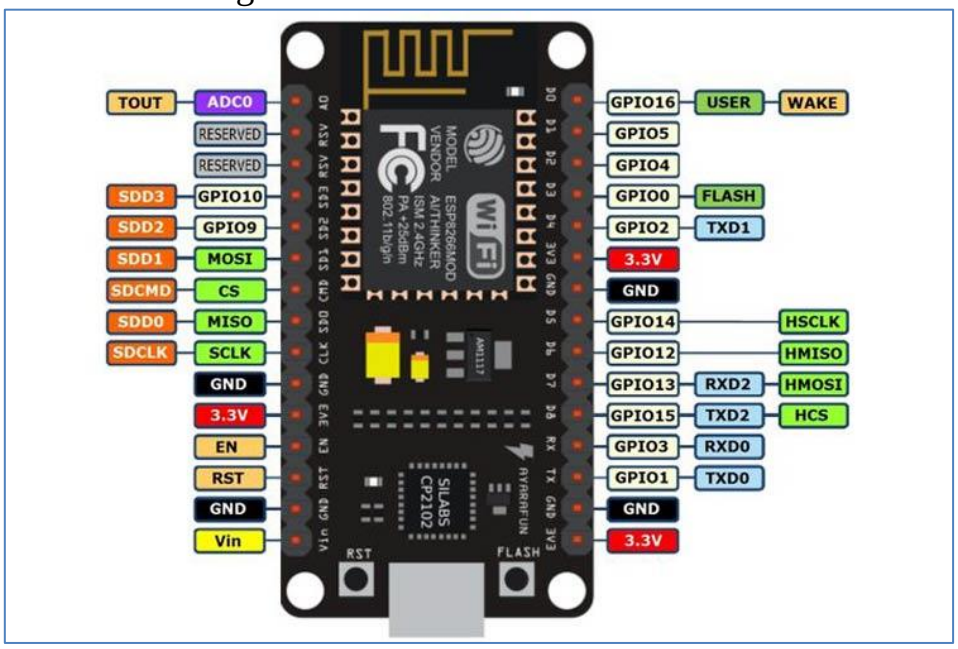


Figure 3. ESP8266 microcontroller datasheet

4. **Software:** Software module for developing a system using various software tools which includes: Arduino IDE and android studio [4].
   Arduino IDE. Arduino is programmed with a C/C++ programming language. Then Arduino IDE software is written in Java based on the processing project from writing

and uploading the code to the Atmega chip in Arduino. It is compatible software to program with some module such as ESP

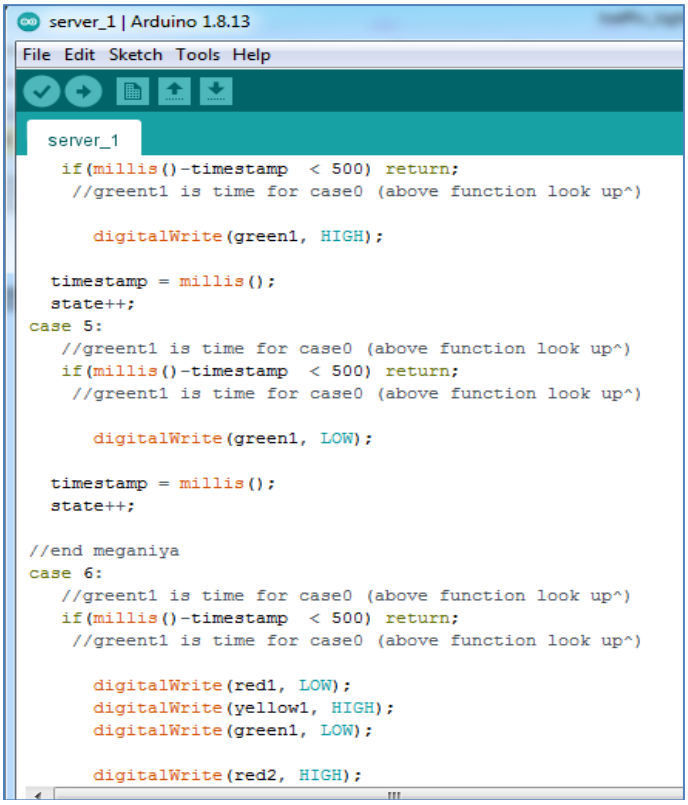


Figure 4. Arduino IDE source code

5. Future works

There are still some areas need research to explore. These are few suggestions to future researchers.

a) Smart traffic light controller could be control from distance if esp8266 connected to internet. From could base you will be able to give command to esp8266 (server) to change cycle or to change timing of cycle.

b) Traffic light system could become adaptive system if some necessary sensors added to system. In adaptive traffic light system, controller collects data from road which number of car passing, depending on which is more jam the system may adapt the cycle timing. It will prevent traffic jam.

6. **Conclusions:** In this paper we have discussed development wireless traffic light system. The each traffic light has its own controller. One of the traffic light controllers is server which means it controls the other three traffic light controllers by sending signal. We call the main controller a server and other controllers as slaves. The esp8266 can host or can connect to host Wi-Fi. In this paper we create one host which is server controller and 3 slave controllers connect to server controller. There are future works could be added.

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