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INTELLIGENT AUTOMATIC BEAM LIGHT CONTROLLER

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CONTENT

ABSTRACT

- The number of vehicles on our roads is burgeoning day by day. This is turn forced almost all this vehicle manufactures to think about the extra safety instruments and electronic controls to attach with these products for giving the users a safety derived in all road conditions through a mass flow traffic.
- If asked, one should always mention that the right driving is very cumbersome due to the dazzling light problems and the frequent dipping of headlights by manual means that often causes fatigue to the driver particularly at the time of peak traffic.
- So naturally to get rid of this perennial problem, an automatic mechanism has to come up to dip the headlamp automatically whenever required.
- Simply, an automatic high beam controller is a unit, which can automatically judge when the headlight beam needs to be lowered, and which dip the headlamp from which beam to a dipped beam.

INTRODUCTION

- Car accidents data shows that the rate of night time accidents is higher than that for the day time
- This fact may be endorsed to number of parameters, among them, is the poor lighting conditions at night that reduce the visual capability of the driver
- For that reason it is harder at night to see the road environment parameters such as warnings, cars, pedestrians and traffic signs.
- At night it is very difficult to determine the nature of objects by human eye from long distance.
- This due to the fact that night time diminishes the advantages of the colors and contrasts of objects.

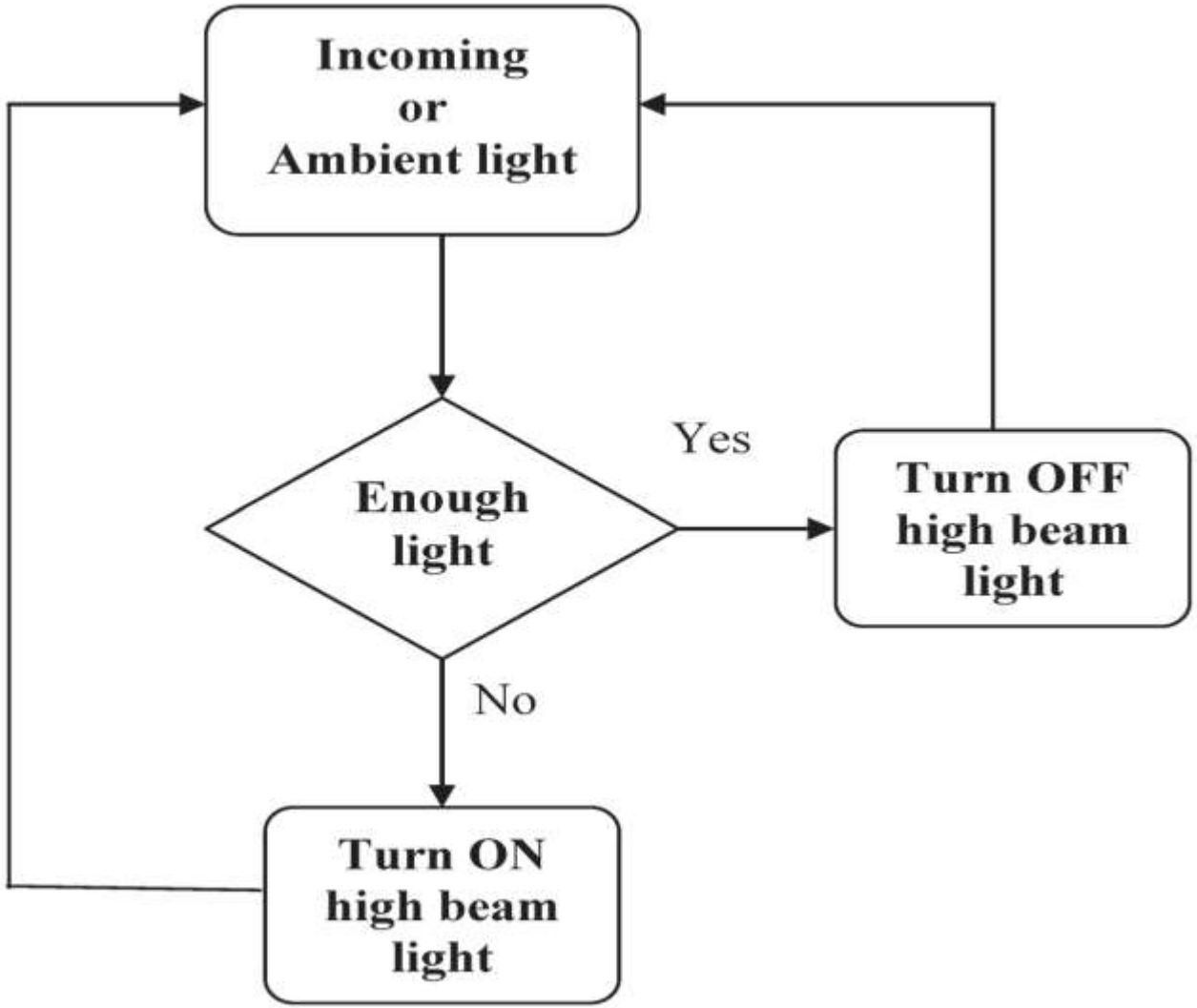
PROBLEM IDENTIFICATION

- All vehicles are equipped with a headlight system to grant a safe lighting for night time driving or at any other situation.
- Usually the headlight system contains two reflector lamps the low beam and high beam system contains two reflector lamps the low beam and high beam lights.
- The drivers must toggle from high beam to low beam lights in order to circumvent dazzling other drivers moving in the opposite way.
- On the other hand low beam lights create less dazzling effect, but with a reduction of quality and range of visibility.

METALOGY

- LDR
- TWO RESISTOR (0.25 W, 1.6 KOHM, 30 OHM)
- LIGHT BULB (1W)
- SUPPLY VOLTAGE (12V)
- TRANSISTOR [BJT 2N2222]
- ARDUINO BOARD,ARDUINO CABLE
- CAPACITOR (0.1 Mu f)

FLOW CHART

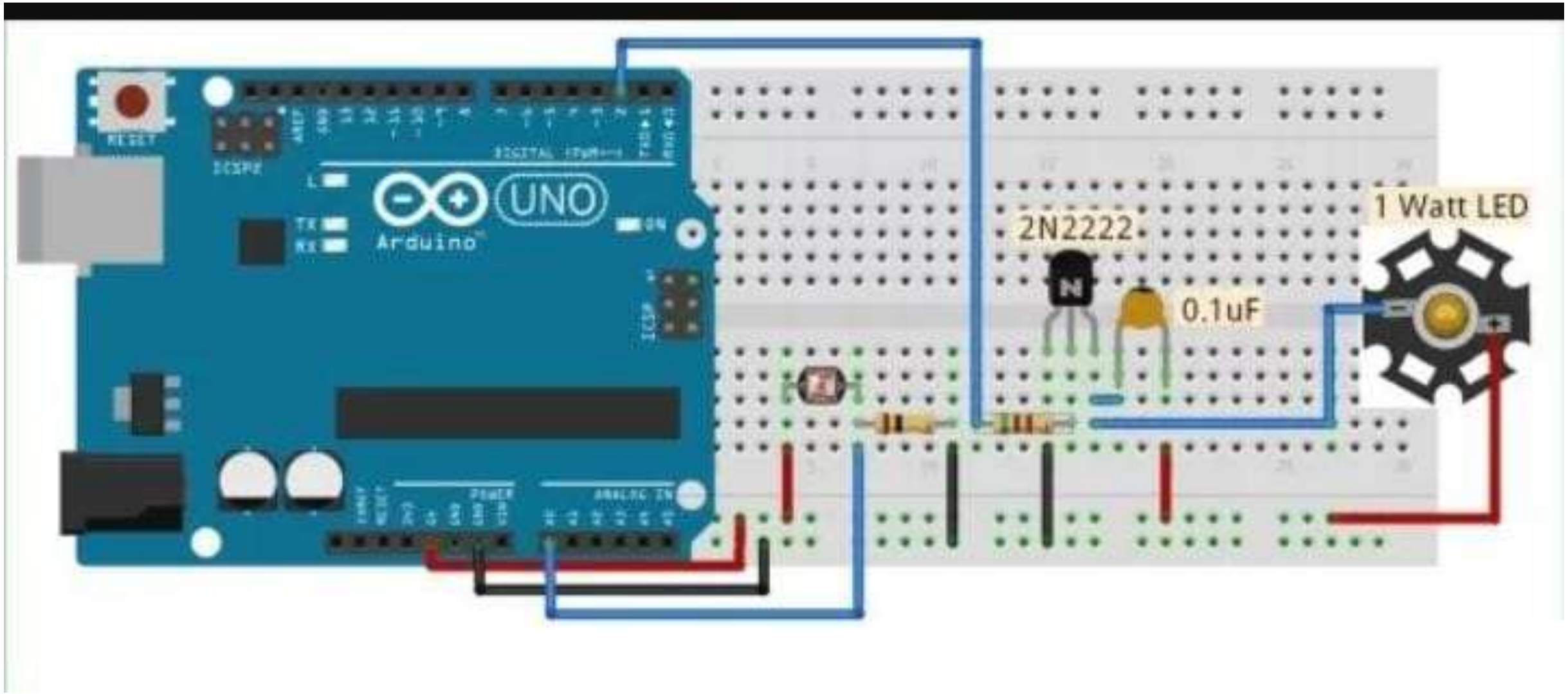

Incoming
or
Ambient light
Enough
light
Yes
Turn OFF
high beam
light
No
Turn ON
high beam
light

SYSTEM CONCEPT AND DESIGN

- The concept of the system basically can be divided into two parts: the light detection and the high beam off/on control circuit.
- Flow chart of the system operation concept. In order to design a simple low cost control system, a simple approach is needed to detect the light of the incoming traffic or the ambient lights in the road.
- A light dependent resistor (LDR) is used (some literature refers to it as photoresistor) as a light sensor.
- The resistance value of the LDR is changing according to the impinging light on it. Typical LDR has a linear relation with the incident light such that if the light density is increased the resistance of the LDR is decreased. Other electronic components such as a transistor. LDR ,Two resistor (0.25 W, 1.6 K ohm, 30 ohm),Relay switch (400 ohm coil ,12volt ,5 terminal type) ,light bulb (0.25W),supply voltage (12V),Transistor [(BJT BC 547),(MASFET IRF 840)]

- operational amplifier (used as comparator), relay, diodes and resistor are used to build the electronic control circuit.
- This can be discussed briefly as following: when the resistance of the LDR changed by the incident light or the ambient light; the comparator output will be either high or low depending the value of the LDR resistance
- If $Vx > 6.2V$ then the comparator output is high, Transistor on, relay is on and the high beam light is on. On the other hand if $Vx < 6.2V$ then the comparator output is low, Transistor off, relay is off and the high beam light is off.
- The value of the 150 KΩ variable resistor can be adjusted to increase or decrease sensitivity.
- Consequently, increases or decreases the action distance. It can be easily shown that the value of the LDR resistance that just make the high beam light on is when $Vx = 6.2V$ therefore the value of R_LDR is 160 KΩ.

SYSTEM SCHEMATIC DIAGRAM



EXCEPTED RESULT

DISTANCE (METER)	LUMINANCE (LUX)	R (OHM)	NOTES
300	25	180 K	
200	50	100 K	
150	100	50 K	
100	400	10 K	LIKE SUN RISE ON CLEAR DAY
50	3000	1 K	
25	12000	100	LIKE FULL DAY LIGHT

RESULT

- The table shows that as the incoming car distance from the test car decreases, the luminance of the incoming light is increasing and the LDR resistance decreases.
- It can easily seen from the table that the relation between the incoming light an LDR resistance is linear as stated before.
- It is noteworthy to mention that the high beam light on the test car is turned off when the incoming car was about 230 m away.
- Using this observation with the data from table 1 it can be seen that the LDR resistance is between 100 KΩ - 180 KΩ.
- This agrees with the calculations done in the pervious section were the calculated threshold value for LDR resistance was 160 KΩ
- The difference between the experimental and theoretical resistance value may be attributed to the tolerances of the components used in the circuit.

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THANK YOU