

İşyerleri ve Alkollü Mekânlar için Tasarlanmış Alkolmetre Makinesi

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Özet

Anahtar kelimeler

Alkolmetre; Kaza Önleme; Arduino.

Alkolmetre cihazı ile sürücülerin nefesteki alkol oranının ölçülmesinin tespiti yapılmaktadır. Ölçüm sonucu promil cinsinden görülen değer alkol içeriği ile kan miktarı arasındaki oranı gösterir. Promil, her yüz miligram kan miktarında kaç miligram alkol olduğunu gösterir. Bu çalışma da arduino mikrodenetleyici tabanlı bir alkolmetre cihazı tasarlanmıştır. Bu cihazın alkollü eğlence mekânları gibi noktalarda montajı yapılarak bozuk para okuyucu ile çalışması öngörülmüştür. Alkol alan insanların bir pipetle üflemeleri ile birlikte kendi alkol düzeylerini ölçebilecekleri bir cihaz geliştirilmiştir. Cihazın doğruluğu emniyet müdürlüklerince kullanılan alkolmetre cihazları ile karşılaştırılmıştır. Yapılan karşılaştırmalar sonucunda %3 gibi bir hata payı ile doğruluk analizi yapılmıştır.

Designed Breathalyzer Machine for Workplaces and Alcohol Drinking Places

Abstract

Keywords

Alcohol detection system; Accident prevention system; Arduino.

It is determined that the alcohol content of the drivers is measured by the alcoholmeter. The result of the measurement shows the ratio between the alcohol content and the amount of blood in terms of promil. Promil shows how many milligrams of alcohol in every hundred milligrams of blood. In this study an arduino microcontroller based alcohol meter device is designed. This device is intended to be installed in places such as alcohol drinking places such as pubs and working with a coin reader. A device has been developed for people who drink alcohol to measure their alcohol levels with a pipette blow. The accuracy of the device was compared with the alcohol meter devices used in the market. As a result of the measurements, accuracy analyses were performed and the error remained less than %3 in all cases.

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1. Giriş

Alcohol use which causes millions of people to lose their lives is a serious problem. Although it is a causal factor of many serious diseases, it is also the cause of the events that cause violence and injury consequences in cases of overuse. Especially in terms of drivers driving along with the use of vehicles, it is seen as a damaging element to the other members of the society.

According to a report published by the World Health Organization (WHO), more than 3 million people died in 2016 as a result of harmful alcohol use.

In general, the harmful use of alcohol causes more than 5% of the global disease burden. Alcohol is a

major public health problem in most of the traffic accidents.

According to data from the World Health Organization, approximately 1.2 million people worldwide die as a result of traffic accidents. Even a small amount of alcohol consumption increases the risk of accidents for drivers and pedestrians. Alcohol not only disrupts the critical processes for safe road use, such as vision and reaction times, but is also linked to the judgment of judgment, and is therefore often linked to other high-risk road-use behaviors, such as using or using a seat belt. It should be noted that the number of traffic accidents caused by alcohol in our country is too high (Organization, 2007; Organization & Unit, 2018). One of the most important elements of the modern world is transportation. With increasing technology, passengers are provided with more comfortable vehicles in road transport. However, according to the report of the world health organization, approximately 1.2 million people lost their lives in 2016 in the traffic accidents occurring worldwide (Organization & Unit, 2018). Traffic accidents for societies, families and people, together with social problems, bring a heavy burden on health services and economies (Organization, 2007).

It is a rapidly growing problem in traffic accidents with the increase of motor vehicles on highways. Especially the most dramatic situation for injuries and fatal accidents is the vulnerable citizens in the traffic. The factors affecting the way in which alcohol, drugs and other people are exposed to traffic cause the death of others and the death of others. According to the research reports, it has been shown that alcohol consumption negatively affects driving skills such as cognitive performance and decrease in impulsive behavior and distraction due to alcohol use (Kesen, 2004).

In our country, the Law No. 2918 on the use of vehicles under the influence of alcohol and stimulants has been defined. According to Article 48 of this law, drivers who have been drinking

alcohol, stimulants or drugs are not allowed to drive on highways.

Technical devices are also used to determine the amount of alcohol in the blood by security forces (amacıyla Highway Traffic Law, 2005).

As a result of the measurements carried out by the private car drivers, the amount of alcohol in their blood is above 0.50 promil is prohibited in accordance with the law on road traffic regulations. Similarly, for other vehicle users, this limit is 0.20. In this context, alcohol audits are carried out by law enforcement officers in order to ensure traffic safety.

In this study, a coin operated alcohol meter device has been developed for citizens who want to check the amount of alcohol in places like entertainment venues etc. The device is activated with the discard of the money and the person who wants to make alcohol measurement by a pipette blow to the alcohol sensor can learn the necessary level of promil lcd screen.

2. Material ve Metod

In this study, open source Arduino microcontroller is used. Various analog inputs can be read with arduino microcontrollers, light, sound etc. on a sensor. information can be converted to output. From engine control to lighting systems. Arduino can be used in many projects ranging from daily application projects to complex scientific studies. In this way, there is incredible accessibility information that will provide great help for those who need it, with widespread use throughout the world (IntKyn. 1).

2.1 System Components

In this section, information will be given about the design, installation and operation of coin operated coinmeter system with coin acceptor to be used in workplaces and entertainment venues realized with Arduino microcontroller card. The Arduino board consists of a gas sensor, an LCD display and a coin acceptor assembly. It is a great advantage that Arduino cards can be used with many sensor types.

With these sensors, anything can be detected or measured. In addition, the overall use of sensors is both easy and inexpensive.

One of these sensors is the MQ-3 gas sensor that detects alcohol. The MQ-3 gas sensor is a sensor that tests the levels of alcohol, gasoline, hexane or LPG in the air, but is most commonly used as an alcohol breath analyzer for a person who drinks vodka, wine, beer or another drink (Sahu et al.2017). The circuit diagram of the built-in meter is shown in Figure 1.

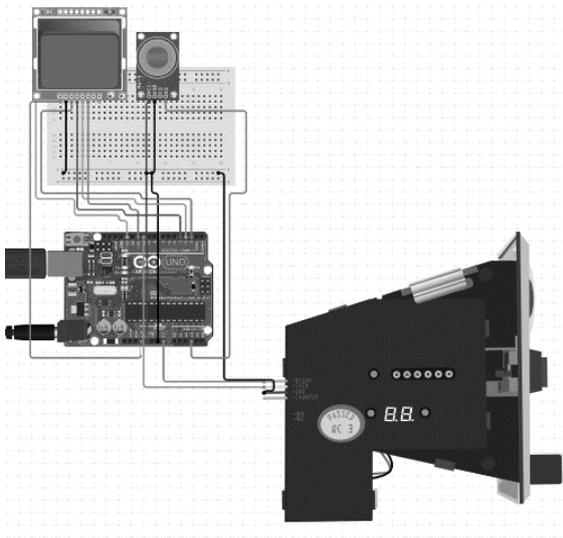


Figure1. Alcoholmeter circuit diagram

ArduinoUno is a micro controller card based on ATmega328P. There are 14 digital input / output pins. 6 of these pins can be used as PWM output. It also has 6 analog inputs, 16 MHz quartz crystal, one USB connection, one power input, one ICSP header and one reset button. It can be connected to the computer with a USB cable to operate, or can be operated with an AC / DC adapter or battery. It is the most widely used product of the entire Arduino family (IntKyn. 2).

The ArduinoUno microprocessor card allows employees to develop systems in this area. Open source electronic prototyping is a convenient platform for easy-to-use hardware and software. It is connected to the MQ-3 sensor, which depends on factors such as the number of measurements carried out in sequence with analog inputs. The

sensor is made by measuring the alcohol concentration that matches the equivalent of milligrams of alcohol per liter of water connected to the serial port 3. This heater of the sensor should rise up to 40 ° C (Özekinci and Öztürk 2017). The temperature reaches the desired value within a few minutes after the sensor is reached. The sensor is in a mold made of plastic and stainless steel mesh. Here, the heater provides the necessary operating conditions for the operation of sensitive components. The MQ-3 gas sensor has 6 pins. Four of them are used to receive the signal and the other 2 to provide the heating current. The algorithm of the study is shown in Figure 2.

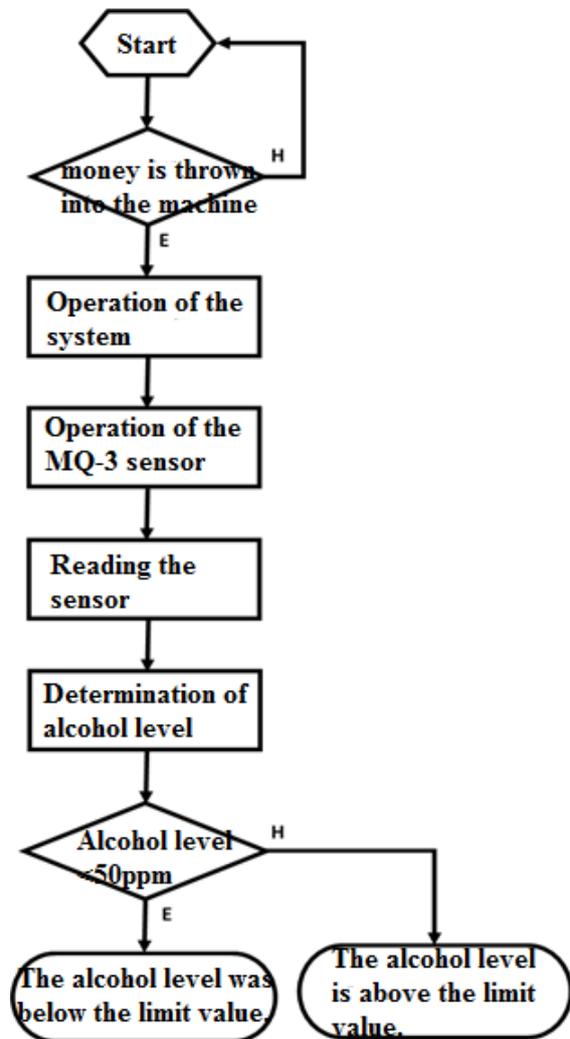


Figure 2. System working algorithm

3. Results

Design and production of the alcohol meter is shown in Figure 3. Measurements were made for alcohol test. As a result of the measurements performed, the correct and successful result values were seen on the LCD screen

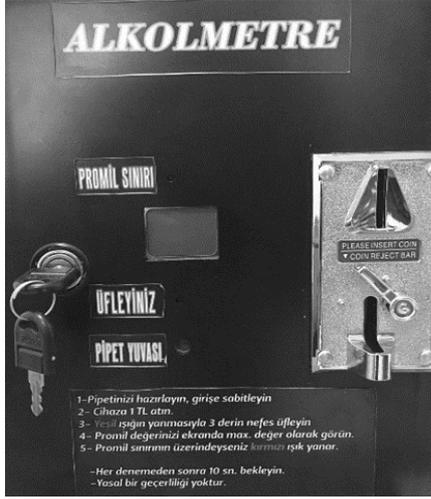


Figure 3. Alcoholmeter

4. Discussion and Conclusion

The results of the study were compared with the alcohol meter devices used in the market. The comparison results are based on a pre-stimulation system for individuals who have been drinking alcohol in areas with alcoholic entertainment that may endanger driving safety. With this control system, a cheap and reliable practical test facility was obtained. With this system, the rate of accidents can be reduced by predetermining the accidents caused by alcohol.

5. References

- Highways Traffic Law. (2005), (1).
- Kesen, J. (2004). Alcohol Levels of Driving Drivers, 51–54.
- Organization, W. H. (2007). Drinking and driving: a road safety manual for decision-makers and practitioners. *Drinking and Driving: A Road Safety Manual for Decision-Makers and Practitioners*.
- Organization, W. H., & Unit, W. H. O. M. of S. A. (2018). *Global status report on alcohol and health, 2018*. World Health Organization.
- Özekinci, M., & Öztürk, S. (2017). Breath Alcohol Measurement, 66–68.

Sahu, P., Dixit, S., Mishra, S., & Srivastava, S. (2017). Alcohol Detection based Engine Locking System using MQ-3 Sensor, 979–981.

internet kaynakları

- 1-<https://store.arduino.cc/usa/arduino-uno-smd-rev3>, (10.11.2018)
- 2-<https://www.arduino.cc/en/Guide/Introduction>, (10.11.2018)