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Automatic Alcohol Detection System

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Abstract: In pretty much every industry and field, innovation keeps on disturbing old frameworks and opening up new pathways. Not more so than in the field of law enforcement, where analysts, designers, and tech virtuosos are chipping away at further developed apparatuses not exclusively to uphold DUI, yet additionally to forestall it. Maybe the most encouraging of these drives is the Alcohol Safety Detection System, fostering an innovation that will consequently keep an intoxicated driver from driving an engine vehicle, an attempt will be made to fabricate a locking mechanism for vehicles so it would not begin without an Alcohol detection system. This paper portrays a driver alcohol concentration detection framework dependent on breath testing, created utilizing a microcontroller Compatible Compiler, that permits the program of microcontroller boards. The framework can gauge the liquor from the breath test and control the activity of the vehicle start framework to forestall smashed driving. Additionally, the utilization of virtual instrumentation gives high adaptability, in contrast to traditional methods. Drunken driving has become a significant problem in present-day culture. It is a typical reason for vehicle crashes including human mistakes. This venture focused on developing a system to prevent, in anticipation of making everyday traffic safe.
Keywords: Alcohol safety detection system, MQ3 sensor, Arduino UNO.

I. INTRODUCTION

When a drunk person sits in the vehicle's driver seat, he jeopardizes the lives of everybody on the road as well as himself and anyone in the vehicle. This one decision of his, which may not appear to be significant at that point, may have a fatal effect. At the point when the decision of whether to drive under the influence of liquor faces an individual, he usually doesn't understand the results of his activities and makes irrational and sometimes harmful decisions. Many people think that increasing fines for drunk driving cases will significantly reduce driving under the influence. In any case, while stiffer DUI laws will look effective on paper, they won't help in the battle against drunk driving.

While the battle against drunk driving appears to have no closure, numerous different arrangements exist other than the increasing fines. One such arrangement is awareness of this issue in educational textbooks at primary and secondary level education. On the off chance that the overall population turns out to be appropriately taught about the significance of inebriation, they can settle on a legitimate decision when it comes time to choose whether or not to drive while being intoxicated. An individual needs to know realities, for example, the number of drinks it takes to push them over the lawful blood liquor cutoff to drive. The legal blood alcohol level in India is at 0.03% this implies that if an official stops a driver whose blood liquor content demonstrates over 0.03%, the official perceives this individual as hindered, and can continue with giving them a DUI.

In the alcohol safety detection system, the vehicle itself checks the level of alcohol consumed by the driver, before starting the engine. If the driver is heavily intoxicated ie. If the alcohol content in his breath has a high concentration, the vehicle won't start even if it has keys inserted since the mechanism will block the engine of the vehicle. In the event that the driver is not intoxicated while beginning, but consumes liquor while driving the vehicle, its speed will drop slowly and the car will come to a stop. This project is for the public interest.

II. LITERATURE SURVEY

Following research papers and websites were used to study implementation and upgrading the system of this project:

A. Altaf SV, Abhinay S, Ansari E, Kaunain Md, Anwer R. Alcohol Detection and Motor Locking System.
B. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering. 2017; 6(2): 989-993.
C. Kousikan M, Sundaraj M. Automatic Drunken Drive Prevention System. Students Research in Technology and Management. 2014; 2(2): 75-77.
D. Bhuta P, Desai K, Keni A. Alcohol Detection and Vehicle Controlling. International Journal of Engineering Trends and Applications. 2015; 2(2): 92-97.

III. METHOD USED

The system block diagram is as displayed in Figure 1. Our model prototype consists of the following hardware parts in the plan: A LCD, the MQ-3 liquor sensor, a DC motor, and one LED, all connected to a microcontroller. The proposed system was designed and simulated in tinkercad software. The code required for the proper functioning of the system must be entered into the microcontroller and was written in Arduino IDE sketch.

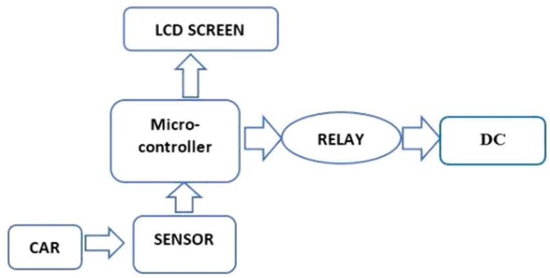


Fig 1.

Our system is powered by a 9V battery. A 5V DC supply is needed by the microcontroller, sensor, and LCD display unit. Other parts like the DC motor require 5V and the LED needs 3.3V. The microcontroller board is already designed to work without the utilization of a transformer, the system can be given power through the USB cable connection from PC or with an outside power supply of 9v to 12V. The External (non-USB) current can come either from an AC-to-DC connector (wall-wart) or battery. Any voltage that is above 12V will cause the control board to burn, annihilating the board. It is prudent to utilize voltage between 7 - 12V.

Steps followed while booting and initial test run by device are given below:

1) *Step 1:* The system will start along with vehicle electronics when the key is inserted
2) *Step 2:* Will verify if the system is working properly and has not been tampered with.
3) *Step 3:* Checks for alcohol concentration, which takes a few seconds for detection as well as engine to start.
4) *Step 4:* If high alcohol concentration is detected, the vehicle engine doesn't start-up.
5) *Step 5:* If alcohol concentration is below the legal blood alcohol percentage, then the vehicle will startup.

IV. COMPONENTS

A. Arduino Nano

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.0) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality as the Arduino Duemilanove but in a different package. It lacks only a DC power jack and works with a Mini-B USB cable instead of a standard one. The Nano was designed and is being produced by Gravitech

The Arduino Nano can be fueled by means of the Mini-B USB association, 6-20V unregulated external power supply (pin 30), or 5V directed outside power supply (pin 27). The power source is naturally chosen to be the most significant voltage source. The FTDI FT232RL chip on the Nano is only powered if the board is being controlled over USB. Accordingly, when running on outside (non-USB) power, the 3.3V yield (which is provided by the FTDI chip) isn't accessible and the RX and TX LEDs will glint if computerized pins 0 or 1 are high.

The ATmega168 has 16 KB of blaze memory for putting away code (of which 2 KB is utilized for the bootloader); the ATmega328 has 32 KB, (likewise with 2 KB utilized for the bootloader). The ATmega168 has 1 KB of SRAM and 512 bytes of EEPROM (which can be perused and composed with the EEPROM library); the ATmega328 has 2 KB of SRAM and 1 KB of EEPROM.

1) Specifications

Microcontroller Atmel ATmega168 or ATmega328
Operating Voltage (logic
level) 5 V
Input Voltage
(recommended) 7-12 V
Input Voltage (limits) 6-20 V
Digital I/O Pins 14 (of which 6 provide PWM output)
Analog Input Pins 8
DC Current per I/O Pin 40 mA
Flash Memory 16 KB (ATmega168) or 32 KB (ATmega328) of which
2 KB used
by bootloader
SRAM 1 KB (ATmega168) or 2 KB (ATmega328)
EEPROM 512 bytes (ATmega168) or 1 KB (ATmega328)
Clock Speed 16 MHz
Dimensions 0.73" x 1.70"

B. MQ3 Sensor

The sensor is made of Tin Dioxide (SnO2) sensitive layer. The sensor is designed with a high sensitivity to liquor and little sensitivity to Benzene. It has a basic drive circuit with quick reaction, strength, and long life. It has a simple interface type. On the sensor, port pins 1, 2 and 3 address the output, GND and VCC individually. The specialized particular of the sensor is depicted in table 1.

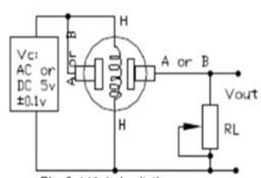


Fig. 3: MQ-3 circuit diagram

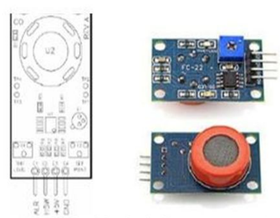
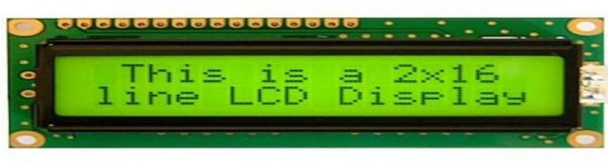


Fig. 4: Simplified circuit diagram of MQ-3 alcohol sensor

C. LCD Display Unit



LCD is utilized for displaying the message. The LCD module (Fig. 5) shows alphanumeric, and images. It comprises 16 pins (8 information lines, 3 control lines, 2 electrical cables, 1 difference line and 2 pins for backdrop illumination LED association). The information line and control line are associated with the microcontroller. The LCD show power rating is as expressed beneath:
Current () (dd = 5.0) 1.0– 3.0

D. Alarm and Indication Unit

Fig.6. Buzzer

The alarm unit used is a buzzer that rings when liquor concentration is detected. The buzzer used has a place with the PS series. The PS series are superior buzzers that utilize Uni-morph piezoelectric components and are intended for simple consolidation into different circuits. They have extremely low power consumption in contrast with electromagnetic units. It has a voltage necessity of 2V and is associated with pin 10 of the microcontroller. The standard resistor value of 220 Ω financially accessible is nearest to the registered value of 250 Ω, so a 220 Ω resistor was used to restrict the current going through the LEDs.

Fig 7. LED

E. DC Motor

The DC motor is used to exhibit the idea of engine locking. Here in this work, the DC engine will be associated with nail 9 to the microcontroller, when liquor is identified the DC motor stops in other to demonstrate that alcohol concentration is recognized and keep running when there is no liquor distinguished.

Fig 8. DC Motor

F. Flow Chart

The flow chart of the system is shown in figure 6. The system algorithm comprises three main steps. The first is to boot up the system, next is the measuring state, this stage measures the amount of alcohol level from the drivers. A prescribed set limit will be given as input to the microcontroller, once the alcohol level exceeds the limit the car will not start.

1) *Step 1:* Power on the system
2) *Step 2:* Checks for alcohol concentration
3) *Step 3:* If alcohol is detected
4) *Step 3.1:* Turn off the car engine
5) *Step 4:* Else
6) *Step 5:* Car engine running
7) *Step 6:* Goto step 1

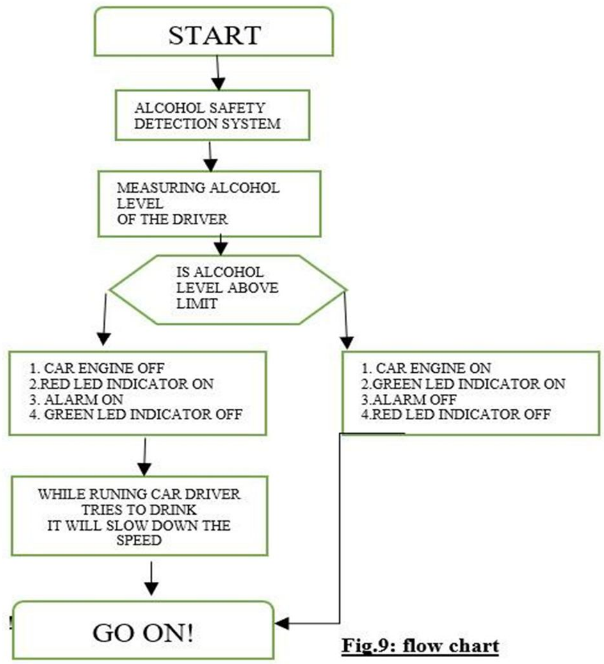


Fig.9: flow chart

V. RESULTS

Result obtained from testing the proposed system is sufficiently coordinated with the prerequisites for turning over a motor once the degree of liquor identified in the breath of the driver is higher than the recommended level passable by law.

A. General Results

Liquor fixation information focuses were averaged at the compartment (i.e., blood, the two distinctive breath, and tissue) across all members and afterward were plotted after some time. Situation #1 Lag Time Results This analysis was directed to decide in which of the compartments (blood, breath, or tissue) the liquor would initially show up in the wake of burning-through a bolus portion of liquor. In any case, in view of the challenges with breath examining (because of buccal assimilation), the exactness of the slack time in breath was hard to decide.As can be found in Figure 2, the main appearance of liquor in the breath was hard to build up because of the exceptionally quick ascent in breath fixation following utilization. Liquor showed up in the blood inside 6 minutes, however didn't appear in tissue until 14 minutes had passed. Pinnacle liquor fixations in blood and breath tests were accomplished somewhere in the range of 1.25 and 1.5 hours after utilization, while the pinnacle liquor focus in tissue happened 15 to 20 minutes after the fact. These differences were insignificant.

VI. CONCLUSION

The data obtained distinctly support the proof-of-idea that detached advancements (breath) can recognize liquor focuses rapidly and are not influenced by numerous individuals of the normal situations that are known to modify blood liquor fixations. While the liquor pharmacokinetic profile was modified by the different genuine situations in the current series of analyses, the main perception is that the liquor focuses estimated through the various gadgets (that reflect distinctive natural compartments) resembled each other.

The models performed very well against blood and "constrained" breath referential liquor focuses. The total fixations varied, however they strayed in an anticipated and straight way to such an extent that recalibrations of the instruments will bring about brilliant direct relationships with blood focuses. This relationship is of most extreme significance since, supposing that these gadgets will be helpful in checking plastered driving, then, at that point the deliberate fixations from these gadgets should precisely follow BAC as that is the best quality level that records driving while intoxicated The current series of tests satisfied many key objective points: we exhibited the attainability of latent, subtle breath-liquor location frameworks that could ultimately be set in vehicles; The admonition of the discoveries, and subsequently a focal point of the following period of the examination program is that the current models needed between 20–30 sec for the liquor focuses to be enlisted. Thus lives of people are saved.

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Parameter Name	Sensor type	Detection gas	Concentration	Voltage	Load resistance (R_L)	Heater resistance (R_H)	Sensing resistance (**Rs**)	Slope	Temp humidity
	Semiconductor	Alcohol gas	0.04-4mg/l alcohol	±5.0V	Adjustable	31Ω ±3 Ω	2KΩ-20KΩ (in 0.4mg/l alcohol)	200–1000ppm	20±2; 65%±5%RH

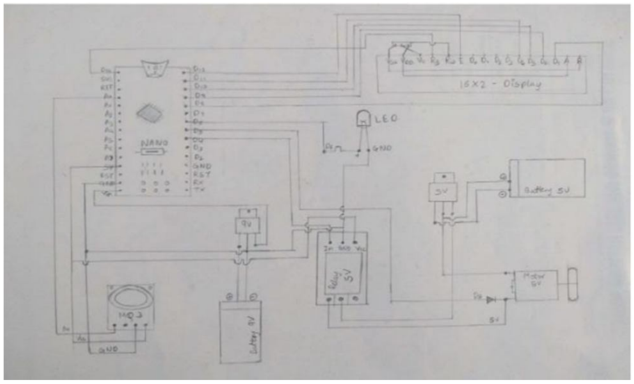


Fig.10: circuit diagram

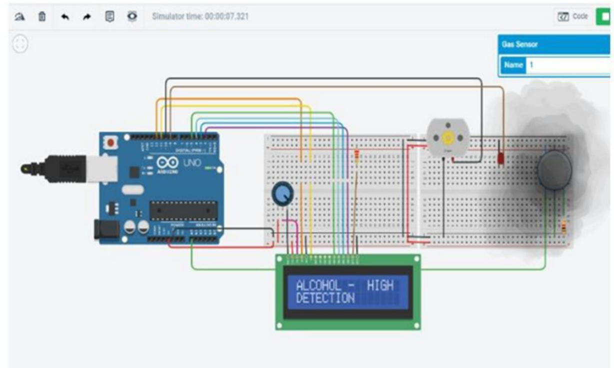


Fig.12:Stage1.1

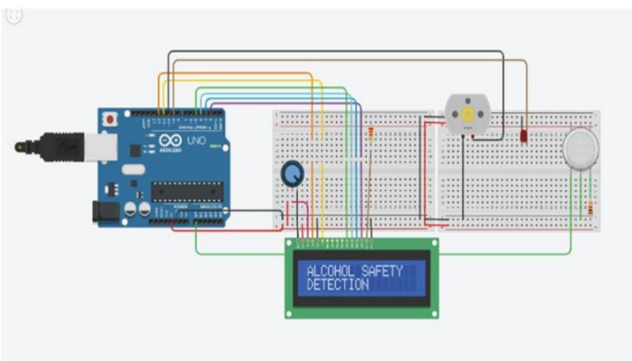


Fig.11:Stage1

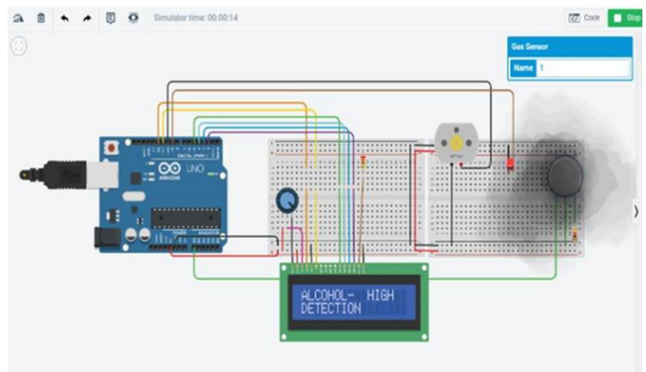


Fig.14: Stage1.2.1

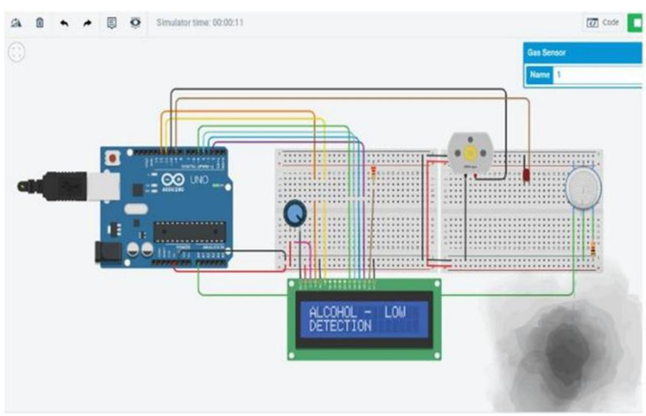
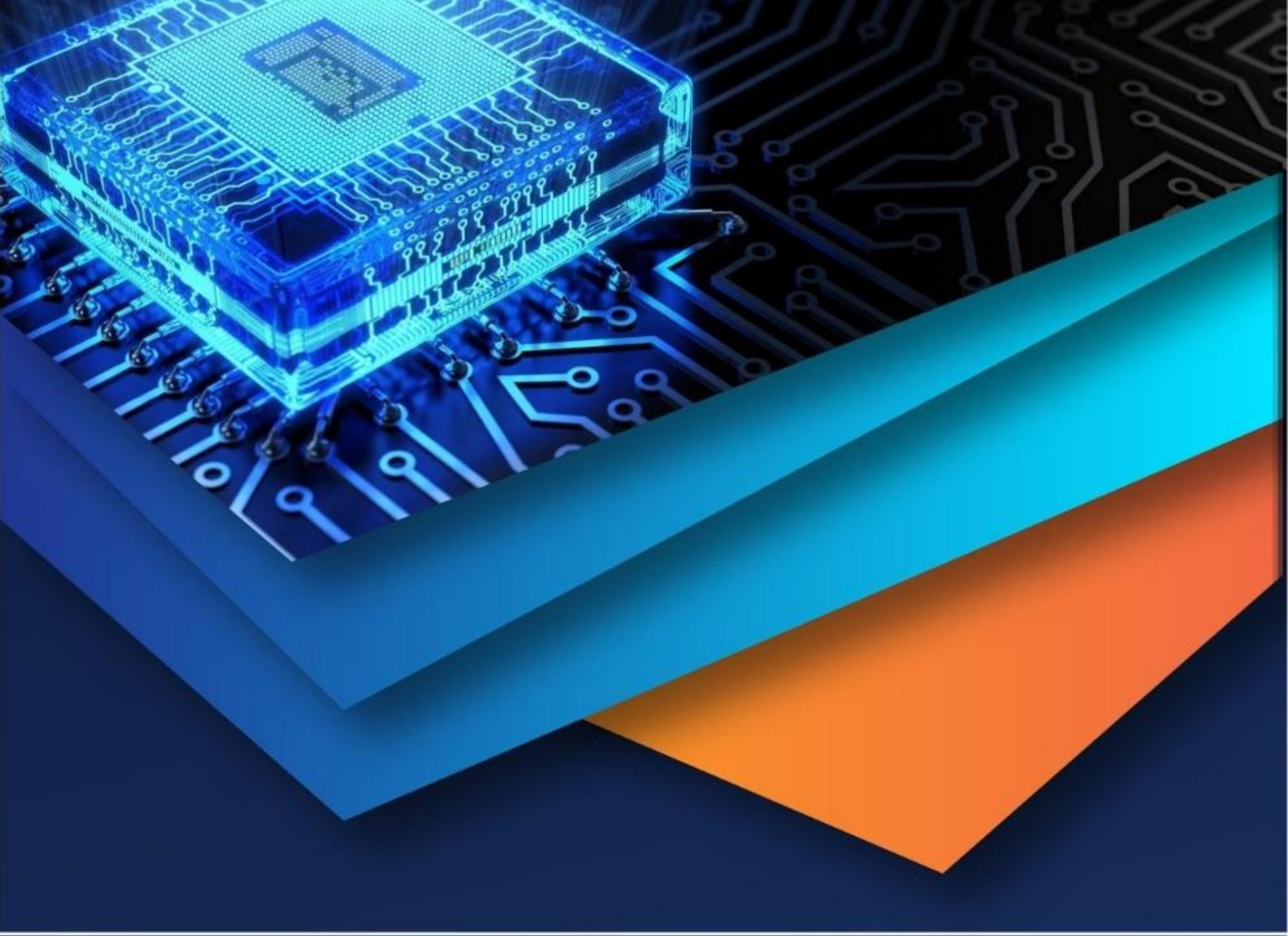


Fig.13: Stage1.2



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