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Head-Up Display (HUD)

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Abstract*: It is known as Head up display because while using it the operator's head position is UP means forward instead of looking down. A head-up Display, HUD, is a safety feature for automobile drivers.HUD can be fitted in place of windscreen which will give the view of road plus the required information. HUD is the outcome of GPS and compass based data about a vehicle position and the emergence of computer vision technology that can recognize objects on and around the road and the navigational information as transparent colored paths. Head up displays (HUDs) are available in aircraft industries from a long time and they are now finding way into automotive industry also. Although there have been some HUD systems in commercial already, their images are too small to show assistance information. We demonstrated a HUD including micro-projectors, rear-projection screen and realized a 14 inches image on the windshield. It is able to show speed, map-navigation and night vision information. We adopted digital light processing, DLP, as our image source because of its brighter image output required. The uniqueness of DLP Technology makes it possible to solve common design challenges of Head-Up Display systems including managing environmental extremes and thermal loading, delivering high brightness and high resolution, and implementing dynamic dimming capabilities. Additionally, DLP projection-based architecture provides flexibility in the optical design needed to create very large field of view virtual displays over the road that augment and assist the driver. This paper includes a brief overview of DLP solid state illumination operation and how the implementation of DLP technology can solve the common HUD design challenges listed above.

Keywords: Head-up display, HUD, Autonomous vehicle, DLP Technology.

I. INTRODUCTION

A head-up display or heads-up display, also known as a HUD, is any transparent display that presents data without requiring users to look away from their usual viewpoints. A HUD also has the advantage that the pilot's eyes do not need to refocus to view the outside after looking at the optically nearer instruments. Although they were initially developed for military aviation, HUDs are now used in commercial aircraft, automobiles and other, mostly professional applications.

The defining characteristic of an automotive HUD is that it can be monitored simultaneously with the roadway. Thus, traditional instruments could properly be called HUDs when they are mounted very high on instrument panels, or perhaps on hoods. However, the common understanding is that HUD refers to a display produced by special optics that superimposes a translucent image on the driver's view of the environment. An automotive HUD projects a virtual image on a windshield, which is usually specially treated, or on a combiner. This virtual image is often projected such that it appears near the center of the driver's visual field, approximately at the end of the automobile's hood. The image is usually fairly small, covering only a few degrees of the driver's visual field.DLP projection is a mature and widely used technology in numerous display applications including: hand-held projectors, conference rooms, and digital theaters. DLP technology is well suited to meet the needs of advanced HUD systems.

II. OVERLAY POINTS

A. Car Data and OBD

On-board diagnostics (OBD) is an automotive term referring to a vehicle's self-diagnostic and reporting capability. OBD method provide the vehicle owner or repair technician access to the status of the various vehicle subsystems. The strength of diagnostic information available via OBD has varied widely since its introduction in the early 1980s versions of on-board vehicle computers. Early versions of OBD would simply illuminate a malfunction indicator light or "idiot light" if a problem was detected but would not provide any information as to the nature of the problem. Modern OBD implementations use a standardized digital communications port to provide real-time data in addition to a standardized series of diagnostic trouble codes, or DTCs, which allow one to rapidly identify and remedy malfunctions within the vehicle.

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B. OBD-II Signaling Protocols

There are five signaling protocols that are permitted with the OBD-II interface. Most vehicles implement only one of the protocols. It is often possible to deduce the protocol used based on which pins are present on the J1962 connector.

III. CAN PROTOCOL

Controller area network (CAN or CAN-bus) is a vehicle bus standard designed to allow microcontrollers and devices to communicate with each other within a vehicle without a host computer. CAN-bus was designed for automotive applications but is also used in other areas. The protocol was officially released in 1986 by the Society of Automotive Engineers (SAE). CAN become most available OBD standard for vehicles produced after 2007 yrs. A modern automobile may have up to 50 electronic control units (ECU) for various subsystems. Usually the biggest processor is the engine control unit, others are used for transmission, airbags, antilock braking, cruise control, audio systems, windows, doors, mirror adjustment, etc. Some of these form independent subsystems, but communications among others are essential. The CAN standard was devised to fill this need. The devices that are connected by a CAN network are typically sensors, actuators and control devices. A CAN message never reaches these devices directly, but instead a host-processor and a CAN Controller is needed between these devices and the bus. And the valuable embedded clinical knowledge is not efficiently exploited. In this paper we present an online depository, ORIGA-light, which aims to share clinical ground truth retinal images with the public; provide open access for researchers to benchmark their computer-aided segmentation algorithms. An in-house image segmentation and grading tool is developed to facilitate the construction of ORIGA-light.

A. ELM327

The ELM327 is a programmed microcontroller produced by ELM Electronics for translating the on-board diagnostics (OBD) interface found in most modern cars. The ELM327 command protocol is one of the most popular PC-to-OBD interface standards and is also implemented by other vendors. The original ELM327 is implemented on the PIC18F2480 microcontroller from Microchip Technology.ELM327 is one of a family of OBD translators from ELM Electronics. Other variants implement only a subset of the OBD protocols.

IV. OPERATING PRINCIPLE OF THE ELM327 INTERFACE

The electronic unit contains 3 main sub-assemblies to operate the interface: Electrical voltage adaptors: On-board networks in cars have voltage levels that require specific drivers. For an ELM327, as the device supports several protocols, several drivers are necessary. These protocols can be classified into 3 families, CAN networks, K/L lines and PWM/VPN. For more details about these protocols, see our page communication standard. The ELM327 chip: The integrated circuit, which gives its name to the whole device, is the brains of the interface. It selects the protocol and converts it into one understood by modern PCs. This small circuit (speed 4 MHz) acts as a bridge between the protocols. Voltage adaptors for the PC: The electronic chip is not in itself able to communication with a computer; it needs to adapt the electrical levels before sending data streams.

Figure 1.Bluetooth ELM327

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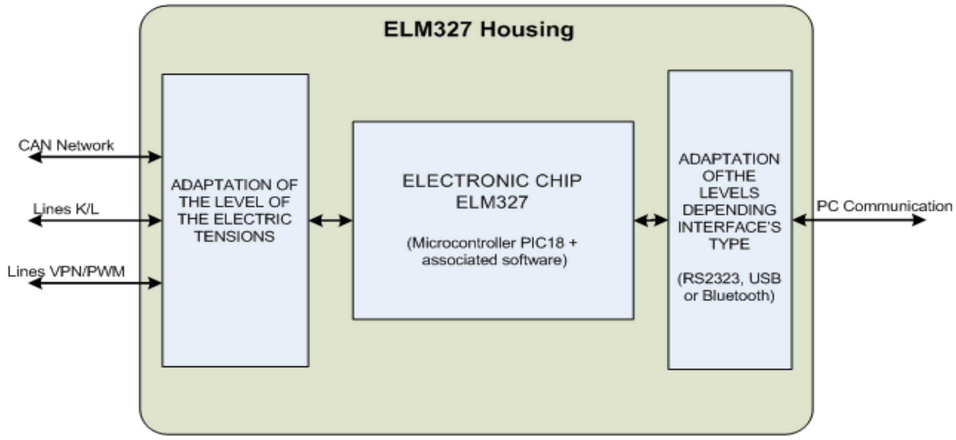

Figure2. Main function of an interface

V. DLP PROJECTOR

DLP projection is a mature and widely used technology in numerous display applications including: hand-held projectors, conference rooms, and digital theaters. DLP technology is well suited to meet the needs of advanced HUD systems. The high-dynamic-range LED control system concept has been demonstrated to meet necessary conditions for day and night viewing. In addition the optical design implementations based on DLP technology enable greater flexibility to solve optical design challenges, form factor constraints, and thermal load management of future automotive HUD systems.

Fig 3: DLP Projector

A. *Raspberry Pi 3*

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside of its target market for uses such as robotics. Peripherals (including keyboards, mice and cases) are not included with the Raspberry Pi. Some accessories however have been included in several official and unofficial bundles. Here we used raspberry pi 3 to retrieve information from the car and acts as an interface OS to send the data to the DLP projector.

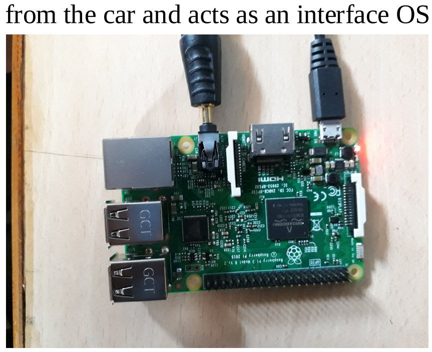

Fig 4: Raspberry Pi

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VI. RESULTS AND DISCUSSIONS

The output obtained from the car obd 2 using raspberry pi is given below. This output shows the car data's which is need to be projected in the windshield.

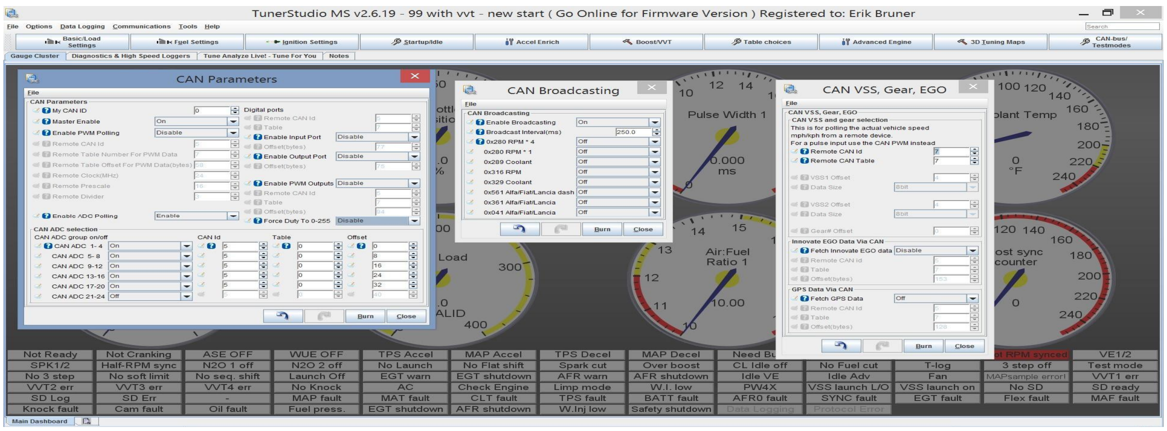

Fig 5: Output obtained at raspberry pi

VII. CONCLUSION

A HUD also has the advantage that the pilot's eyes do not need to refocus to view the outside after looking at the optically nearer instruments. Although they were initially developed for military aviation, HUDs are now used in commercial aircraft, automobiles and other, mostly professional applications.

REFERENCES

[1] Androutsellis-Theotokis S. and Spinellis D. A survey of peer-to-peer content distribution technologies. ACM Computing Surveys, 36(4):335–371, December 2004. Ding, W. and Marchionini, G. 1997 A Study on Video Browsing Strategies. Technical Report. University of Maryland at College Park.

[2] Wolffsohn J. S., McBrien N. A., Edgar G. K. and Stout T. (1998). The influence of cognition and age on accommodation, detection rate and response times when using a car head-up display (HUD). Ophthalmic and Physiological Optics 18 (3), 243–253..

[3] Marcus Tonnis, Rudi Lindl, Leonhard Walchshausl, Gudrun Klinker. 2007. Visualization of Spatial Sensor Data in the Context of Automotive Environment Perception Systems. The Sixth IEEE and ACM International Symposium on Mixed and Augmented Reality, Nara, Japan, Nov. 13 - 16, 2007.,

[4] W. Narzt, G. Pomberger, A. Ferscha, D. Kolb, R. Muller, J. Wieghardt, H. Hortner, and C. Lindinger. Pervasive information acquisition for mobile ar-navigation systems. In Fifth IEEEWorkshoponMobileComputing Systems and Applications, 2003

[5] Pace, T., Ramalingam, S., and Roedl, D. 2007. Celerometer and idling reminder: persuasive technology for school bus eco-driving. In CHI '07 Extended Abstracts on Human Factors in Computing Systems (San Jose, CA, USA, April 28 - May 03, 2007). CHI '07. ACM, New York, NY, 2085-2090

[6] Burnett, G.E. (2003) A road-based evaluation of a Head-Up Display for presenting navigation information, In Proceedings of HCI International conference, Vol 3 (HumanCentred Computing), pp. 180-184

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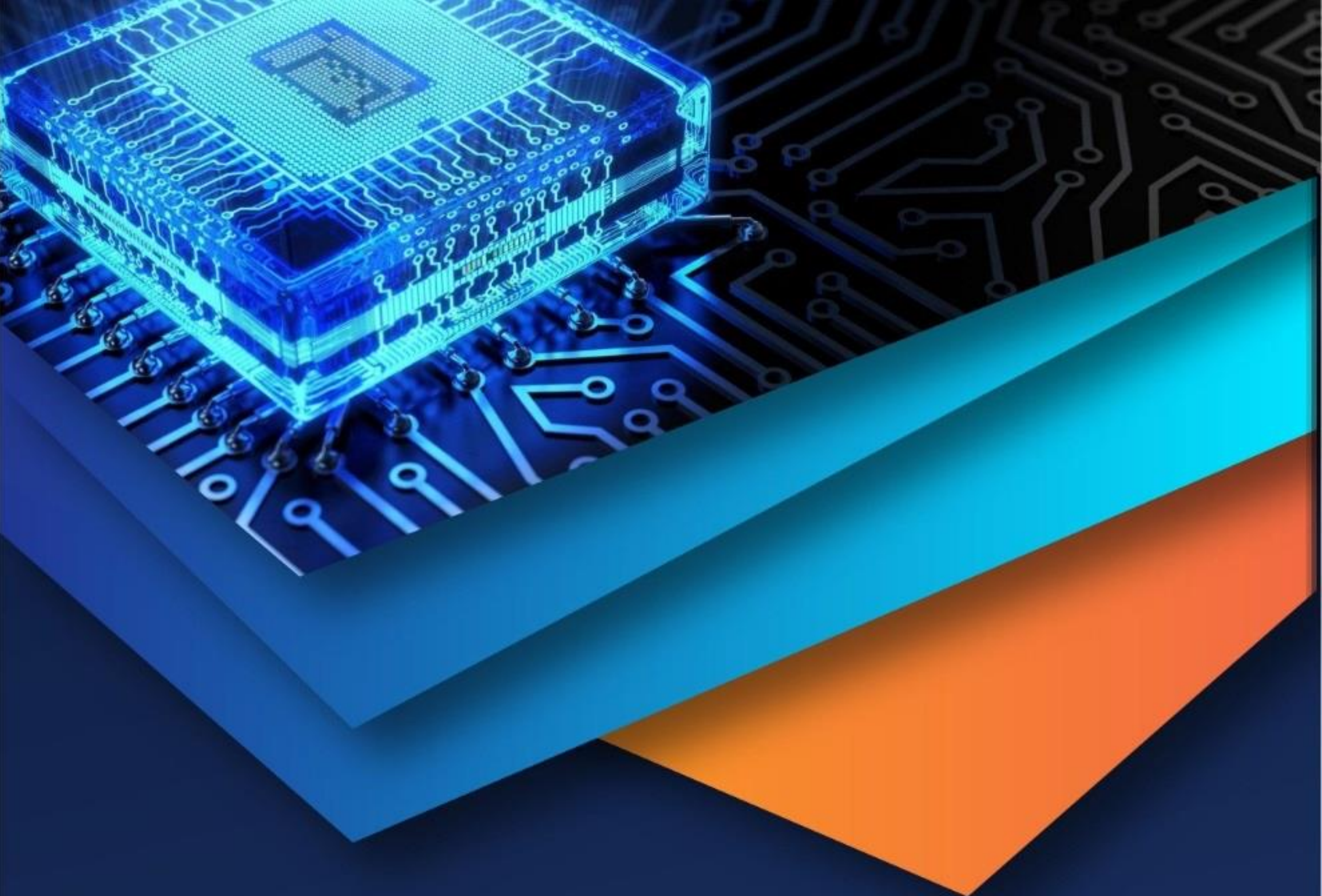

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