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Effect of Augmented Reality in Automobile

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Abstract*—An automobile Augmented Reality Information Scheme is presented for Augmented Reality (AR) information such as collision warning using Accelerative Condition Awareness Service(ACAS) and path guide using Lane level Guide service(LLGS) in a vehicle. The proposed system decides information to be offered through Accelerative Condition Awareness Service and Lane level Guide Service using GPS and provides AR information on windshield using Head-Up Display in an automobile for a driver. It is help to improve a driver's cognition in low visibility condition and warns before collision with other vehicle and pedestrian.

Keywords-- Augmented reality, Automobile, Accelerative Condition Awareness Service, Head-Up display, Collision warning, Lane level Guide Service, GPS, windshield, visibility condition.

I. INTRODUCTION

Today, the automotive industry is attentive on human vehicle interaction related with assignment, reactions and information offering for safety and convenience, and a more active approach to improving driver safety would be to try to develop ways [1]. One of them is head-up display (HUD) to device augmented reality (AR) in a vehicle for information contribution[2]-[4]. AR is currently being functional actively to commercial products and various types are being developed and commercialized for a vehicle [5].

In this study, we discuss an automobile Augmented Reality Information Scheme to offer information such as collision warning using ACAS and path guide using LLGS through AR in a vehicle. This scheme realizes AR on windshield using projection type HUD and provides AR information for safety and convenience of a driver.

II. AUTOMOBILE AUGMENTED REALITY INFORMATION SCHEME

The proposed scheme deals information mixed with real world and concentrate on driver's eye for security and convenience such as swiftness of vehicle, pedestrian and vehicle warning, path guide, etc. This scheme (figure 1) consists of

Sensor (used to acquire set of data through detector, camera and GPS),
Data fusion (used to obtain driving information from gathered set of data),
Decision (ACAS and LLGS)
Display(used to provide warning and guide information at vehicle's windshield using HUD) .

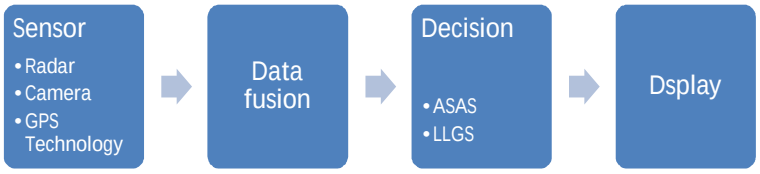

Figure 1: Architecture of Automobile AR System

A. Accelerative Condition Awareness Service(ACAS)

The ACAS forecasts a collision situation with a vehicle or pedestrian from the front of the host vehicle and predict the danger level through the threat assessment. And then it provide a driver the cautionary information, such as forward collision warning, time-to-collision (TTC), etc., for the front objects in order to prevent accident as shown in figure 2. For the assessment of threat, the velocity of host vehicle and the 3D-coordinate of a detected object for distance with the host vehicle are used and level of collision is calculated. The threat assessment is done by considering the position, movement, TTC, and relative velocity of a detected object (pedestrian or vehicle) in the front of the host vehicle, and decides the risk level of the object.

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Figure 2: Accelerative Condition Awareness Service

B. Lane-Level Guide Service (LLGS)

The LLGS provides AR information for the route guidance information on the lane-level and lane departure warning. For a lane change, the path guidance evidence is resulted from the lane info recognized on the camera, and route and lane properties, which are achieved from the navigation map and the position information as shown in figure 3. The lane departure warning detects whether the vehicle is departing from the current lane and notifies the driver of it. LLGS also provides suitable information for a variety of lane types and shapes, such as overpass, underpass and crossing roads.

Figure 3: Lane-Level Guide Service

III. REPRESENTATION OF PROPOSED MODEL

Augmented Reality is displayed on windshield of vehicle through HUD. The sensor acquires dataset through their surrounding using radar, camera, and GPS technology present at vehicle. The representation should be expressed so that a driver can recognize simply and intuitively warning or guide information when AR information is presented to avoid collision with the front vehicle or to guide lane change for a lane information. After the demonstration of caution or guide information is determined, the registration in HUD in the geometric perspective is performed to provide the AR information in the driver's viewpoint. An calculation method with least complexity is used to overlay the AR information on the real world. Geometric modeling between the 2D copy of a camera and a 2D HUD is carried out in a projective transformation with a fixed driver's eye position.

IV. RESULTS

We have assembled an interior assessment bed which is similar to real driving environments and established the system using the dataset collected on the real driving. To implement Augmented Reality on automobile we used a HUD with projection on a vehicle windscreen and for the real driving environment sensor, datafusion,decision & display plays an important role. The result of both display mechanism ACAS and LLGS are shown in figure according to representation strategy.

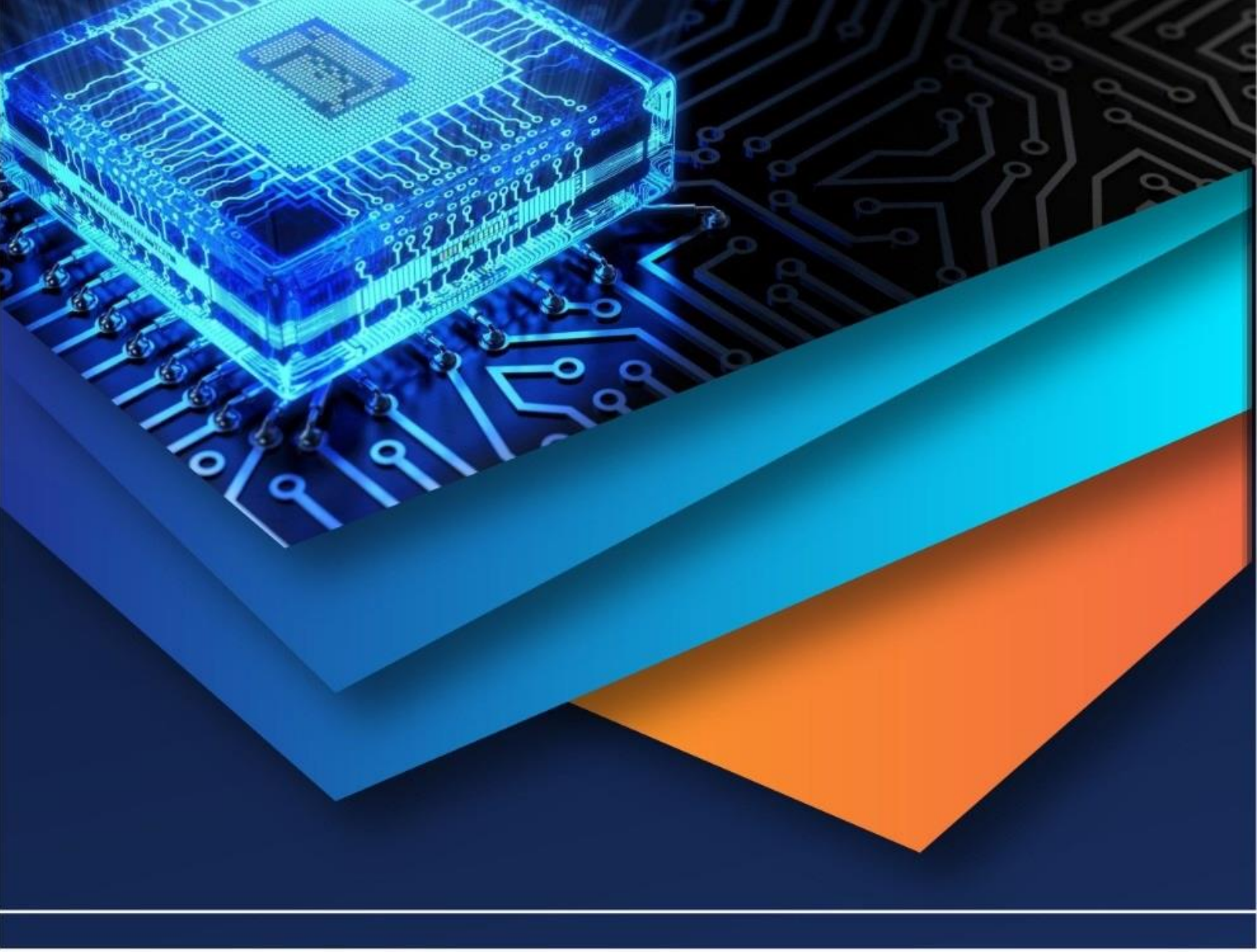
figure 4(a)Result of ACAS figure 5(b) Result of LLGS

V. CONCLUSION & FUTURE SCOPE

We have proposed an automobile Augmented Reality Information Sysytem with ACAS(which notifies the collision situation with a vehicle or pedestrain) and LLGS(which notifies when a driver should change their lane while turning or to overtake another vehicle). In future both of these display techniques can be used in Aircraft in the era of twenty second century. In future performance of this Augmented Reality system will be enhanced and ergonomic information can be obtained.

REFERENCES

[1] Azuma RT, "A survey of augmented reality," In Presence: Teleoperators and Virtual Environments, CA, vol. 6,pp. 355-385, 1997.
[2] Zhou F, Duh H B L, Billinghurst M, "Trends in augmented reality tracking, interaction and display: A review often years of ISMAR",Proceedings of the 7th IEEE/ACM International Symposium on Mixed and Augmented Reality, IEEE Computer Society,2008,pp.193-202.)
[3] Van Krevelen D W F, Poelman R, "A survey of augmented reality technologies, applications and limitations", The International Journal of Virtual Reality,vol.9 2010, pp.1-20.
[4] H.S. Park and K.H. Kim, "Adaptive Multimodal In-Vehicle Information System for Safe Driving," ETRI Journal, vol. 37, pp. 626-636, 2015.
[5] B.-H. Choi, J.S. Oh, S.J. Park, and S.C. Lee, "The Relationship between Multidimensional Traffic Locus of Control and Reckless Driving Behavior," Korean J. of Industrial and Organizational Psychology, vol. 28, no. 1, pp. 1-22, February 2015.
[6] Pandey, Mayank, Ms Prabha Nair, Manoj Wadhwa, and Ashish Chaudhary. "Augmented Reality based on Image Processing.", International Journal Of Engineering And Computer Science ,vol. 3 Issue 5 ,pp. 5924-5929, May 2014.
[7] Pandey, Mayank, Ms Prabha Nair,"Survey of Augmented Reality And its Improvement" International Journal of Engineering Research & Technology (IJERT), Vol. 3 Issue 4, April – 2014.



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