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Analysis of KIA's Intelligent Manual Transmission

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***Abstract:** It is difficult to decide that the new Intelligent Manual Transmission in the KIA motor's vehicle is an automatic or a manual transmission from the point of view of user. In general, iMT is a manual gearbox, but talking about it's mechanism it has gears with mechanism that looks precisely like any other manual transmission. The iMT transmission does not have clutch, it contains only a break and throttle. To be noticed, it's not totally automated. iMT is the next generation gearbox technology in Indian automobiles ater the AMT (automated manual transmission) that Maruti Suzuki popularized. It is now available in the KIA Seltos, Carens etc.*

***Keywords:** Transmission, Gearbox, AMT, IMT*

I. INTRODUCTION

The transmission system in automobiles serves as the critical nexus between a vehicle's engine and its wheels, orchestrating the seamless transfer of power to propel the vehicle forward. Over the decades, this essential component has undergone a remarkable evolution, adapting to the dynamic needs of drivers, fuel efficiency demands, and technological advancements. The transmission system plays a pivotal role in translating the engine's power into a controlled and optimized driving experience. In the early days of automotive engineering, manual transmissions dominated the landscape, requiring drivers to manually engage and disengage gears to match the speed and load conditions.

However, as technology progressed, the automotive industry introduced automatic transmissions, relieving drivers of the need for constant manual gear changes. This marked a significant leap forward in convenience and accessibility. In the ever-evolving landscape of the automobile sector, technological advancements continually redefine the driving experience. One such innovation that has garnered attention is the Intelligent Manual Transmission (IMT) system. Combining the familiarity of manual transmissions with intelligent electronic control, IMT represents a harmonious marriage of tradition and innovation, offering drivers a new level of convenience and efficiency. The latest innovation in the market is the Hyundai's intelligent Manual Transmission which is now available in popular KIA vehciles. Therefore, in this paper, we will do an analysis of the of the Intelligent Manual Transmission.

II. DESCRIPTION

For those who are confused that, what the intelligent Manual Transmission actually is, it's within the simplest of words a clutchless manual transmission. Yes, it's right. Intelligent Manual Transmission (IMT) is an innovative transmission technology that combines the characteristics of a traditional manual transmission with intelligent electronic control systems. It is designed to enhance the driving experience by providing the convenience of automatic transmissions while retaining the engagement and control associated with manual gear shifting.

So, the iMT eliminates the requirement of a foot pedal. to place it simply, imagine you're driving a car with a manual gearbox. Usually once you change gears, you press the foot pedal, take your foot off the accelerator and shift the gear with the assistance of the gear knob. in an exceedingly car with iMT technology, there's no foot pedal. So, your left foot is essentially resting while driving. once you do feel the requirement to vary gears, just slot the gear knob into the specified position and shift up or down such as you normally would. The gear knob will have the standard H-pattern which is seen on the majority manual cars. Plus, there'll be just two pedals within the footwell, the accelerator and also the pedal.

While it should feel disconcerting initially, it'll be a welcome change after you are driving a car on traffic laden roads, in an exceedingly bumper to bumper traffic situation. it's just a matter of getting accustomed.

III. WORKING

The Intelligent Manual Transmission (IMT) combines the mechanical features of a traditional manual transmission with electronic control to enhance the driving experience.

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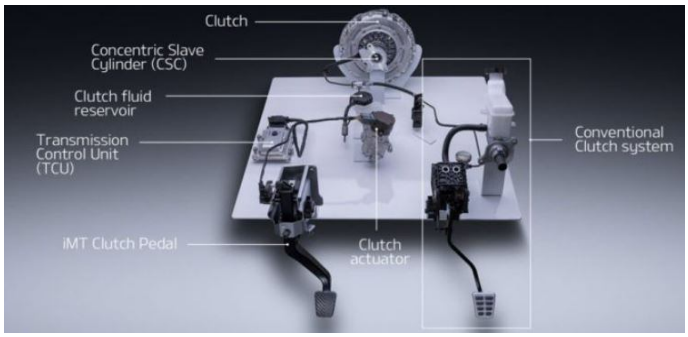


Fig -1: Elements of iMT transmission system

Here's a step-by-step breakdown of how IMT works:

1) *Sensors and Input Recognition:* IMT-equipped vehicles are equipped with sensors that monitor various parameters such as vehicle speed, engine RPM, accelerator pedal position, and brake status. These sensors continuously feed data to the Electronic Control Unit (ECU). The ECU interprets these inputs to understand the driver's intention regarding gear changes. The ECU analyzes the real-time data from the sensors, including vehicle speed and engine load.
2) *Driver Input Detection:* When the driver intends to change gears, sensors detect inputs such as the movement of the gear lever and the level of accelerator or brake pedal activity.
3) *Clutch Automation:* Unlike traditional manual transmissions where the driver manually operates the clutch pedal, IMT features an automated clutch system. The ECU engages or disengages the clutch based on the driver's input and the driving conditions. This eliminates the need for the driver to use a clutch pedal during gear changes.
4) *Optimized Gear Selection:* The ECU analyzes the real-time data from the sensors, including vehicle speed and engine load. Based on this analysis, the ECU determines the optimal time to change gears for a smooth and efficient transition.
5) *Real-time Adaptability:* IMT systems are designed to adapt to various driving conditions, providing a seamless driving experience in different scenarios, such as city driving, highway cruising, or uphill climbs.
6) *Fuel Efficiency and Performance:* By automating clutch operation and optimizing gear shifts, IMT contributes to improved fuel efficiency. The system also enhances overall driving performance, providing a balance between manual control and the convenience of an automatic transmission.

In summary, the IMT system integrates electronic control to automate clutch operation, making manual gear changes smoother and more convenient for the driver. This technology aims to offer the best of both manual and automatic transmissions, providing an engaging driving experience with enhanced usability.

IV. MERITS AND DEMERITS

A. *Merits*

1) *No Jerking of Vehicle:* Smooth shifting of gears without nodding of head. In this version delay in gear shifting has been minimized.
2) *Creep Function:* IMT transmission is actually suitable in stop & go traffic, all you have to do is initiate breaking gently. For maneuver ahead you just have to shift to first gear and release the brake pedal slowly.
3) *Elimination of Engine Stall:* With the help of this version, it does not matter that you're in wrong gear or not at wrong speed, it will try to get along. In the worst scenario, it will give heavy warning in the cluster saying shift down.

B. *Demerits*

Complexity and reliability of system in the future is questionable due to the high maintenance and precaution of clutch system is required.

V. CONCLUSION

This is one of a kind transmission that has been customized to its extent. As the time surpasses people will adopt this ease of manual shifting without clutch.

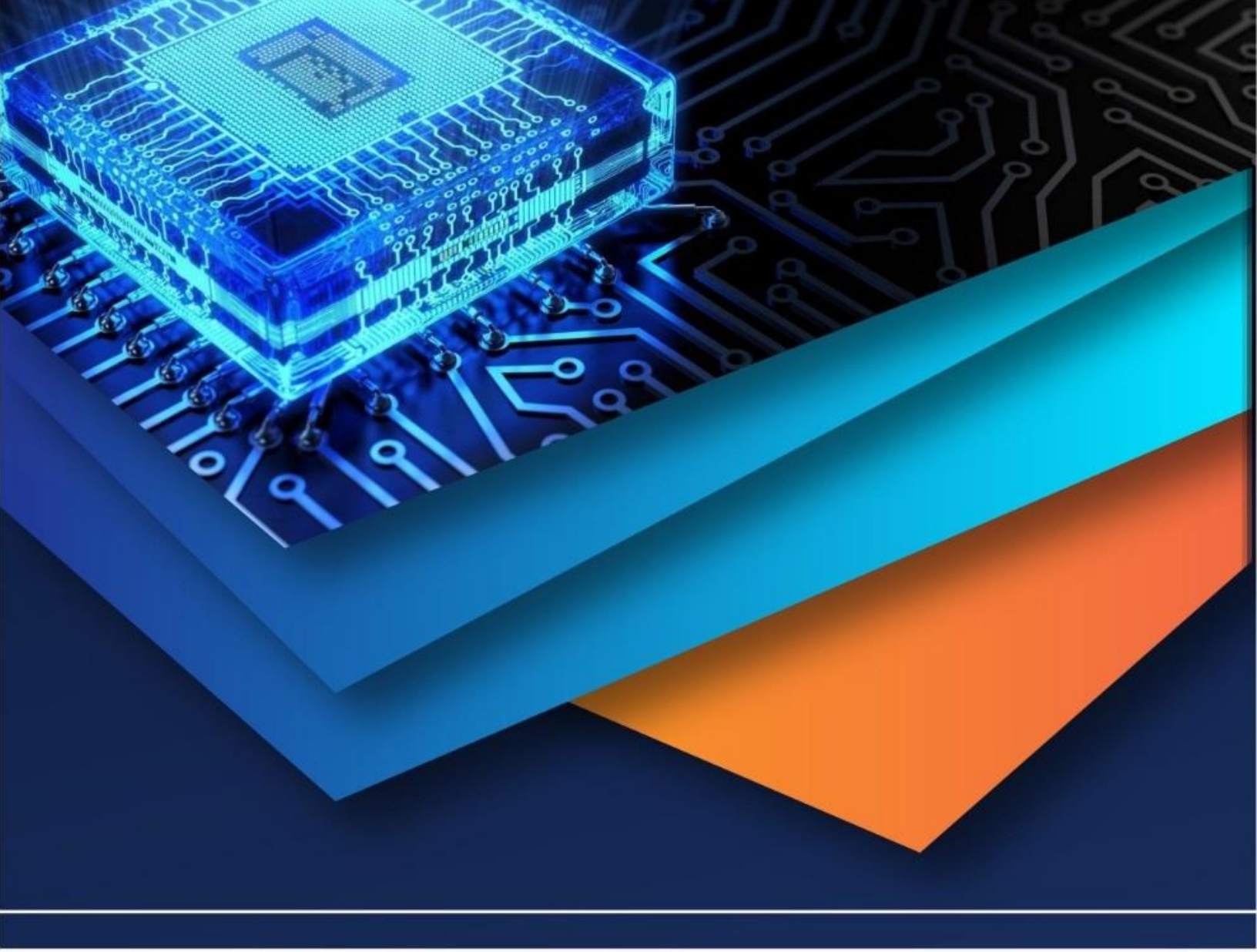
VI. ACKNOWLEDGEMENT

We appreciate the evolving technological adaption of KIA which inspires us to be more advance to face the upcoming future technological aspects.

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