ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 05, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

REDUCING FUEL CONSUMPTION AND EMISSIONS BY CONVERTING MODERN CARS TO ELECTRONIC SYSTEMS

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Annotatsiya: *Atrof-muhitning ifloslanishi va iqlim o'zgarishi global miqyosda jiddiy muammolarga aylandi. Transport sohasi, xususan, ichki yonuv dvigatellariga asoslangan avtomobillar uglerod dioksidi (CO_2) va boshqa zararli gazlarning asosiy manbalaridan biridir. Zamonaviy avtomobillarni elektron tizimlarga o'tkazish, ya'ni elektr va gibrid transport vositalarini joriy etish, yoqilg'i sarfini kamaytirish va atrof-muhitga chiqadigan gazlar miqdorini sezilarli darajada qisqartirish imkonini beradi. Ushbu maqola ushbu jarayonning texnologik, ekologik va iqtisodiy jihatlarini keng qamrovda tahlil qiladi hamda amaliy yechimlarni taklif etadi.*

Abstract*: Environmental pollution and climate change have become serious global problems. The transport sector, in particular, vehicles based on internal combustion engines, is one of the main sources of carbon dioxide (CO_2) and other harmful gases. The transition of modern cars to electronic systems, that is, the introduction of electric and hybrid vehicles, allows you to significantly reduce fuel consumption and the amount of gases emitted into the environment. This article comprehensively analyzes the technological, environmental and economic aspects of this process and offers practical solutions.*

Аннотация: *Загрязнение окружающей среды и изменение климата стали серьезными мировыми проблемами. Транспортная сфера, в частности, транспортные средства на базе двигателей внутреннего сгорания, являются одними из основных источников выбросов углекислого газа (CO_2) и других вредных газов. Переход современных автомобилей на электронные системы, то есть внедрение электромобилей и гибридных транспортных средств, позволяет существенно снизить расход топлива и количество выбрасываемых в окружающую среду газов. В данной статье всесторонне анализируются технологические, экологические и экономические аспекты этого процесса и предлагаются практические решения.*

Kalit so`zlar: *Karbonat angidrid(CO_2), azot oksidi(NO_x), elektron tizim, Tesla Model 3, kruiz kontroll, gibrid avtomobillar, avtopilot tizimi.*

Keywords: *Carbon dioxide (CO_2), nitrogen oxide (NO_x), electronic system, Tesla Model 3, cruise control, hybrid cars, autopilot system*

Ключевые слова: *углекислый газ (CO_2), оксид азота (NO_x), электронная система, Tesla Model 3, круиз-контроль, гибридные автомобили, система автопилота.*

Today, the automotive industry is facing serious global environmental problems, in particular, harmful gases emitted into the atmosphere and the rapid depletion of fuel resources. Modern electronic systems and digital technologies play an important role in solving these problems. The transition to electronic systems allows you to increase the efficiency of cars,

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reduce fuel consumption and minimize the impact on the environment. Electronic systems have become an integral part of modern cars. They play a significant role in controlling various components of the car, increasing efficiency and ensuring driver safety.

Figure 1. Internal combustion engines and electric motors.

Now let's look at the main types of electronic systems: - Electronic engine management system monitors and optimizes engine performance in real time. This system precisely adjusts fuel injection, air-fuel mixture and combustion process. As a result, fuel efficiency increases by 10-15%, while at the same time reducing emissions of harmful gases such as carbon dioxide (CO_2) and nitrogen oxides (NO_2). Hybrid and fully electric vehicles are much more efficient than traditional internal combustion engines.

Figure 2. Electric fuel station**.**

Electric motors use energy efficiently and reduce emissions to zero. For example, electric cars such as the Tesla Model 3 consume 3-4 times less energy per kilometer than conventional gasoline cars. Intelligent cruise control systems can optimize the speed and range of a car, reducing fuel consumption by 5-10%. Autopilot systems, on the other hand, minimize driver errors and select the most efficient driving style according to traffic conditions. Regenerative braking systems used in hybrid and electric cars convert kinetic energy during braking into electrical energy and store it in the battery. This reduces fuel consumption by up to 20% and significantly reduces the

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impact on the environment.

Figure 3. Modern electronic systems.

Electronic systems have a number of advantages in reducing fuel consumption: 1) Precise control - electronic systems optimize fuel consumption in real time, which prevents engine over-run. 2) Low emissions - increased fuel efficiency reduces harmful gas emissions, which is important in the fight against global warming. 3) Economy - Reduced fuel consumption is economically beneficial for drivers, significantly reducing fuel costs. Electronic systems are making great strides in reducing the amount of harmful gases emitted into the environment: carbon dioxide (CO_2) - hybrid and electric cars reduce CO_2 emissions by 50-100% compared to conventional cars; nitrogen oxides (NO_x) - electronic control systems optimize the combustion process, reducing NO_x emissions by 30-40%.

Conclusion

Electronic systems and modern technologies are an important step in improving fuel efficiency and reducing environmental problems in the automotive industry. However, in order to achieve full sustainability, it is also necessary to pay attention to green methods of energy production. States should expand tax incentives and subsidies for the introduction of electric vehicles, expand the network of charging stations and integrate them into renewable energy sources, develop battery recycling processes and minimize their environmental impact, exchange experiences through international cooperation and accelerate the introduction of innovative technologies, which will not only serve to protect the environment, but also ensure sustainable and efficient development in the transport sector. If new electric cars have arrived, it is also necessary to increase the number of personnel who understand this field well. In particular, during the operation of the car, various malfunctions may occur. As such cars increase in our country, we will also need specialists who understand this field well.

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