GAZ-EL Tech: An Innovative Method to Reduce Glare from the Sun While Driving Using Gaze and Electrochromic Technology

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Every year over 3000 automobile accidents occur due to the sun impairing a driver's vision for an extended period of time. While there have been attempts to solve this serious problem, such as sunglasses or sun visors, there are drawbacks to all of these "solutions" that fail to prevent or sometimes even increase the problem. This results in a severe lack of security which is a significant problem for the driver. Therefore, the goal of this engineering project was to enhance the innovative system previously created, GAZ-EL Tech, to maximize the reduction of the blinding sun glare. The system was enhanced to include infrared eye-tracking technology and a new and improved smart film matrix in addition to the smartphone eye-tracking application, light sensors, Arduino microcontroller, and smart films previously used. To improve the system, multiple infrared receivers along with an infrared emitter were installed in the vehicle directly in front of the driver, without obstructing the driver's vision. Additionally, a more accurate matrix of smart films that uses a greater amount of electrochromic smart films, smaller in size, was installed in order to tint more specific locations where the sun glares into the driver's eye. As a result, the system's accuracy was greatly improved. Following the final iteration, the system was able to increase the driver's visibility 95-100% of the time. Thus, the GAZ-EL Tech system proved to be an extremely viable solution that minimizes the potentially fatal effects of sun glare on a driver's vision, saving thousands of lives.