
THE IN-VEHICLE VIDEO SURVEILLANCE SYSTEM

Buying a car is among the most expensive and volatile purchases one can make. Every year, property losses due to motor vehicle theft total approximately \$7 billion, and unless the perpetrators can be identified, it is left to the victims and their insurance companies to resolve these losses. Beyond burglary, in the USA alone, it is estimated that over six million vehicle collisions occur every year. In each of these cases, law enforcers must rely on questionable evidence and contradictory testimonials to assign liability. If the wrong decision is made, the innocent victim can either pay tens of thousands of dollars in reparations and suffer absurd insurance rate hikes, or attempt to defend his or her case in court, leading to legal fees without any guarantees. All this assumes that the identities of both drivers in the collision are known, but when a parked car gets damaged, its owner has no means to track down the culprit, and must take care of the expenses without restitution. A solution to these issues with a reasonable, one-time cost would have the potential to save car owners thousands of dollars, and considering that there are an estimated 254.4 million registered vehicles on the road today, if even a small percentage of the population has the good sense to buy such a product, its producers could earn a sizable and dependable profit.

Enter the Vehicle Video Surveillance System, a unique and innovative product designed to protect car owners from the aforementioned fees and liabilities. The system will consist of two to four outward facing webcams, connected to a small, inexpensive computer. For each camera, a circular log of video is maintained at all times when the vehicle is in operation, using the storage available on the in-car computer. In order to handle parking lot incidents, when the vehicle is not in use, a low-power recording mode will be available to capture video only when motion is detected. An HTML interface to the device will be available via a wireless link, allowing the vehicle owner to modify device settings and manually download video log files. Optionally, the user can install a background service on a desktop machine to periodically download video data.

Alternative systems do exist to solve similar problems, but are usually little more than a single camera, and require users to interact with the device each time they start their vehicle. Though some systems have multiple cameras, they cost thousands of dollars, and are primarily geared towards monitoring the inside of the vehicle. All of the hardware our product would require is already available commercially at a very low cost. A plug computer, commonly priced at under \$200, would be capable enough to serve as the in-car computer. Webcams can be purchased for as low as five dollars each. Therefore, a prototype with four cameras¹ could be manufactured for approximately \$220, which is extremely cheap compared to some of the options already on the market. When materials are bought in bulk, the price will only decrease. Combined with sophisticated and unobtrusive software, our proposed product would have a significant advantage over any others in the market.

¹ See the figure below for a diagram of the connections between the six components of the system

Implementation of our product is heavily dependent on existing hardware and software interfaces. Considering the emphasis on cost over performance, it is unclear whether the computer we plan to use will be capable of handling video simultaneously from multiple cameras, or if we can obtain enough physical storage space to hold a useful amount of video. We believe that adjusting the video quality can mitigate both of these issues. Beyond implementation issues, there are inherent privacy risks involved in gathering continuous video and sending it across a network, which can be resolved by employing secure networking protocols and authentication.

For the client, purchasing our Vehicle Video Surveillance System provides financial protection that far outweighs the low one-time cost. For the manufacturer, the large number of car owners guarantees a sizable market. With your support, our team of six-to-eight highly trained software engineers can construct a working hardware prototype in ten weeks. Together, we can create a product that will make a difference in the lives of many.

