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Dash Cameras: The Unbiased Witness

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ABSTRACT:

In recent years, there has been a huge market boom in terms of supply and demand for dashcams. This is due to the purpose of the camera mounted on the vehicle. Drive recorders are now becoming indispensable tools for investigating various incidents. Detect violations of traffic rules and other laws, and record and interpret the course of traffic accidents or other crime-related events. The purpose of this camera is to monitor the space in front of and behind the vehicle and the situation inside the vehicle. The content of this research paper is intended to introduce the reader to basic information about dash cams. Specifically, individual parts of the paper deal with the importance and significance of dashcams, the benefits of their use, and the legal framework regulating their use. It concludes with a brief overview of innovative approaches based on the use of dashcams to increase road user safety while driving a vehicle.

Keywords: Dashcams, Vehicles, Cameras, video, Driver.

1. INTRODUCTION:

A dash cam is a special subset of a video surveillance system that records road conditions through the vehicle's windshield. The main reason for their use is to ensure vehicle safety. Vehicle safety means, among other things, the objective recording of traffic accidents and

other traffic safety-related events to reduce the uncertainty of witness statements and the misinterpretation of experts. Another advantage of dashcam video is that it helps insurance companies resolve claims issues more efficiently. The motivations for installing dash cams vary, for example, insurance companies can offer drivers better premiums, or they can collect evidence to prove themselves in court. Video recording from vehicle-mounted cameras can help insurance companies process claims faster. Many insurance companies offer premium discounts to policyholders.

Despite the presence of potential threats. Privacy threats and intrusions into citizens' data, and video recordings from dashcams can help achieve the right goals and protect citizens. Designers have come to implement cameras in vehicles as one of the basic elements of vehicle equipment. This means that images are not only taken while driving, but also automatically evaluated to minimize risks for vehicle occupants. As an example, Russo's research describes his two different algorithms in near real-time using data recorded by dash cams: one to identify semaphore states and one to track and detect vehicles. is mentioned. Digital footprints such as video recordings from

dash cams are the most valuable resource regarding the course of an accident or other crime-related event (CRE). It includes information about not only the vehicle, but also the spatiotemporal context, or information about

the visibility of the driver. This provides an objective source of information for later expert image analysis and forensic casework.

The purpose of this article is to familiarize the reader with the topic of dash cameras using general knowledge.

2. Working of a Dashboard camera.

The name dash cam is a bit misleading, as the dash cam isn't actually connected to the dashboard. A small camera that can be attached to the windshield with a bracket like a navigation system. It is typically powered by his 12V cigarette lighter socket in the car and contains a Secure Digital (SD) card for recording road footage while driving. If there is no incident, the camera will just rewrite the old footage. The larger your camera's SD card, the more footage it can record before it's overwritten. However, if you run into an incident along the way and need to save a copy of the footage, you can transfer it to your computer via an SD card. Most dashcams don't come with an SD card, so you'll need to purchase one separately. Almost all dash cams support at least 720p resolution, and some even support 4K images. Other features include Global Positioning System (GPS) tracking position and speed, G-Force sensors for collision detection, and Wi-Fi to stream footage from your dashcam to your phone. Some dash cams also have a parking mode that automatically starts recording if the car collides while parked. It could also include an SOS feature to alert emergency services if it detects a collision. You can also purchase a cabin camera to record inside your vehicle and a rear window camera to cover the road behind you. The more money you spend, the more sophisticated features you get. When purchasing a dash cam, it should be placed correctly behind the rear-view mirror so as not to block your view of the road. It's also a good idea to tuck the cord into the car's trim panel so it doesn't hang out and get in the way. It is illegal to operate a dash cam while driving and taxi drivers must inform passengers if their vehicle is equipped with a dash cam.

To understand the difference between a dedicated dash cam and a generic device, you need to understand how dash cams work. Unlike

general-purpose recording devices, dashboard cameras are typically no-frills, often overlooking flashy bells and whistles like power buttons and recording controls in favor of solid day-to-day performance. The prototype dash cam consists of a handful of basic components.

A camera captures the action.

Hardwired Power Input:

Battery-powered dash cams can run in the car if desired but must be taken out for charging. Simply plug it directly into your car's electrical system or into your cigarette lighter and you're good to go.

Internal or Removable Solid State Storage:

It's fine to have a dashcam with storage built in, but it's better if the storage is removable. Solve your headache by choosing a dash cam that accepts a micro SD card. For the dashboard camera, the function follows the format. So looking at this sparse list of components should give you a pretty good idea of how they work. Without the on/off switch, the dashboard camera is typically connected to a circuit that only heats up when the ignition key is in the start or run position. For added security and a lower risk of draining the battery, the camera can also be connected to constantly hot circuits. Without any kind of recording control, dashboard cameras are usually designed to record continuously when turned on. Others have a security option that only records motion when it senses it. You can see that it is designed to turn on automatically and start recording. This is in contrast to general-purpose portable recorders. Almost any recording device can be used as a dash cam, but you have to turn it on and set it to record every time you get in your car. The allure of custom-made devices is easy to understand if you can imagine a random accident scenario.

What happens when the memory is full?

If you've used portable recording devices such as cell phones or digital cameras, you've seen what happens when the storage media fills up. The device will immediately stop recording. If you want to continue recording, you need to free up space or insert a new memory card.

On the surface, this seems like a big problem for dashboard cameras. They're always recording, so expect it to fill up quickly. Even if you use a large

SD card for storage, it'll fill up soon, right? And who wants to mess around with memory cards while driving?

This is another area where custom-built dashboard cameras tend to outperform their alternatives. Unlike general-purpose recording devices, dashboard cameras are typically designed to automatically overwrite the oldest files on your storage media when it fills up.

This is a terrible feature when built directly into a digital camera or iPhone because you could accidentally delete something you want to keep, but it's great for surveillance and surveillance device.

3. Pros and Cons of Dashboard Cameras.

THE PROS:

First, we will look into the advantages of a dashcam installation on the vehicle. How it brings safety and security to the vehicles.

Enhanced Protection:

The dashcam acts as enhanced protection for the vehicle. As dashcam records, all the incidents occurred during the trip both the cabin and road view, if the application supports it will record while parking too. This footage will come in handy in case of accidents as it will act as proof to the police, law authorities, and insurance companies. It is the real eyewitness of the incidents to protect your security and safety.

Additional Security:

In certain dashcams, there will be in-built GPS tracking functionality to track the vehicle and purposes to review the driver's driving behavior and can be used as study material to improve the safe driving experience.

Cons

In this segment, we will analyze some of the disadvantages of dashcam installation on vehicles.

The Cons:

Driving Distraction

The dash cam is a good product that is reliable for safe driving and real-time vehicle monitoring, but

record the dashcam footage. In extreme circumstances, if anyone stole the vehicle, the vehicle can be traced using the dashcam GPS to identify the location, in such scenarios it acts as additional security to the vehicle.

Insurance Premium Discounts:

The dashcam adds more advantages to the vehicle owner on the insurance premium front. Certain insurance companies work on the insurance premium on certain added features included in the vehicle.

The insurance company encourages those who want to prevent unwanted incidents, to focus more on safety and precaution. In that case, installing a dashcam is to improve the safety standards of the vehicle and driver.

So, the fleet owners get the discounted price on the insurance premium from certain insurance companies on installing the dashcam, one small investment leads to multiple savings.

Evidence:

For most road accidents in India, police depend on CCTV camera footage and eyewitness during the accidents. In most cases, there will not be any clear picture of the incidents.

Having a dashcam on the vehicle will create evidence with the cabin and road view camera installed on the vehicle dashboard.

The footage from the dashcam can be used as evidence before the law to prove the innocence of the driver (If he is innocent, or else the footage evidence may backfire against the driver and vehicle owner).

Safe Driving Improvement:

A dashcam is a powerful tool that helps to improve safe driving for drivers and personal vehicle users. The footage video can be used for the study

at the same time, it could be a material for driving distractions.

Usually, the dashcam will be fixed on the vehicle dashboard or at the windshield, in certain instances while driving the vehicle the dashcam may create blind spots for the drivers.

The dashcam will be in the size of mobile or tablet size and certain dashcams, will have a display in-built in it, it will create a distraction with videos streaming in it and at times with some alert notifications.

Invade to Privacy:

This is one of the major drawbacks of dashcam installation on vehicles. The dashcam will record all the activities happening inside the vehicle using a cabin view camera, it may invade the privacy of individuals who travel in the vehicle.

Though the driver may aware that he/she is being recorded, the installation of the dashcam is affecting individual privacy in this circumstance. The next scenario is installing a dashcam on the passenger vehicles, it will record all the details using the cabin view mode. The passenger in the vehicle may not aware of the fact of the installed dashcam and they are being monitored and recorded using the dash camera on the vehicle. It is seriously a breach of privacy under such scenarios.

Legality:

Dashcams are allowed to be installed on vehicle by the law of land in certain countries and it is banned to install in certain regions. As it violates the privacy policy, it records all of the incidents that occurred on the vehicle, which is against the law in certain parts of the world.

Price and Quality:

Pricing is one of the major concerns for any product and technology advancement, but for dashcams, the products are evolved, and the demand is increasing with competitors in the market, so the vehicle owner can choose the dashcam as per the requirement at the competitive price.

The quality of the video recording on the dashcam may poor in certain variants of the dashcam, because of this, there may be propaganda not to using dashcam as it does not provide high-quality videos. But in the market, there is a high-quality resolution dashcam with 1080p available now, that provides HQ video clips.

4. Types of Dashboard cameras and what do they do?**A. Front dash camera.**

Location: Windshield

What it records?

- Road in front of the vehicle

These dash cameras are designed to detect collisions through a lens aimed at the road. It is also

suitable for capturing footage that can be used to guide drivers and protect against false claims. These cameras do not record on the dashboard.

B. External Dash Camera.

Location: Outside the vehicle, usually on the side.

What is captured: 360-degree view around the vehicle.

These dashcams provide a 360-degree view of the vehicle. When driving a vehicle with blind spots or requiring difficult turns. Video footage can be used to protect drivers from tolls by other road users. This is especially useful for fleets dealing with many road collisions.

C. Rear Dashcam

Location: Outside the vehicle, usually near the license plate.

What is captured: The area behind the vehicle.

These dashcams record the road behind the vehicle. Great for object detection when the driver is backing up.

D. In-Car Dash Cam

Mounting Location: In Car, Usually Trailer.

Contents Recorded: In Car (especially useful for fleets that use male instructors to train female drivers). Also, if you can verify that a thief is registered, they are less likely to steal your goods or break into your vehicle.

E. Double-sided dash cam

Position: Windshield.

What to record: Road in front of car and driver in the cab

The camera faces the road, but his second to record in the cab also has a lens.

5. Public Survey:

First, we surveyed people to get information about their attitudes through Google forms and data collection services.

5.1 Questionnaire:

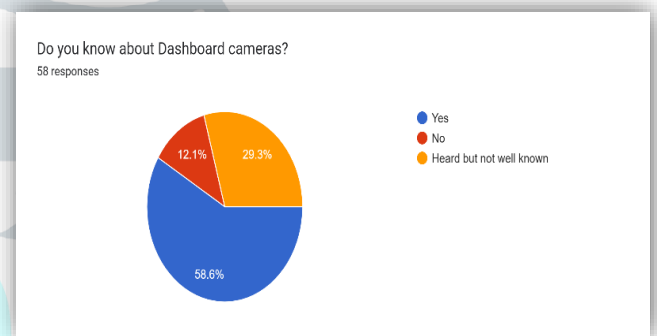
- Do you know about Dashboard cameras?
- How useful do you feel is a dash camera in a vehicle?
- How often do you come across road accidents?
- Do you feel dash cameras can decrease road rage and accident incidents?
- Will you recommend dash cameras to a driver who drives daily?
- How useful will be the audio data and video data recorded in a dash camera for accident analysis?

- What is your opinion on whether the government should make this camera mandatory on every vehicle you buy?
- Do you think the data will be useful for insurance claims if an accident happens?
- Your views on how you find a dashboard camera useful.?

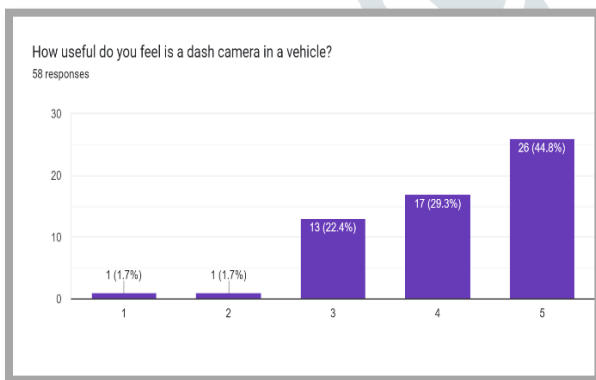
5.2 Results:

Following are the results of the poll conducted online through Google Forms.

1) Do you know about Dashboard Cameras?

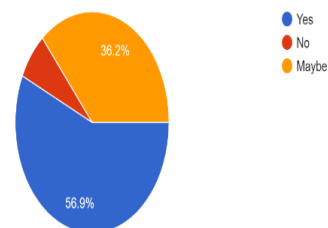


2) How useful do you feel is a Dashboard camera in a vehicle?

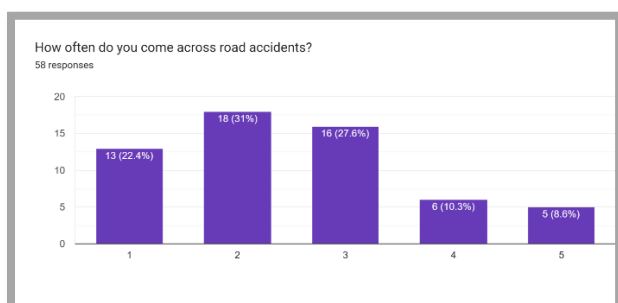


4) Do you feel dash cameras can decrease road rage and accident incidents?

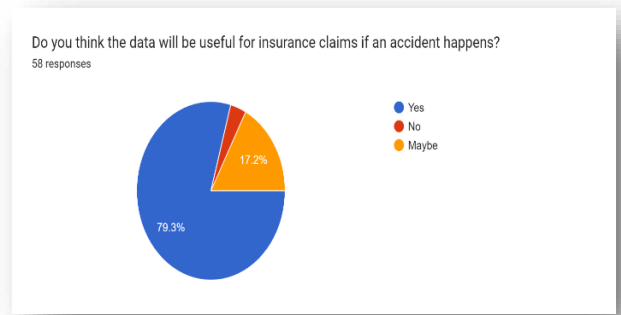
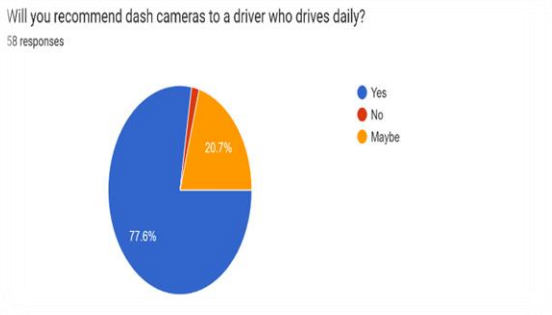
Do you feel dash cameras can decrease road rage and accident incidents?
58 responses



3) How often do you come across road accidents?

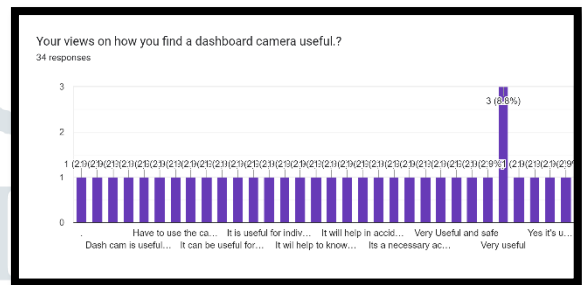
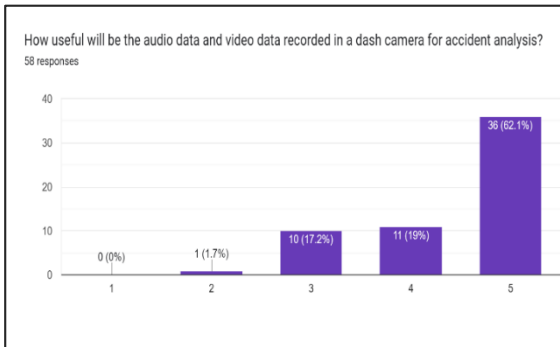


5) Will you recommend dash cameras to a driver who drives daily?



6) How useful will be the audio data and video data recorded in a dash camera for accident analysis?

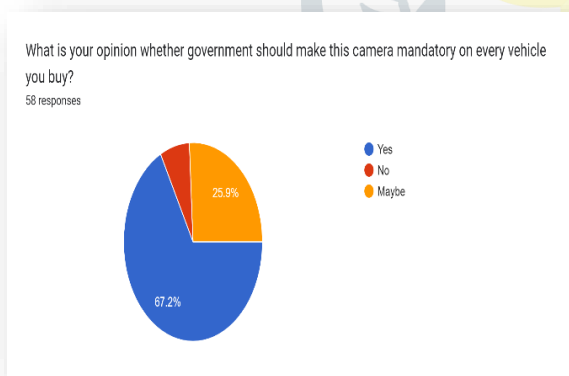
9) Your views on how you find a dashboard camera useful.?



7) What is your opinion on whether the government should make this camera mandatory on every vehicle you buy?

6. Descriptive Statistics:

Descriptive Statistics is a means of describing features of a dataset by generating summaries about data samples.



Mean	1.719298
Standard Error	0.119403
Median	1
Mode	1
Standard Deviation	0.901475
Sample Variance	0.812657
Kurtosis	-1.52396
Skewness	0.59577
Range	2
Minimum	1
Maximum	3
Sum	98
Count	57
Confidence Level(95.0%)	0.239193

8) Do you think the data will be useful for insurance claims if an accident happens?

Table 6.1

How useful do you feel is a dash camera in a vehicle?	
Mean	4.140350877
Standard Error	0.126249635
Median	4
Mode	5
Standard Deviation	0.953163839
Sample Variance	0.908521303
Kurtosis	0.551278746
Skewness	0.931331596
Range	4
Minimum	1
Maximum	5
Sum	236
Count	57
Confidence Level(95.0%)	0.252908409

Table 6.2

How often do you come across road accidents?	
Mean	2.508772
Standard Error	0.160518
Median	2
Mode	2
Standard Deviation	1.211888
Sample Variance	1.468672
Kurtosis	-0.47956
Skewness	0.54027
Range	4
Minimum	1
Maximum	5
Sum	143
Count	57
Confidence Level(95.0%)	0.321557

Table 6.3

Do you feel dash cameras can decrease road rage and accident incidents?	
Mean	1.771929825
Standard Error	0.12520045
Median	1
Mode	1
Standard Deviation	0.945242672
Sample Variance	0.893483709
Kurtosis	1.742976102
Skewness	0.480121619
Range	2
Minimum	1
Maximum	3
Sum	101
Count	57
Confidence Level(95.0%)	0.25080664

Table 6.4

Will you recommend dash cameras to a driver who drives daily?	
Mean	1.403509
Standard Error	0.105784
Median	1
Mode	1
Standard Deviation	0.798652
Sample Variance	0.637845
Kurtosis	0.388095
Skewness	1.526394
Range	2
Minimum	1
Maximum	3
Sum	80
Count	57
Confidence Level(95.0%)	0.211911

Table 6.5

How useful will the audio data and video data recorded in a dash camera for accident analysis?	
Mean	4.421052632
Standard Error	0.111796025
Median	5
Mode	5
Standard Deviation	0.844041477
Sample Variance	0.712406015
Kurtosis	0.054208377
Skewness	1.127938485
Range	3
Minimum	2
Maximum	5
Sum	252
Count	57
Confidence Level(95.0%)	0.223954349

Table 6.6

What is your opinion on whether the government should make this camera mandatory on every vehicle you buy?	
Mean	1.596491
Standard Error	0.117032
Median	1
Mode	1
Standard Deviation	0.883573
Sample Variance	0.780702
Kurtosis	-1.10914
Skewness	0.903267
Range	2
Minimum	1
Maximum	3
Sum	91
Count	57
Confidence Level(95.0%)	0.234444

Table 6.7

Do you think the data will be useful for insurance claims if an accident happens?	
Mean	1.385964912
Standard Error	0.102458458
Median	1
Mode	1
Standard Deviation	0.773544393
Sample Variance	0.598370927
Kurtosis	0.671186147
Skewness	1.59621784
Range	2
Minimum	1
Maximum	3
Sum	79
Count	57
Confidence Level(95.0%)	0.205248955

Table 6.8

7. Findings:

- I. Out of the whole survey conducted it was seen that 58.6% of the people know about dashboard cameras, 12.1% of people do not have an idea about it, and 29.3% of people have heard of but do not have an idea about what exactly dashboard cameras are.
- II. Out of the total responses 44.8% of people think that the camera is most useful to be installed in a vehicle, and 29.3% people find it important to install the camera, 22.4% people have mixed opinions about it. 2% found it not useful.
- III. Coming to the number of road accidents 22.4% of people have not seen much often 31% of people have seen few, 27.6% of people have seen some more accidents, 10.3% of people have come across more accidents, 8.6% of people have seen the accident most frequently.
- IV. When asked how many people feel dash cameras can reduce road rages and accidents 56.9% of people think it can be helpful, 36.2% people feel that it may reduce it and may not as well, and 6.9% people feel that it is not useful.

- V. When it comes to daily drivers a question was asked whether you will recommend it or not. 77.6% of people will recommend it to the drivers they see or meet. 20.7% of people are confused because they do not know about the working and functions of dash cams, and 1.7% would not recommend them as shown in the results.
- VI. When asked about whether the video and audio data recorded is useful or not, 62.1% of people think that it is very useful when it comes to safety 19% of people think that is useful for the security of the drivers. 17.2% of people think it neutrally, while 1.7% of people think it is not that useful.
- VII. When asked to people whether the installation of cameras should be made mandatory by the government response was 67.2% in favor of Yes, 25.9% thought that it may or may not be and should be left over by the government, and 6.9% had negative thoughts about it.
- VIII. When talking about accidents, insurance comes into the picture where 79.3% of people feel that it will be useful to claim insurance by showing the data in the dashcams that are recorded, 17.2% thought it neutrally, 3.4% thought it is not that useful for such things.
- IX. At last the people were asked about their opinions regarding the useful things about dashcams different people had different things to say.

8. Conclusion:

A dashboard camera (Dashcam) has proven to be an effective tool for recording traffic

accidents. Traffic offenders cannot claim that their incidents have been recorded, seen, and shared with others about the probable cause of the accident. to identify video footage recorded on the streets of Mumbai. The timing of the accident can be observed in real-time from the onboard camera recording, and the image can also be captured and enhanced by digital image processing technology. It is hoped that road drivers who see these crash videos will become more and more alert on the road while driving. The attempt in this paper is to control traffic accidents that occur in daily life through a traffic monitoring system using a dashboard camera.

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