Query optimization

The solution will bring down the use of specialized hardware thus helping reduce cost and making implementation faster and easier. We shall use a pattern matching algorithm to compare the drivers' driving style to predefined patterns depicting rash driving. These patterns will be based on a number of various parameters such as speed of the vehicle, radius of turns etc. If the patterns are matched then an alert will be generated in the form of a message, alarm or call. Keywords - Mobile Phones, Sensors, Driving Pattern, Android l. INTRODUCTION It goes without saying; a majority of accidents which occur are due to rash driving.

Crashes caused by lack of alertness in vehicle drivers pose a serious danger to people. This is hazardous not only to drivers themselves but also often to the general public. According to the report of U. S. National Highway Traffic Safety Shish Chuddar et. Al. Administration (NATHAN), more than a million people have died in traffic crashes in the United States since 1966. Also the main reason for the occurrence of these disasters was reckless driving. Till date, the detection of rash driving has been based on visual observations by patrol officers.

But detection through visual observations does not possess satisfactory results. So it is essential to develop systems that actively keep track of driver's operating situations and generate alert on any insecure conditions to prevent accident. It is preferable that the actively monitoring system is real-time monitoring system with quick response, reliable with accurate performance, intrusive and has low cost. Mobile phone being a self-sufficient device, presents a mature hardware and softwareenvironmentfor the development of active rash driving monitoring system.

The system based on mobile phone can function effectively on its own because mobile phones are highly portable; all necessary components are already integrated therein, and theircommunicationservices have vast coverage. The minimum requirement for such a mobile phone platform is the presence of simple sensors, e. G. , accelerometer and orientation sensor. Now- 2131 wry. I]cams. Org a-days, many phones, especially smart phones, meet this requirement In this paper, we emphasize on using mobile phones as the platform for rash driving detection system development, as they provide the combination for detection and communication functions.

We shall build a yester that compares the driving style of the driver to predefined patterns depicting rash driving. These patterns will be based on a number of parameters like speed of vehicle, lane position maintenance and radius of turn. Driving patterns will be matched at real time. If the pattern matches the pre-stored pattern obtained in rash driving cases, immediately an alert would be generated and a message would be send to a concerned person. The performance of our system is evaluated by conducting real driving tests.

During these tests, we drive regularly or imitate the rash driving related behaviors. We also vary the position and orientation of mobile phones in the vehicle for the purpose of validation. The results show that our detection system achieves good performance in terms of false negative and false positive. In particular, this paper is organized as follows: Section II represents the methodology involved in Rash Driving Detection which includes Mobile Orientation, Pattern Generation and Matching and Alert Generation.

Section Ill represents the Mathematical Model that describes the input, output functionalities along with the success andfailurecases. Section IV represents the System Design here we have mentioned about the nature of algorithm to be used for pattern matching. Section V represents the Energy Efficiency of the system. Section VI contains the implementation details of our system. Section VII concludes this paper. RASH DRIVING DETECTION A. Mobile Orientation The acceleration readings are provided by accelerometers in directions of x, y, and z axis, correspondingly represented by Ax; Ay and Az.

Acceleration readings in direction of x-, y-, and z-axis are with regard to the body of the mobile phone. A mobile phone's orientation can be determined by orientation angles, I. E. Pitch and roll values. Pitch and roll represent the rotation around y-axis and z-axis. In the simplest case, we assume that the mobile phone is laid flat in the vehicle, with the top of phone toward the head of vehicle, so that the accelerations on x-axis and y-axis represent the lateral and longitudinal accelerations of vehicle, respectively.

However, the real situations are more complex. The mobile phone may be laid in the vehicle arbitrarily, neither flat nor heading toward the head of the vehicle. Therefore, we set a calibration procedure to help the system determine what direction is longitudinal. 2132 B. Pattern Generation and Matching The calibration procedure begins to work when the system detects the vehicle starts to move. Its starting movement gives the mobile phone a continuously initial longitudinal acceleration, either forward (to get off directly) or backward (to back off the vehicle first).

We denote this acceleration as vector AAA. It is much different from that in human movement. Next, we denote the angle between vector Ax and AAA as the angle between vector Ayah and AAA. These two angles are calculated as: driver's side and a message is sent to a person whose contact details are taken into he system initially at the time of installation of the application. The message would contain a link providing the latitudinal and longitudinal coordinates of the current position of the driver. The exact location is determined through GAPS.

Thus, if the message is successfully delivered, an alert notification would be generated at the driver site and the driver will be rescued with the immediate effect. MATHEMATICAL MODEL S= {Ax, Ay, AZ, eye , ex, If, C, Altar, Alone, An, Ink, save, sham, Dry, AAA, LLC , SEC, UP, IF, FAA, Deed, Then the lateral and longitudinal components of acceleration are calculated using the formula: We have stored the test cases of rash driving data in a file. At run time, we will be matching the above obtained values with the pre-stored data using an efficient pattern matching algorithm.

Let S be the system that describes " Mobile based monitoring of driving patterns. " Let A is the set of x, y and z components of acceleration. Let O is the set of pitch and roll values obtained from orientation sensor. Inputs: {Ax, Ay, Az 0= { eye , Oz} Let C is the set of lateral and longitudinal components of acceleration. Output: C = {Altar, Alone } Function: Sec: (A, 0) -+ C Where F is a non-injective function C. Alert Generation Once the pattern is successfully matched, an alarm is generated at the 2133 Let V is the set representing the average speed reached during driving and the maximum speed of the vehicle.