NapX: Safety Alert Mobile Application to Detect Drowsy Drivers

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Various studies have shown that nearly 100,000 police-reported crashes occur each year because of drowsiness. NapX employs multiple sensors to proactively warn users when symptoms of drowsiness or cardiac abnormalities are observed. NapX measures behavior changes such as heart rate, eye movement, yawns, vehicular acceleration and lane movement to detect drowsiness. If the symptoms meet the predefined threshold, then the alerts are triggered and dispatched to preconfigured contacts. NapX consists of three detection modules and a dispatch module. The Heart Rate module calibrates users' resting heart rate and determines drowsy or abnormal heart rate. Datasets of 8,000 images each for face and eyes were trained to determine and record various patterns in order to process the images. The Image Detection module, using the front facing camera, detects face and eye patterns to determine if the driver's eyes are opened or closed. The Image Detection module also identifies yawns by monitoring the area of contours and face. The GPS sensor is used to determine the rate of acceleration and deceleration. Finally, the accelerometer sensor monitors lane position to determine the deviations of the vehicle. If the symptoms are detected, alerts are triggered in the form of visual and audio playback on the device, email and text message appended with the current location. This application was fully designed, developed, and debugged using Java language in the Android Development Studio. Application was validated for complete functionality, deployed, and documented. NapX is an integrated, economical solution to proactively detect drowsiness and cardiac abnormalities.

Awards Won:

Fondazione Bruno Kessler: 1st Alternate