

Volume

1

DRIVER DISTRACTION MANAGEMENT USING SENSOR DATA CLOUD

For A Safer Driving Experience

Users Manual

FOR A SAFER DRIVING EXPERIENCE

DRIVER DISTRACTION MANAGEMENT USING SENSOR DATA
CLOUD

© Green Networking Research Group
Mokarram Bhaban, University of Dhaka
Dhaka- 1000, Bangladesh
Phone +880 2 9661920 • Ext 7421 • Fax **+88 02 8615583**

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Introduction to the Device

If you are a driver or employer of one, this product will help you to ensure safety of the driver and keep him/her extra vigilant while driving. You will be installing the system in your car using the a few accessories. First you need to ensure you have the following:

ITEMS
1. Raspberry PI Module
2. Alcohol and temperature circuitry
3. Digital blood pressure machine with Wi-Fi support (Blipcare)
4. Smartphone as hotspot
5. Car USB hub charger plug
6. USB power cable
7. HD Webcam
8. SD Card
9. 3G/HSPA Modem + 3G SIM card
10. USB to micro-USB power cable

Make sure you have it all

RASPBERRY PI MODULE

It is the heart (main control and communication module) of the whole system. You will now integrate the accessories with it. Have a look at the raspberry module on Figure 1.



Figure 1: Raspberry PI module

ALCOHOL AND TEMPERATURE CIRCUITRY

This looks like a typical circuit board. Attached with it are two very important sensors: temperature and alcohol. This will be used to detect whether the driver is suffering from unusual temperature or is driving drunk. Look at the figure below:

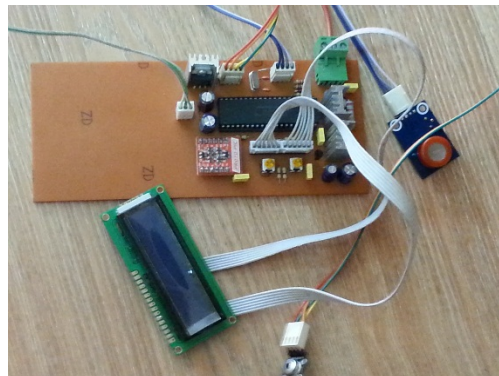


Figure 2: Alcohol and temperature circuitry

DIGITAL BLOOD PRESSURE MONITORING MACHINE

This device will be used to measure the blood pressure and heart rate of the driver. It is paired with a smartphone which will serve as a communication device for the readings. See the figure below:



Figure 3: Digital blood pressure monitoring machine paired with Smartphone

SD CARD

This is a typical SD card we use as memory card for our smartphones. It will store the essential information of the entire system. See the figure below:



Figure 4: SD card

HD CAMERA

This is a regular HD camera you see attached to a desktop or laptop. See the figure below:

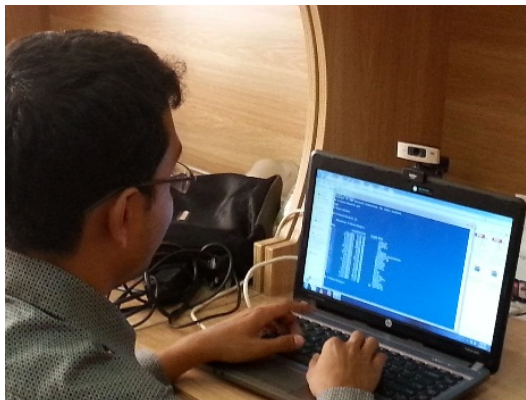


Figure 5: Developer testing the HD camera

USERS GUIDE TO SAFER DRIVING

SMARTPHONE

Any 3rd generation mobile phone. It will be used as a hotspot for Wi-Fi network. It will be paired with the blood pressure monitoring machine. See the figure below:



Figure 6: Smartphone

3G MODEM

It will hold the 3G sim card to provide network connection to the Raspberry PI module and handle all communication with the website. See the figure below:



Figure 7: 3G modem

ESSENTIAL CONNECTORS

For connecting all the components you would need some connectors. Mostly cables such as USB to micro USB, car USB charger cable etc. Follow the figure below:

Easy Steps to Install the Device in Your Car

Once you have all things, you are good to start. Follow the steps below:

Connecting the Accessories

INSTALLING THE SD CARD

At first take out the Raspberry PI module and insert the SD card as directed in the figure below:



Figure 8: installing SD card

INSTALLING 3G MODEM

To access the Internet you need 3G HSPA modem. Insert the 3G modem into any of the USB ports of Raspberry PI. As shown in the figure below:



Figure 9: installing 3G modem

INSTALLING THE TEMPERATURE AND ALCOHOL CIRCUITRY

This step is a bit complicated. So, please be very attentive while doing this. A Three pin cable connected to alcohol and temperature sensor circuitry is used to connect it to Raspberry module. There is a 26 pin interface attached to Raspberry module. The connecting cable of the alcohol and temperature circuitry is attached to the 3rd, 4th and 5th pin of the module as shown in figure

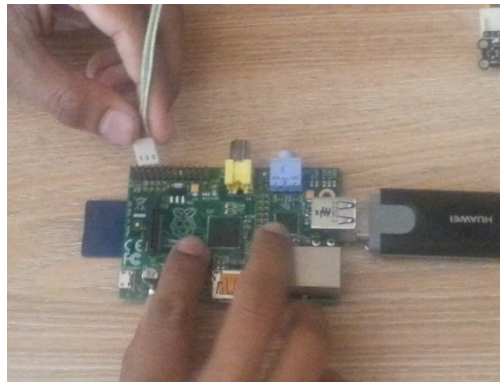


Figure 10: installing alcohol and temperature circuitry

INSTALLING THE HD CAMERA

Connect the camera to one of the USB ports of Raspberry module. Place the camera in the driving dashboard in front of the driver. See the figure for reference:

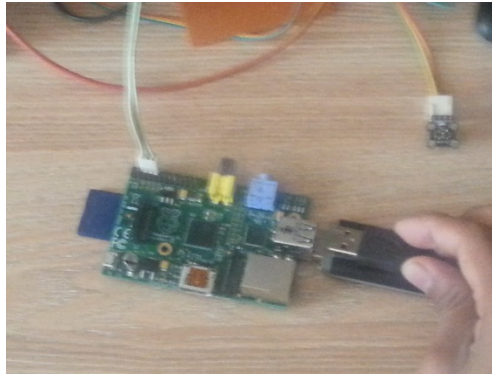


Figure 11: installing HD camera

INSTALLING BLIPCARE

For blood pressure and heart rate monitoring you should setup and use the digital blood pressure monitoring machine Blipcare accordingly.

- i. Setup the smartphone as a hotspot using the wireless tethering feature
- ii. According to the manual of the machine configure it to use the hotspot created in the previous step to access the network of smartphone.
- iii. Follow the instruction to learn how to correctly measure blood pressure

See the figure below:



Figure 12: Developer using Blipcare device

Powering up the Module

To power the system use a 2 Amp 5 Volt adapter or power supply. Insert the adapter according to the figure below:



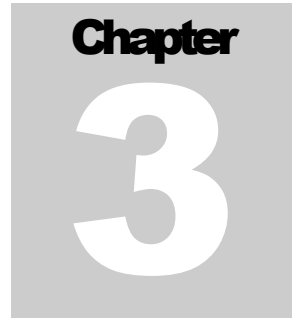
Figure 13 plugging in power cable



Figure 14 after successfully powering the device

Placement of the components

- i. The temperature sensor should be placed on the body of the driver with access to the skin.
- ii. The alcohol sensor should be placed near driver's mouth to sense the alcohol level correctly.
- iii. The cuff band of the blood pressure monitoring device should be appropriately worn as suggested in the corresponding manual.
- iv. The camera should be placed in a manner that it could easily have view of driver's face.



Usage Options

When you see a light blinking on the Raspberry PI module you will know you are now ready to use the module for a safer driving experience.

The Website

All the usage options and functionalities are integrated in our website: “Driver Distraction Management Using Sensor Data Cloud”. Here we explicitly describe the usage options of the website

LOGGING IN AND GETTING STARTED

There are two ways to log in to the WordPress or “back end” of the website.

You can either log in with an administrator account on the website itself (<http://driverdistraction.gnrbd.net>) or you can go directly to the link for the WordPress Dashboard by going to:
<http://driverdistraction.gnrbd.net/wordpress/wp-login.php>

All other Members have accounts with Editor Permissions.

Login information of the website is given below.

Username: _____

Password: _____

This is just a quick introduction to what I will be calling the parts of the website throughout this document. Driver Distraction is using the Light folio theme by Dynamic WP. This theme is very flexible and will allow “Driver Distraction” to do everything it wants to do with the site and gives “Driver Distraction” the ability to grow or change in the future. Below are descriptions of the basic elements of the site.

WEBSITE ELEMENTS

Header

This is a static image that appears on all of the site's pages and posts. It is easily changed through the Appearance tab on the WordPress Dashboard.

Top Navigation

This is a list of the pages on the site. These tabs are automatically created whenever you create a new page. Pages are not posts. You can add a page and exclude it from the Top Navigation, but most needs are covered by creating a post. Posts are never included in the Top Navigation.

Content Area

This is where the content in every page or post is displayed.

Sidebar/Widgets

This is another area of the site controlled by the Appearance tab. currently, the Sidebar only contains three Widgets.

Footer

This is where the copyright information is for the website.

The way you'll be accessing the inner workings of the site is through the WordPress Dashboard. At first, this page might seem a little complicated, but most of it is just extra WordPress information you can easily ignore. I've broken down the basic parts of the Dashboard for you.

Site Link

This is the easiest way to get back to the website. It's accessible from anywhere within the Dashboard.

Login Info

This is where your account information is displayed. You can also log out of the Dashboard and the site by clicking the Log Out link.

Comments

Comment information is displayed here. You can see how many comments you have on posts and pages, how many of those you've approved, how many are pending approval, and how many you've marked as spam.

Quick Press

This is a spot to quickly add a post to the site. I don't recommend using it because it makes it too easy to make duplicate posts.

Recent Drafts

Here's the quickest way to get back to what you were working on.

Sidebar Tabs

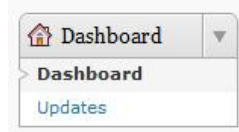
This is where you'll access everything you need to work on the site.

Plug-in News and WordPress News

These are automatically generated news boxes about available plug-ins for WordPress blogs and general WordPress Site News.

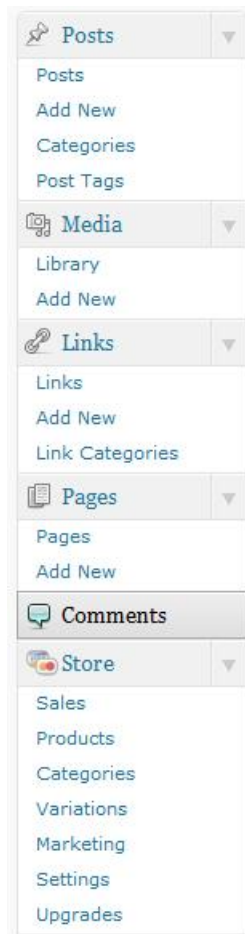
Dashboard Left Side Tabs

This is where you access everything on the site. I'll be working from the top box down and explain what they all do.



The Dashboard Box

This is the fastest way to get back to the dashboard's main page from anywhere else in the dashboard. This is also where you'll be notified of any updated to WordPress or Plug-ins.



THE CONTENT BOX

The Posts Tab

When you click on the Posts tab you'll get a drop down that gives you everything you need to add or edit an individual post.

The **Add New** link does exactly what it says. This is where you'll click when you want to add a new post.

The **Categories link** leads you to a page where you can add categories to better organize the site's content. Currently, there are no categories, but this feature might be useful in the future.

Post tags are like Categories, but more specific. This is where you'd go to see all of the tags you've used on your site and you can also use this page to add any new tags.

The Media Tab

This is how you can see what images you've uploaded for the Header section (see pages # and # for more information about the Header). You can also add new media here by clicking on the New Media link.

The Links Tab

The links found here were automatically created by WordPress. I suggest just to leave these alone. The option is still there to use them in the future, if needed.

The Pages Tab

This is where you'll go to view all of the pages posted to the site. You can also add a new page from here.

The Comments Tab

This is where you'll go to approve comments, delete comments, or mark comments as spam.

THE ADMIN BOX

The Appearance Tab

When you click on the **Themes** link, you'll get a page that shows all the installed WordPress Themes. At the top you'll also find a tab where you can go to install more themes or to search for a new theme.

The **Widgets** link takes you to where you can select new, edit current, or remove widgets from the sidebar of the site.

The **Menus** link is where you'd create a custom menu. You are not currently using this feature.

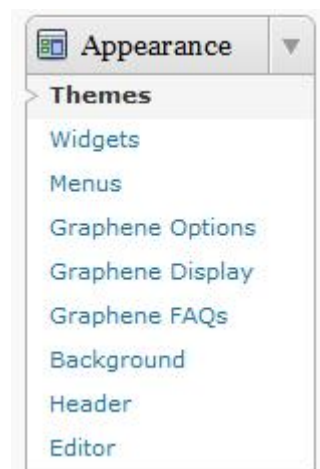
Background is where you'd go to change the background image of the whole site.

Header is where you'd change the header image for the whole site. You can upload a new one or select one of the preloaded ones. You can also choose to add text to the header here.

The **Editor** link takes you to an editor for the templates and stylesheets that make the site run and control how it looks.

The Plug-ins Tab

When you click on **Plug-ins**, you'll see all the plug-ins installed on your blog and which of those plug-ins are active. This is also the page where you'll see if there are any updates to your plug-ins.



From the **Add New** link you can either search for new plug-ins or upload plug-ins you've downloaded elsewhere. I suggest only downloading plug-ins that are updated often and have good user reviews.

Editor is where you would change the function or look of plug-ins. If you don't know what you're doing, you can break the site.

The Users Tab

The **Users** link is where you'll go to manage the roles of users or to delete users.

Add New is where you can add users and select their roles yourself.

Your Profile is where you can adjust the look of the WordPress Dashboard for your account only. You can also change the name users see on your posts and comments, your email, and your password.



You can create **Groups** for your users and give those groups specific permissions. It's a faster way to manage your users.

Add Group is where you'd go if you wanted to add a new group and a description of that group.

The Tools Tab

These are administrative tools that probably won't be needed much.



The **Tools** link gives you access to the Press This app and Categories to Tags converter tool.

Import is for when you have a blog somewhere else that you'd like to convert to a WordPress blog.

Export allows you to save a copy of your site/blog as an XML file.

The Settings Tab

General Settings are things like the displayed site title and tagline. These are used by search engines. This is also where you change the email address for the Administrator, the timezone, the date format for posts, the time format and on which day of the week the calendar starts.



The settings under **Writing** are the most basic and site wide controls for where posts end up when they're published.

Reading settings control the first thing people see when they land on the main page of the site and how many posts are read at a time.

Discussion controls whether people can comment on posts, what information people must leave to comment, whether or not an administrator gets an email when someone leaves a comment, and whether or not comments must be approved before being posted on the site.

Media controls the sizes of thumbnails and the maximum sizes of images, whether or not plain text links are automatically converted to live links, and where files will be uploaded to when embedded in a post/page.

Privacy lets you choose whether or not you'd like search engines to be able to find your site.

Permalinks lets you change the structure of your post/page links. Changing this can break the links on your site, so be careful.

Page Security controls what people see when they're not logged in, but they're trying to look at content meant for members only.

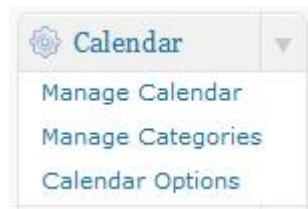
Login With Ajax is the link for the controls of the login widget on the site's sidebar. From here you can choose what page people are sent to when they login based on their roles. You can also control where people are redirected to when they log out of the site and the text of the automated email people receive when they register for the site.

THE EXTRAS BOX

The two sections in this box are the controls for the Calendar and Galleries.

The Calendar Tab

Manage Calendar is where you can see all of your existing calendar entries, edit those entries, and create new entries.



Manage Categories is the page to create, delete, or edit the categories you use to sort your events. Each event has to have a category assigned to it.

Calendar Options are the basic settings for how the calendar looks and functions. Don't change the CSS unless you know how.

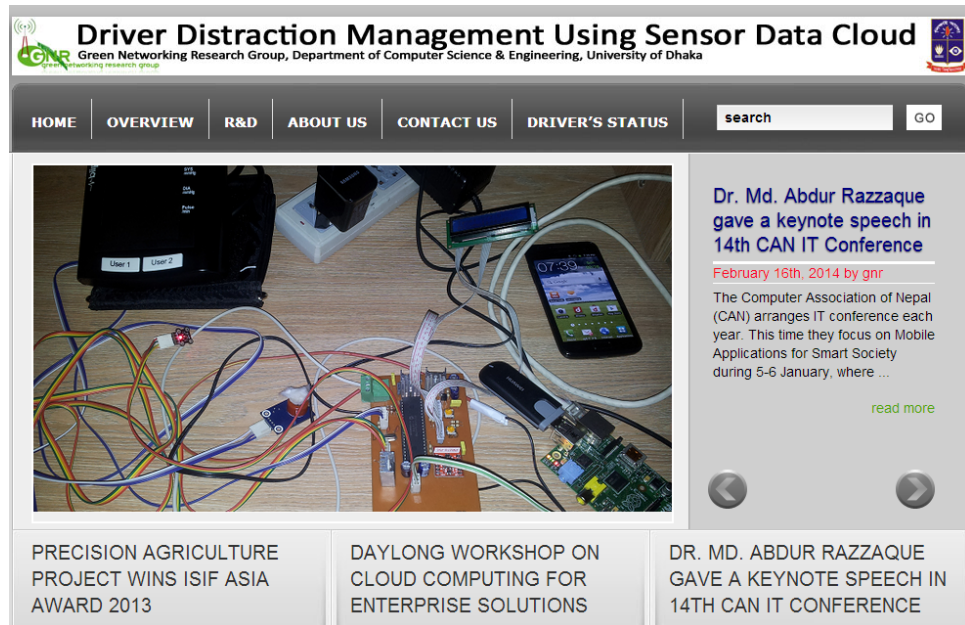
How the Site is structured

Your site is a WordPress driven website. Through WordPress you can create pages and posts.

PAGES

Pages are the top tier way of getting information to your users. Pages are like folders they contain all the smaller parts of information in the form of posts, links, files, etc. These pages function just like they would on a regular website.

There are currently six pages that make up the site.



About Us

This page contains descriptions about our projects Principle Investigator, Consultant and Research Assistants.

Home

This page describes the brief description of our project.

Overview

This page describes the overview of our project.

R & D

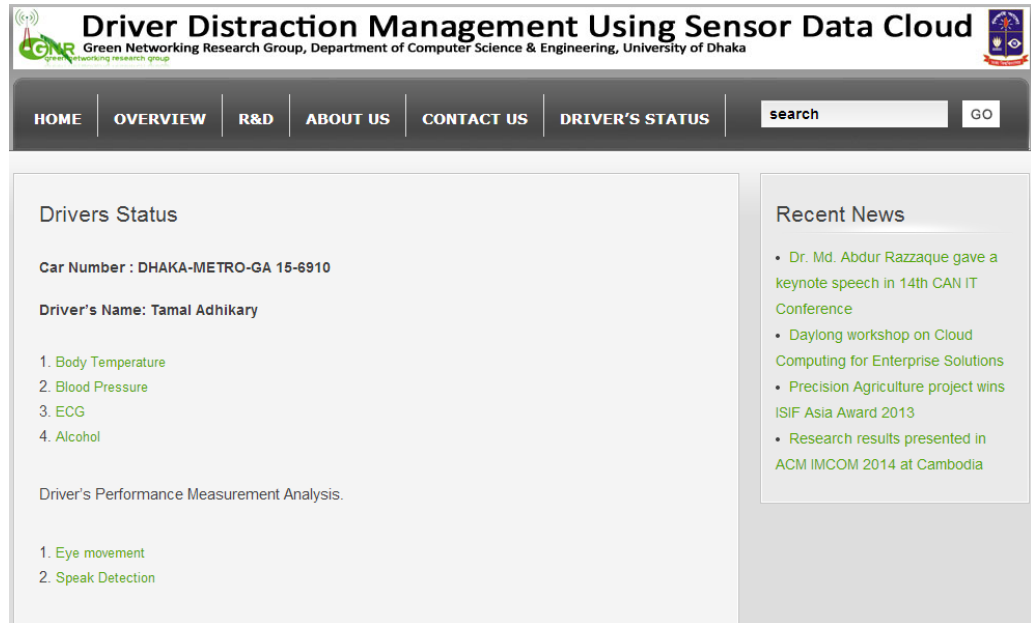
This page describes the R & D activities of our project.

Contact Us

This page describes the contact information of the project members.

Driver's Status

This page will be visible after successful user login. After successful user login the user can see the driver's current time status. The data will be shown in both graphs and tables.



Conclusion

Driver distraction is the main cause of road accidents and highway crashes. Approximately, 80% of crashes and 65% of near-crashes involve some form of driver distraction and the distraction occurs within three seconds of vehicle crash. Different forms of internal distractions include eating, drinking, smoking, music controlling, watching videos on different types of display devices, talking over the cell phone, distraction from passengers like having conversation with driver or holding drivers attention by their activities- reading, texting SMSs, grooming; external distractions like seeing any outside building, billboard, previous accidents, natural beauty or another object, etc. for few seconds might take away visual, cognitive and manual control of the driver, leading to road accidents. To reduce

the number of road accidents due to driver distraction this module will monitor drivers' health condition, different forms of internal and external distractions and his driving performance. Eventually, it will alert drivers, provide driver's performance information to vehicle owners, driver recruiters, road transport management and law enforcement organizations. Finally a safer driving experience will be achieved.