Automatic Traffic Counter and Classifier Using OHR-I Technology

1. Introduction

OHR-I is an automatic counter and classification machine which uses non intrusive light technology. This fully automatic portable machine counts and classifies the vehicle as they pass through the sensors. It consists of a controller box and a transmitter and receiver unit which classify the vehicles. It is equiupped with a touch enabled LCD screen which displays live classification of the passing vehicles. OHR-I is capable of working in all weather conditions and can run for 24 * 7.
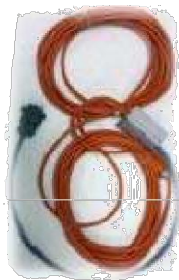
2. Product Package

1. Controller

2. IR Sensor (3 pair as R1-T1, R2-T2 and R3-T3)

3. Sensor Mount

4. Tripod

5. Sensor Cable

6. Power Cable

7. Flight Case

Figure 1

3. Pre Requisites

- Fully charged batteries : 1unit 135 Ah & 2 units 35Ah
- Allen key set (1-10mm)
- Plyer
- Screw driver
- Multimeter
- Measuring tape
- A small tent to protect the machines on median
- Laptop (for data retrieval pre-configured at V R Techniche office)
- Portable blinkers
- Safety cones (10 units)

4. Site Selection

- Choose a spot preferably on a straight, flat roadway with free flowing traffic with minimum overtaking & minimum occlusion.
- Avoid potted and rutted section of road.
- Avoid locations near stops, U-turn, speed breakers or road stretch where traffic flow slows down substantially

5. Guidelines for Installation

Step1: Place the controller unit on the median.

Step 2: Place the receiver classifying sensors on the road within the median shyness line on median side.

Step 3: Place the transmitter classifying sensor on the shoulder side of the road in front of the receiver sensors.

Step 4: Place receiver presence sensor on the median beside the classifying sensors such that R1 , R2 & R3 are in sequential order.

Steps 5: Receiver presence sensor R1 should be at a distance of about 2.5 meter from R2 and at a height of 70cm from road. **Refer figure 2 and 3**

Step 6: Place transmitter presence sensor T1 on the shoulder side beside the classifying sensors T2 & T3 such that they are in sequential order.

Step 7: Transmitter Presence sensor T1 should be at a distance of 70cm from T2 and at a height of 1.4 meter from Road. **Refer figure 2 and 3**

Step8: Connect the sensor cable to T1 and connect transmitter cable with the transmitter batteries

Step 9: Connect the receiver cables S1, S2, S3 with receiver sensors R1 , R2, R3 respectively and connect the other side of receiver cables with the controller unit.

Step 10: Connect the power cable with the batteries and insert its other end in the controller unit. The machine will start now.
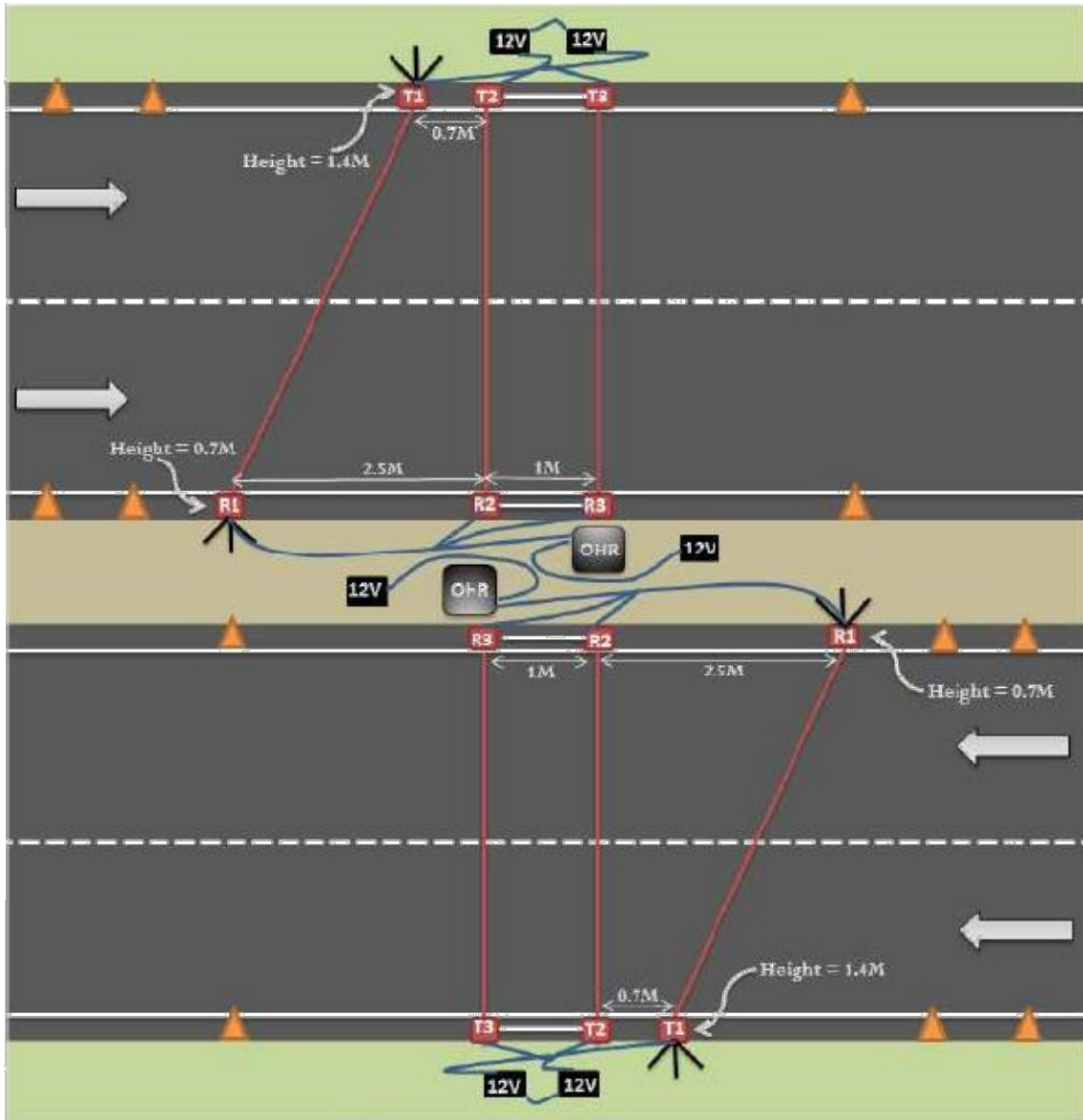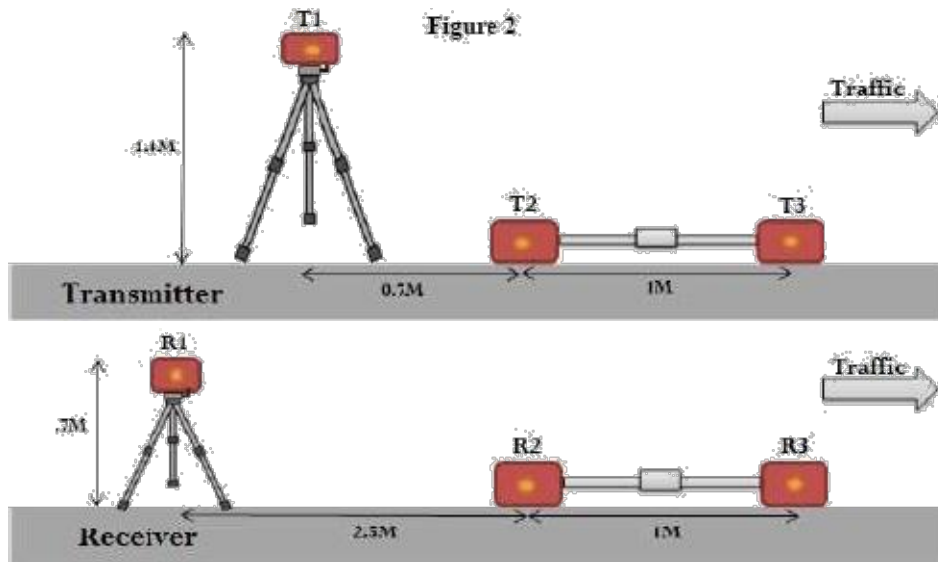
Figure 2

Figure 3

- Step 11: Properly place the traffic cones and blinkers to protect the sensors.

- Step 12: Align all the three receiver sensors R1, R2, R3 with transmitter sensors T1, T2, T3 respectively. **For alignment refer to section 8**

- Step 13: Lift the carrier unit box top main cover and switch on the display. Touch the next screen tap and set the current time and date. Touch home screen tab to return to home screen. **For setting time refer to section 7**

6. Operation

As soon as the all the sensors are aligned the machine starts counting and classifying the vehicles passing through the sensors. On the LCD screen, five classes are displayed with counts. As the vehicle passes, the corresponding class changes its colour from green to red with an increase in the count.

7. Setting Time

- Time has to be set manually on starting of the machine. Follow the procedure given below to set time

- Press the 'NEXT SCREEN' button on the bottom right corner of the screen.

Figure 4

- Following window will appear on screen. Press the blocks in 'Set Time' column to assign corresponding values.

Figure 5

- Fill the date and time information in corresponding blocks and then press 'ENTER'

Figure 6

- Press 'SET TIME' button to set the desired time.

Figure 7

- Return to home screen by pressing 'HOME' button.

Alignment

For the machine to be functional, the sensors should be properly aligned. Aligned sensors refer to a position in which the light from transmitter sensor falls directly on receiver sensors. This can be checked by the observing the LEDs at the end of receiver sensor. There are three possible states of LEDs as follows:

S. No.	Situation	Description
1.		**Green: ON , Amber: ON** This represents the situation in which sensors are not aligned i.e the light from the transmitter sensor is not falling on receiver sensor or when there is an obstacle in between them. This condition has to be removed for machine to work properly by aligning the sensors. *This condition should only occur when a vehicle passes through the sensors.*

S. No.	Situation	Description
2.		**Green: ON , Amber: OFF** This represents the situation in which the sensors are properly aligned i.e. the light from the transmitter sensor is falling directly on receiver sensor. This is desired condition of the sensors which has to be maintained throughout the machine's usage.
3.		**Green: OFF/flickering , Amber: ON** This represents the situation in which the light from the transmitter sensor is partially falling on receiver sensor. This condition should be avoided and resolved immediately.

Table no 1

Data extraction

The counting and classification of the vehicles is stored in the machine in the form of a .csv file, which can be extracted through a laptop, which is preconfigured at VRT office. A file is generated for every 24 hours in the machine. Besides extracting data, laptop can also be used to view the live counting and classification of the vehicles on the screen.

As a vehicle passes through the sensors, machine will generate the data, which contains information such as Time stamp, Speed, No. of axles, Wheel base and Vehicle classification separated by a semi colon.
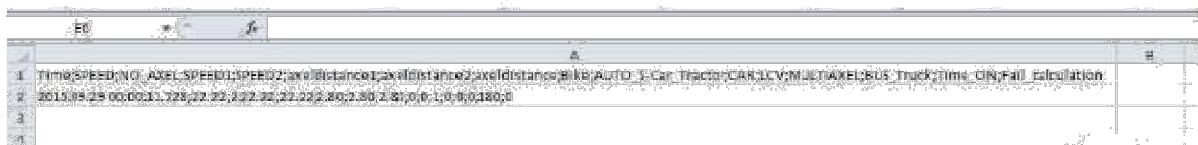

Figure 7

For example, the above data can be interpreted as follows

S. No.	Parameters	Output
1	Date(yyyy-mm-dd)	29/09/2015
2	Time(hh-mm-ss)	00:00:11.728
3	Speed(m/s)	22.22
4	No. of Axles	2
5	Wheelbase 1	2.80
6	Wheelbase 2	2.80
7	Average Wheelbase	2.80
8	Classification	Car

Table no 2

Note: In the data file, vehicle classes are ordered as Bike, Car, LCV, Multiaxle vehicle and Bus/Truck with their default values as '0' and the classification is marked by '1' against the corresponding class. For example, in the above case, the second value is '1', which corresponds to Car.

Follow the steps listed below to extract the data.

- Open the shortcut named 'FTPOHR' on the desktop.

Figure 8

- The following window will appear screen. Here, in the right column, you can see live counting as well as classification of vehicles crossing the sensors. As the vehicle crosses, the machine will automatically update the list.
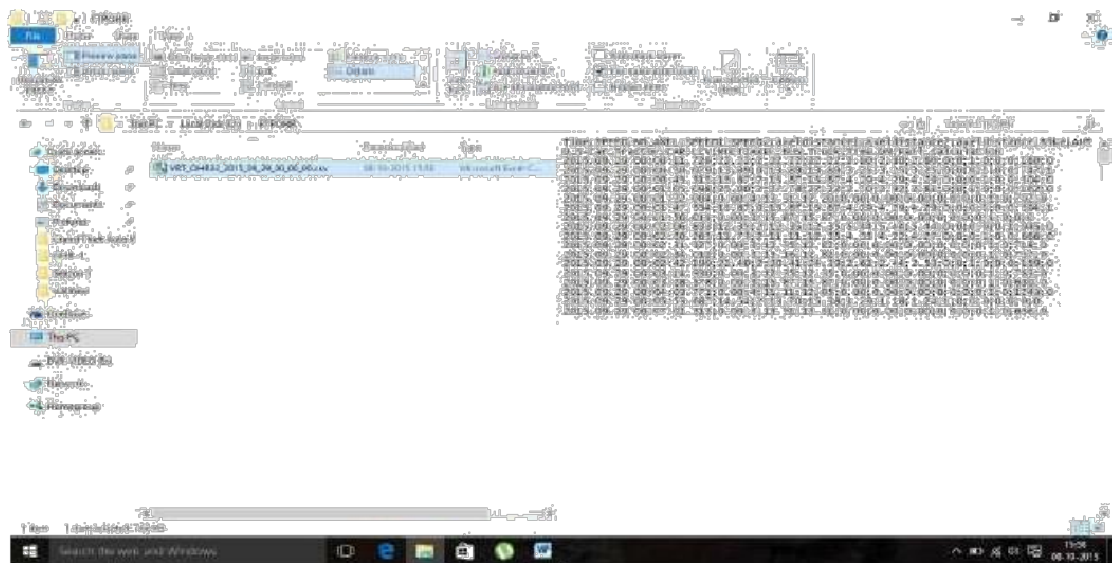

Figure 9

Note: This file is for viewing purpose only which should not be extracted.

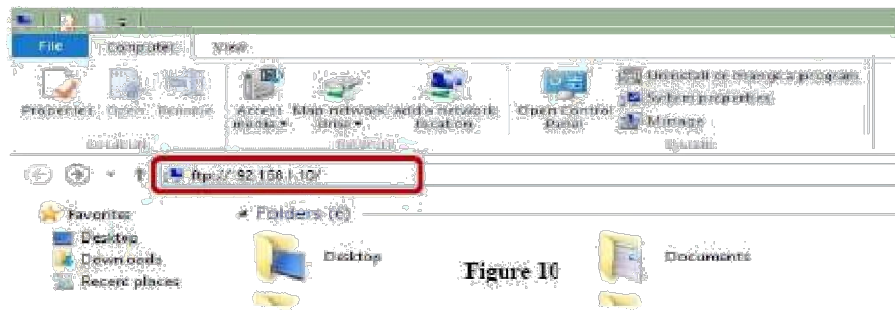- Now to extract data from the machine, enter ftp://192.168.1.10/ in the address bar as shown below.

Figure 10

- Now select the desired .csv file and copy it to a local folder. Now open the file and verify if the data of 24-hour is there or not. After verifying, delete the file from the machine's memory.
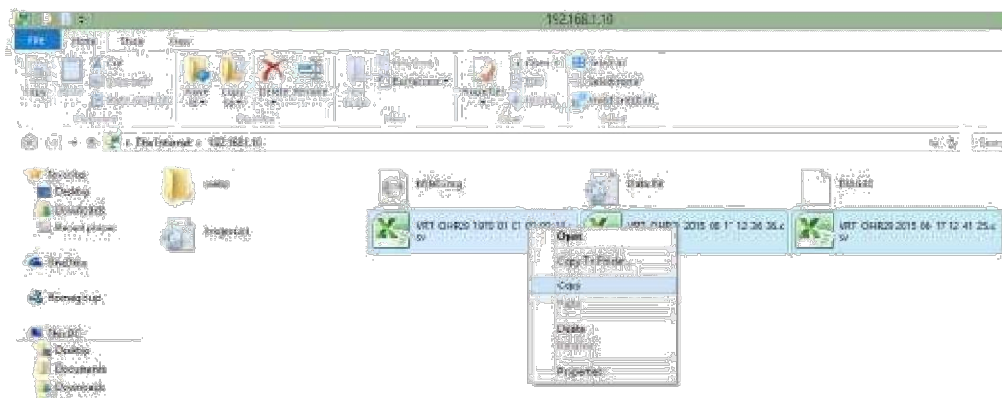

Figure 11

Note: Data has to be deleted regularly for proper functioning of the machine.

DOs & DON'Ts

- The installation of machine must be exactly as instructed by VRT office with all distances and heights must be accurate (as shown in Figure 1).

- All safety measures reflective cones, blinkers and the site safety jackets should be present at the site. The no. of cones should be sufficient to be seen by vehicles from longer distances.

- All batteries to be used at the sites must be fully charged before the start of survey.

- Batteries should be properly connected with correct polarity (black wire to negative & red wire to positive).

- The ATCC box should be properly place in a small tent and protected from dust and rain.

- Time of the machine has to be set 4 times a day at 11:55 AM, 5:55AM, 11:55 PM and 5:55PM (specifically in the last 5 minutes of the hour).Time should be set up very carefully. Don't create gaps of more than 1 second.

- Display should be switch off when not in use.

- Constantly check the sensor if the they are properly aligned in the interval of 30 minutes.

- Cross check the number of vehicles passing through counters and numbers recorded by ATCC machine.

- Connect the laptop to the machine and check for the live data stamping in every two hours.

- After taking backup delete the previous date data from controller memory.

- The machine is designed to operate on 12V DC power (1 battery). However in case of any malfunction 24V DC power can be used by connecting two batteries with 24V power port present on the machine.

- Always start installing the time at 7 PM and check for any error immediately after installing the machine.

- Put some weight on the hook of tripod for its stability.

- Connect only receivers at machine end, do not connect transmitters at machine end.

- Don't allow any vehicle to park within 100m range of machine (upstream side of machine).

- Don't pass through the sensors during its operations.

- Don't connect 12V DC supply (1 battery) to 24V port and vice versa.

- Don't allow any battery less than 11.5V to be connected with any component of machine.

- Don't delete the current data file from the machines memory until the next file is generated.