A Cost-Effective Smartphone Solution for Traffic Management in Marine Ports

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Outline

What is truck turnaround time?
How does it reflect the performance of terminals?
Existing Problems with its measurement
How it has been measured
Proposed solution
Conclusion & future work
Acknowledgement
What is Truck Turnaround Time

The time taken for a truck to enter then exit a terminal.

An indicator of Port performance

Traditionally, using expensive GPS equipments

"Derived from RFID data, and excludes lunch hour, breaks and trouble tickets." - PierPass

No consensus on how to measure or validate anyone’s measurement (lack of transparency)
Previous Work

Metropolitan Transportation Information System (METRIS)

by Digital Geographic Research Corporation

Expensive GPS equipment

No transparency

Not all parties involved

No real time report
Good Data Collection

Need for more accurate and less expensive devices to collect data

Good data leads to good analysis and better planning

Shorter truck turnaround time better performance in our freight system

Benefits to motor carriers, terminals, ports, cargo owners and above all, drivers
Categories of Truck Turnaround Time

- Entrance Gate to Exit Gate
- Entrance Queue to Exit Gate
- Entrance Queue to Exit Queue
- Entrance Gate to Exit Queue
Proposed Solution

Zlyne phone application

Through a simple web interface (zlyne.com)

Current exact location of a truck on a map with different views passed on privileges

Truck turnaround time filtered by:

- hourly, daily, weekly, monthly and yearly
- each terminal

Motor carriers can filter for any driver
Our approach

Our method uses sensor rich smartphones

Accurate GPS signals fused with network signals

64% of American adults own a smartphone (from pewinternet.org)

Smartphones benefit from Geofencing technology

All phone data sent to a secure cloud (Zlyne.com) with real time access for all parties

Incentivize use to truck drivers by providing them with valuable information.
The Zlyne Software

An iOS and Android application for smart data gathering.

Using Location-based Services

1. Geofences
2. Background Tracking

An intelligent administrative web application.

1. Register truck drivers
2. Assign trips to drivers
3. Gather and display data
Register a driver
# Trip View

<table>
<thead>
<tr>
<th><strong>Trip Data</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trip ID</strong></td>
<td>19</td>
</tr>
<tr>
<td><strong>Chasis #</strong></td>
<td>1234</td>
</tr>
<tr>
<td><strong>Container 1</strong></td>
<td>ABCD</td>
</tr>
<tr>
<td><strong>Container 2</strong></td>
<td>EFGH</td>
</tr>
<tr>
<td><strong>Driver</strong></td>
<td>Varun</td>
</tr>
<tr>
<td><strong>Truck</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Company ID</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Terminal ID</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Start Time</strong></td>
<td>2015-10-22 01:00:00</td>
</tr>
<tr>
<td><strong>End Time</strong></td>
<td>2015-10-22 20:00:00</td>
</tr>
<tr>
<td><strong>Pick Up</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>123 W Lane</td>
</tr>
</tbody>
</table>
Sign In

Email

Password

Remember me

Sign In  I forgot my password
Success: You have successfully logged in.

Welcome!

ZLyne helps terminals and truck companies to reduce the amount of truck waiting in the lengthy queues at the terminal, therefore helping ports, terminals, truck companies and drivers.
<table>
<thead>
<tr>
<th>ID</th>
<th>Trucking Company</th>
<th>Driver</th>
<th>Start Time</th>
<th>End Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cows Shipping</td>
<td>John Doe - EZ Shipping</td>
<td>2014-08-18 14:00:00</td>
<td>2014-08-18 16:00:00</td>
</tr>
<tr>
<td>2</td>
<td>Varun Shipping</td>
<td>Varun Chopra - V</td>
<td>2015-09-27 07:00:00</td>
<td>2015-09-27 20:00:00</td>
</tr>
<tr>
<td>3</td>
<td>Varun Shipping</td>
<td>Varun Chopra - V</td>
<td>2015-09-28 07:00:00</td>
<td>2015-09-28 19:00:00</td>
</tr>
<tr>
<td>4</td>
<td>Varun Shipping</td>
<td>Jose Shorty - ABC Inc.</td>
<td>2015-09-05 04:00:00</td>
<td>2015-09-05 18:00:00</td>
</tr>
<tr>
<td>5</td>
<td>Varun Shipping</td>
<td>Varun Chopra - V</td>
<td>0000-00-00 00:00:00</td>
<td>0000-00-00 00:00:00</td>
</tr>
<tr>
<td>6</td>
<td>Varun Shipping</td>
<td>Varun Chopra - V</td>
<td>2015-09-05 10:00:00</td>
<td>2015-09-05 18:00:00</td>
</tr>
<tr>
<td>7</td>
<td>Cows Shipping</td>
<td>Jose Shorty - ABC Inc.</td>
<td>2015-09-09 01:00:00</td>
<td>2015-09-09 23:50:00</td>
</tr>
<tr>
<td>8</td>
<td>Varun Shipping</td>
<td>Varun Chopra - V</td>
<td>2015-09-13 11:00:00</td>
<td>2015-09-13 18:00:00</td>
</tr>
</tbody>
</table>
Ferry Transactions

Add a Ferry Transaction

- Truck Company: ACE Shipping
- Driver: John Doe - EZ Shipping
- Truck ID: ABCDEFG
- Chasis Number: Enter a Chasis Number
- Container ID ONE: Enter a Container Number
- Container ID TWO: Enter a Container Number
- Pick Up Address: Enter an Address
- Pick Up City: Enter a City
- Pick Up State: Enter a State
- Pick Up Zip: Enter a Zip
Edit Profile
Change Profile Details

Current Password

New Password

Confirm Password

Update
I forgot my password
Estimate distance between gates 5.7 miles
Entrance Queue to Exit Queue

Date: Oct 14 to Oct 20

Trend:
- Peak at Oct 16
- Valley at Oct 18
Conclusion and Future Work

A new low cost method of monitoring marine ports traffic

Transparent truck turnaround time and performance monitoring

Analysis of traffic data

Better planning by all parties based on traffic data
Acknowledgment

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Thank You

Demo