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AFD

AFD, PARIS – DIGITAL & TRANSPORT WORKSHOP

November 2017

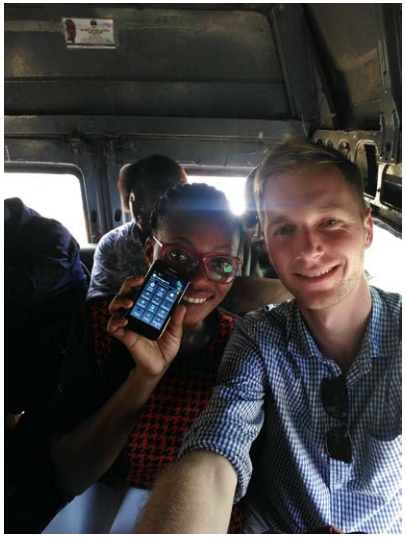
The AccraMobile Initiative
Understanding Paratransit through Digital Data

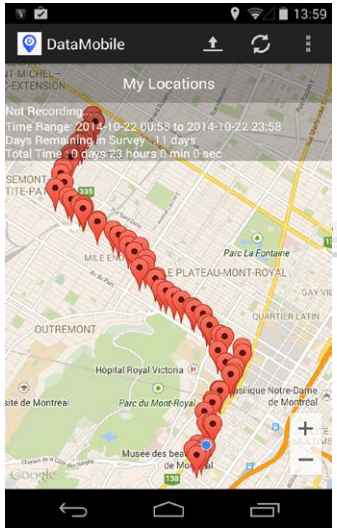
Going beyond a descriptive approach

- Mapping gives a good picture of the network
- But very static and descriptive approach
- Need to better understand the **performance of the transport system**

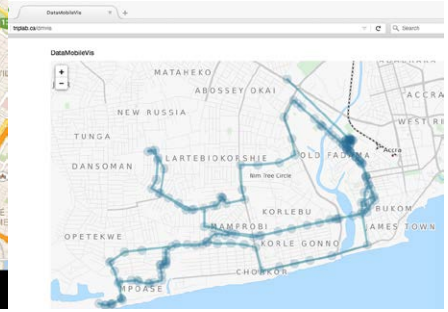
- We decided to analyze it from two different angles:
  - From the user's perspective, looking at service reliability (subset of 60 routes, over 1'200 trips recorded)
  - From the operator's perspective, looking at operational performance (case study on a terminal with detailed analysis on 6 routes)

Digital applications used to date

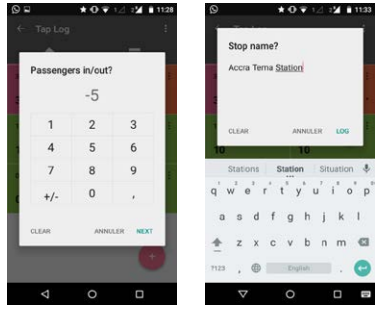




DataMobile/Itinerum

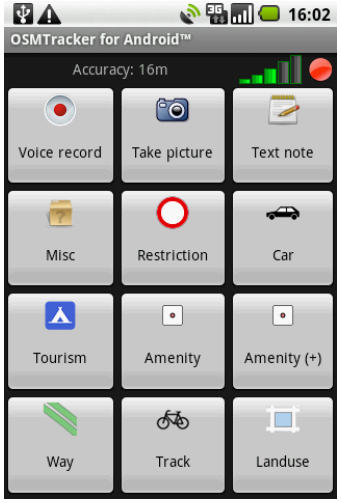


TapLog



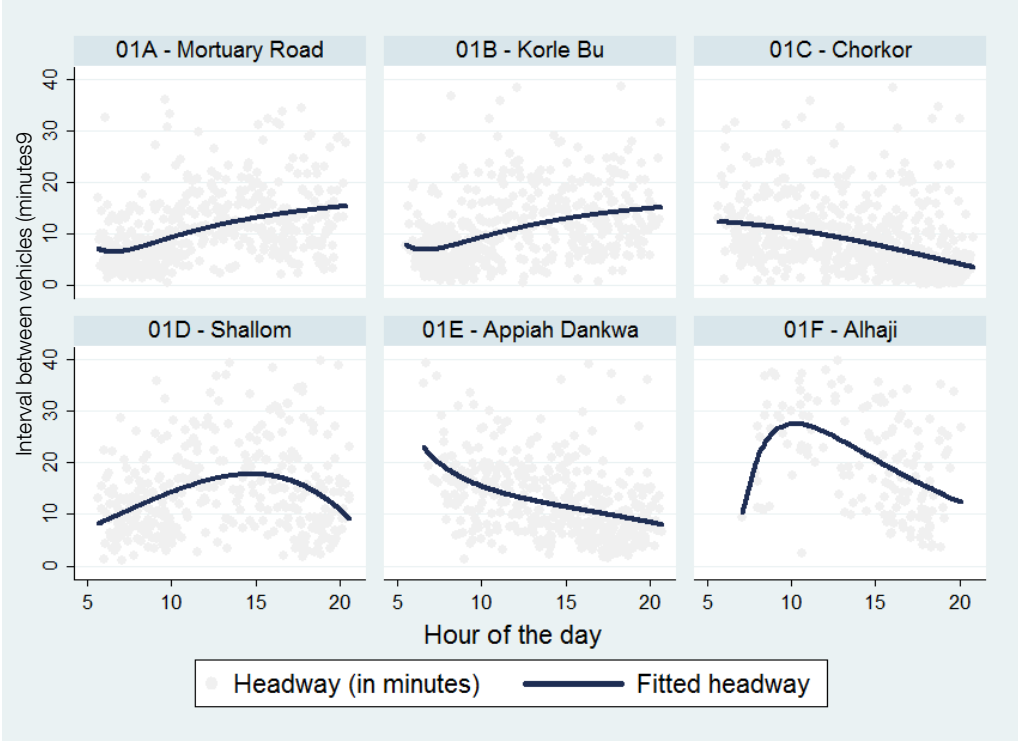
Main limitations:

- A lot of manual manipulation required (retrieving data from server, cleaning up…)
- Data from two different sources has to be merged
- OSM Tracker more integrated but does not allow passenger counts



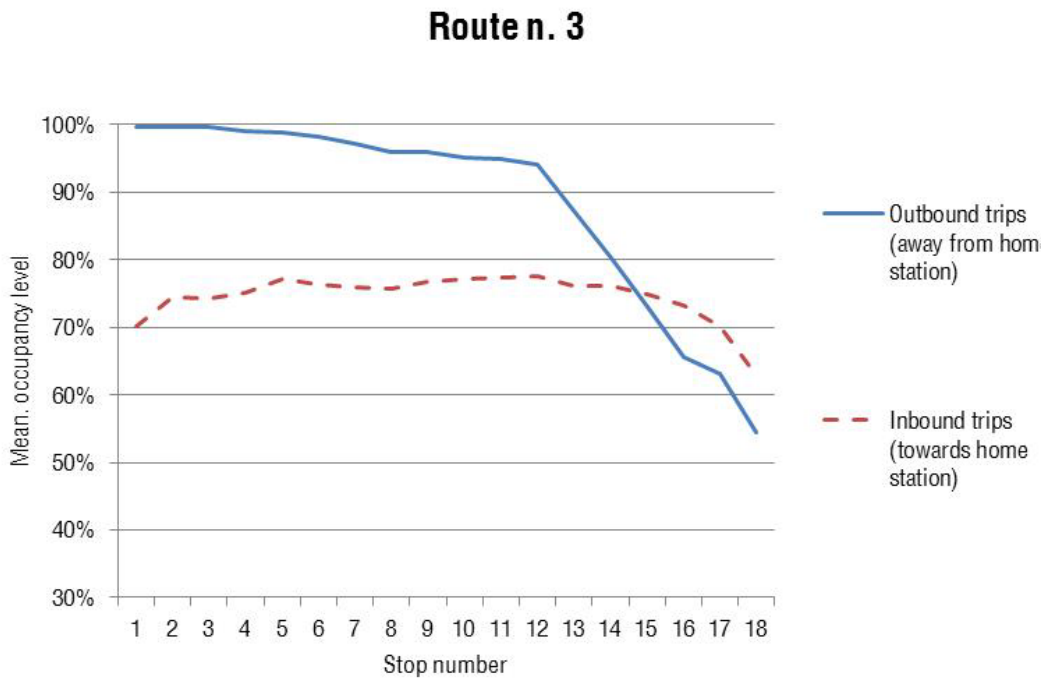
OSM Tracker

Headway variability



- Peak hour headway between 5-15 minutes
- **Very frequent departures during peak hours**
- Complementary patterns across routes
- Reflect distribution of demand (load-and-go)

Vehicle load factor analysis



- No seats available on first part of outbound trip

⇒ **Passengers have to walk to terminal!**

- Passengers alight before last stop to avoid congestion close to terminal
- Lower load factors on return trip, since vehicles are not allowed to wait at last stop

Rotations and driving time

Only taking into account 70 union vehicles *Displayed results are rounded*	**WEEK**	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
				Rotations analysis				
Mean rotations by vehicle	**38**	5.6	5.5	5.5	5.7	5.1	6.2	4.6
Max. rotations by vehicle	**87**	12	15	12	13	11	14	14
Estimated driving time / veh.	**23h**	**3h30**	**3h25**	**3h25**	**3h25**	**3h**	**3h55**	**3h05**
Total number of rotations	**2'667**	389	385	384	397	355	436	321
Number of vehicles operating	**70**	67	68	68	70	70	67	63
				Revenue analysis (in Ghana cedis)				
Total collected revenue	**129'700**	19'000	18'800	18'800	19'300	17'200	21'200	15'400
Max. revenue by vehicle	**GHS 3'740**	GHS 610	GHS 680	GHS 560	GHS 620	GHS 560	GHS 680	GHS 660
Mean revenue by vehicle	**GHS 1'860**	GHS 280	GHS 280	GHS 280	GHS 280	GHS 250	GHS 320	GHS 250
Median revenue by vehicle	**GHS 1'780**	GHS 290	GHS 270	GHS 270	GHS 260	GHS 250	GHS 320	GHS 270
Standard deviation in revenue	**GHS 490**	GHS 110	GHS 110	GHS 100	GHS 100	GHS 90	GHS 100	GHS 110

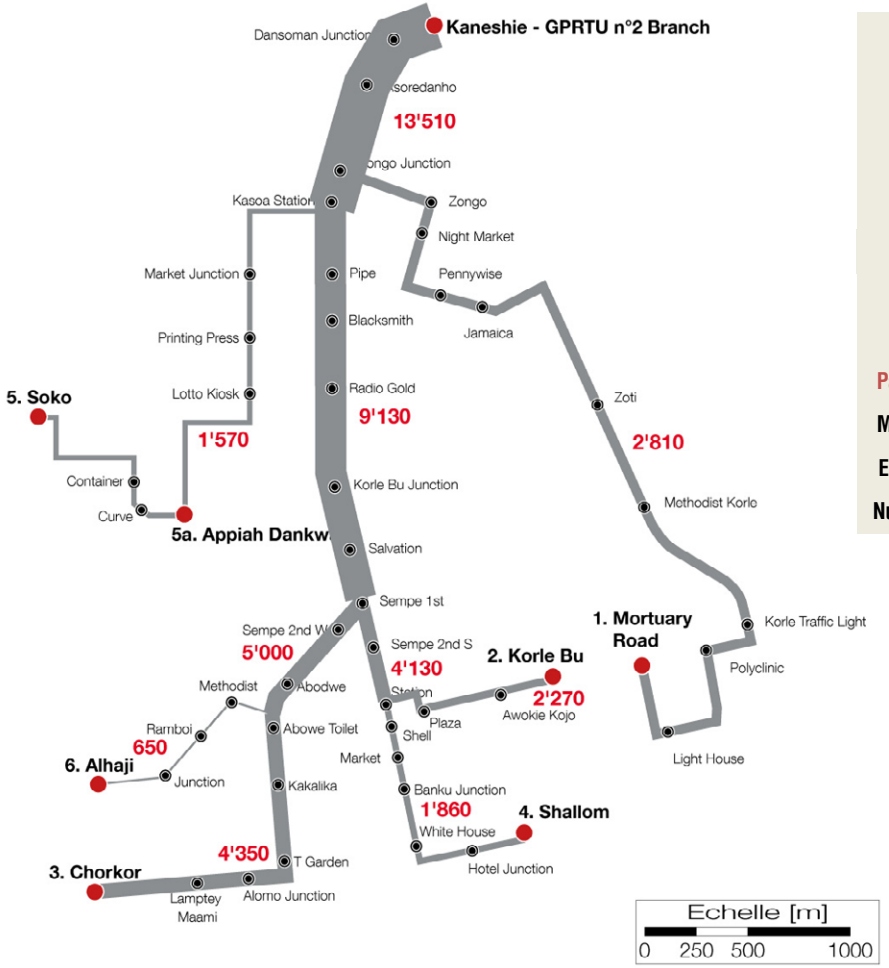
- Vehicles do 5 or 6 rotations per day on average
- Drivers spend less than 30% of their time driving…
- **And 70% of their time waiting in line at terminals!**

⇒ Oversupply of vehicles causing inefficiencies and congestion

- Average daily revenue is approximately 50 EUR

Passenger volumes by section

Daily passenger volumes (both directions)



Results are rounded	1. Mortuary Rd	2. Korle Bu	3. Chorkor	4. Shallom	5. Soko	6. Alhaji
	Means for round trips (n = 254)					
Route length	12 km	9 km	11 km	10 km	9 km	10 km
Travel time	34 min	33 min	42 min	36 min	29 min	40 min
Commercial speed	21 km/h	16 km/h	16 km/h	17 km/h	19 km/h	15 km/h
Passengers	26.6	30.0	31.6	27.9	25.8	26.5
Passengers / travel time	48	55	45	47	53	40
	Means for week days (n = 3,526)					
Number of departures	105	76	138	67	61	24
Vehicle.km travelled	1,265 km	680 km	1,516 km	668 km	547 km	244 km
Passengers (both directions)	**2'810**	**2'270**	**4'350**	**1'860**	**1'570**	**650**
Morning peak hour headway	5 min	8 min	12 min	11 min	43 min	*n/a*
Evening peak hour headway	11 min	14 min	3 min	8 min	7 min	13 min
Number of vehicles operating	31	38	61	36	35	15

- Over 50% of passenger traffic concentrated on two routes
- Most travelled route has 4’350 passengers/day
- Number of km travelled can be used to calculate CO2 emission
- **Passenger volumes by road segment can be used to direct investments on infrastructure**

Perspectives

Current limitations	Desired solution	Future developments
Non-dedicated data collection apps require heavy manual treatment of data	OSM-compatible data collection app compatible with the specificities of paratransit	Jungle Bus future release to include GPS tracking functionality
Lack of automatic integration between data collection and analysis stages	Web-based interface w/ analysis and rendering capabilities directly using data from data collection campaigns against OSM backdrop	???
Data quickly becomes obsolete (need for regular updates)	Real-time data on location of vehicles through embarked GPS sensors	???

Planned

Next step

Future

Conclusion

- Avoid the "data-for-the-sake-of-data" syndrome and consider applications:

For authorities

- Target investments on transport infrastructure
- Tie license delivery to service level agreements
- Focus enforcement on black spots to encourage compliance
- …

For operators

- Develop business cases to access financing towards fleet renewal
- Better match the transport demand (in time and space)
- Rationalize/reorganize supply at the branch or metropolitan level

For passengers

- Obtain information on existing services (maps, journey planning…)
- Have access to on-demand transport in areas or at times of low service
- …

⇒ **Digital technologies and data can be a powerful driver towards a transformation of the paratransit sector!**

Thank you for your attention

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