Using Telecom Data to track Population Movement in Dakar

Abuja, July 5th 2018
Summary

- Partners
- Objectives
- Methodology
- First results
- Takeways
Partners

Data Provider (Household Mobility Survey) and beneficiary of results and conclusions from the project

Provider of the technical data of the mobile network

Comparative studies with Household Mobility Survey data and counts provided by the CETUD

Initiator of the partnership

Network technical data processing (by Flux Vision solution) and creation of mobility indicators

Study tracks relating to the analysis of generating and attracting poles
Objectives

Urban mobility data collection

2 classic ways

- Census Data
- Mobile Phone Data

New solution

How do we track population movement?
Objectives

A. Provide innovative urban management tools from mobile data

B. Data collection from the location of users of the mobile network having made calls (May-June 2015)

C. Analyzing the flow of people between different neighborhoods and mapping data to represent the areas of influence of attractive neighborhoods.

D. Suggest a new tool (in addition to surveys) for a better urban mobility management from mobile data
Senegal

Global fleet of mobile phone

- Fleet of mobile phone lines trending upwards: **average annual growth of 23.6% over 10 years**
- More than **15,750,000 lines** in 2017
Methodology

- Call Detail Record (CDR) data (metadata)
- Observation for every call/text made or received with time stamp
- GPS coordinates of tower from where call is made
- Data is *anonymous*
First results

Measuring movement over long distances
First results

Areas of attractiveness

- Most of the attractions in the morning concentrated on Plateau
- Plateau standing out clearly, far in front of the area of Fann Residence
- Possibility to study the evolution over time of traffic attractions: translating the nature of territories (residential, jobs...)

![Map and graph showing attractions over time](image)
First results

Mapping of movements

- From Tuesday to Saturday: similar profiles
- Important trafficking in the central area of Dakar (the Plateau)
- Trafficking on Sunday and Monday smaller but better distributed
First results

Comparison with household survey data

• The chart shows the different ODs on a point cloud. Each point binds for an OD the volume Orange (in abscissa) and the volume EMD (in ordinate). The curve $X = Y$ is given in orange.

• Much lower flow for the Orange data than for the EMD

• Slope of regression curve close to 0.35
First results

Intensity of inter-district relations in Dakar

- Numerous flows of movements, involving sometimes long distance trips

- 2 zones stand out, both by the importance of flows in absolute value and by their relative intensity:
  - Western Tip of the Peninsula
  - Pikine
Telecom data can be used to measure mobility data
Very fine spatial and temporal level

Can be used to study impact of intervention on mobility by using data from multiple points in time before and after

Important limitations regarding who is represented that need to be accounted for

Data provides opportunity to study direct mobility effects as well as indirect effects generated by the increased mobility
Thank you for your attention!

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