Research Methods in computer science

Spring 2019

Lecture 21

Omprakash Gnawali

April 3, 2019

Agenda

HW9 live grading

Legible Graphs

HW10

Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zônes colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zônes. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. ___ Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M.M. Thiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mobilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

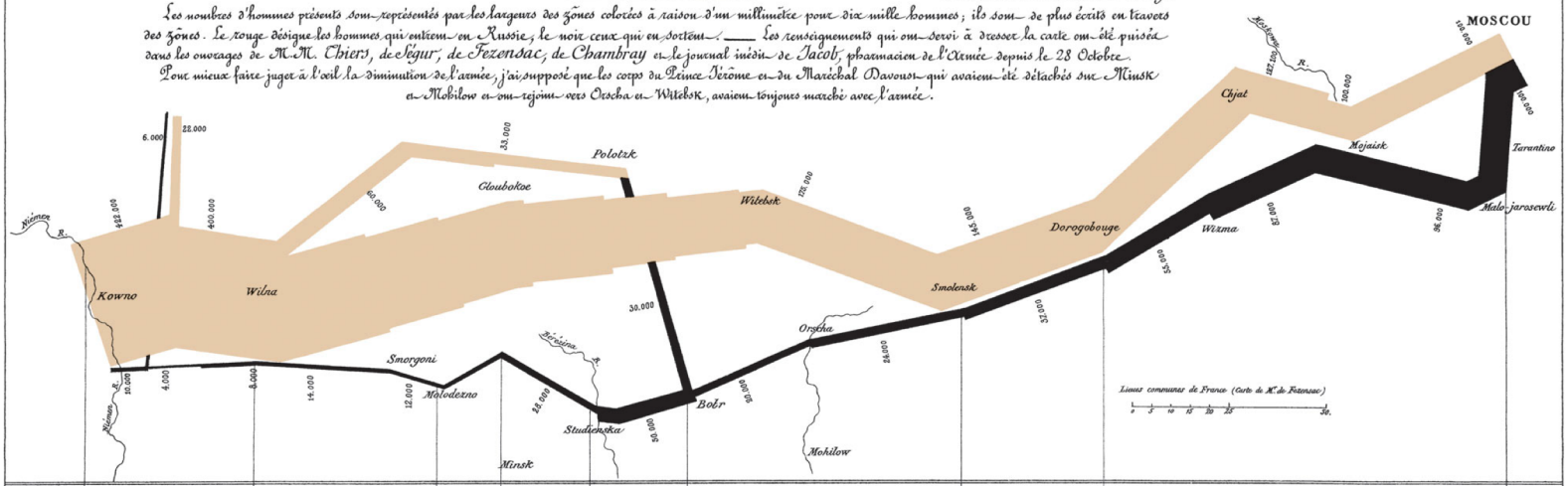
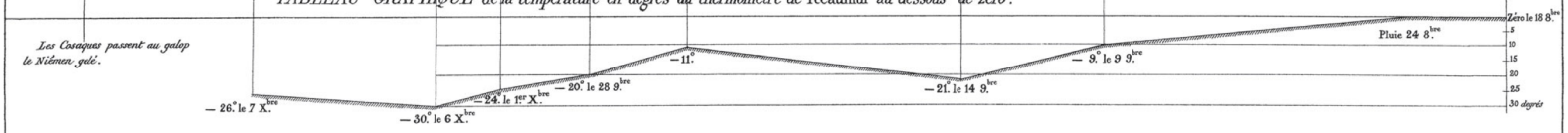
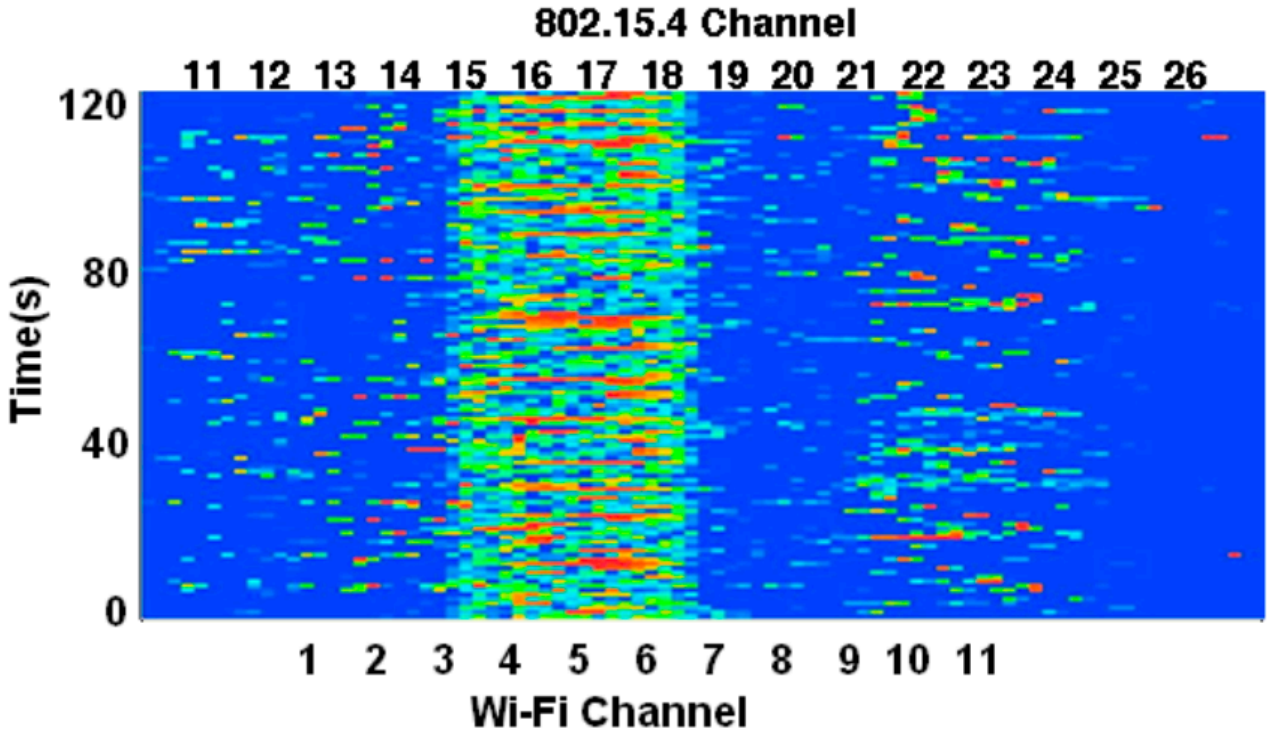


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



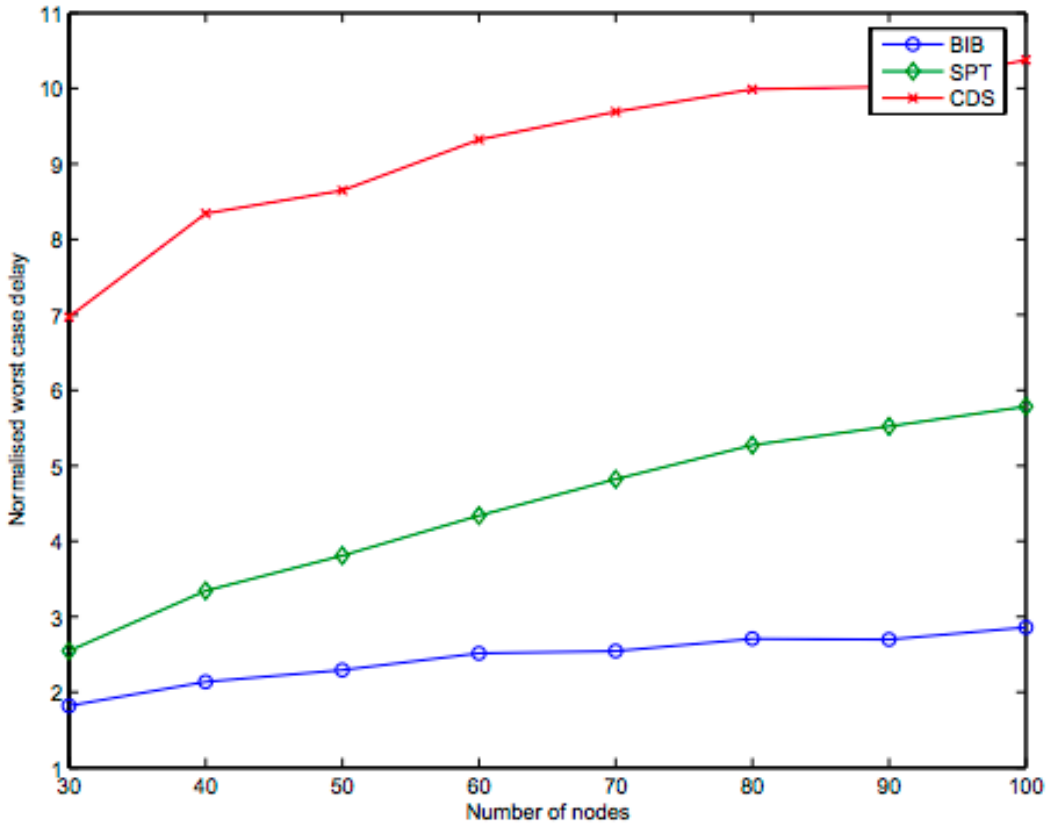
Autog. par Regnier, 8. Pas. Ste Marie St Gven à Paris.

Imp. Lith. Regnier et Dourdet.



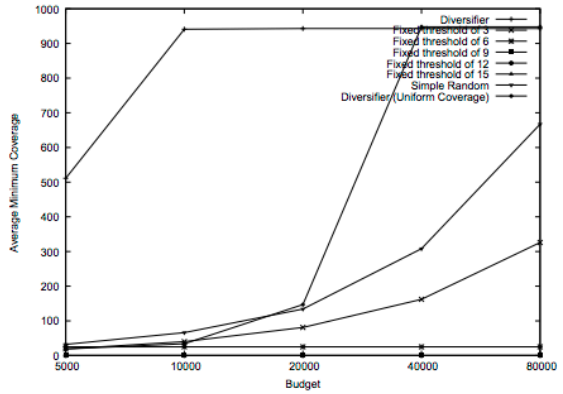
Example of a heatmap (red – high, blue – low)

Annotations

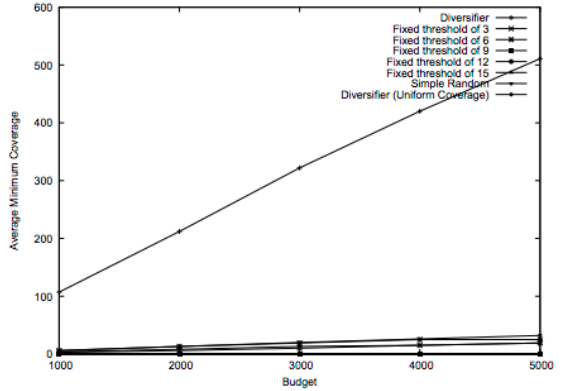


Overlapping legend
Legend order different from line order

Chou 05

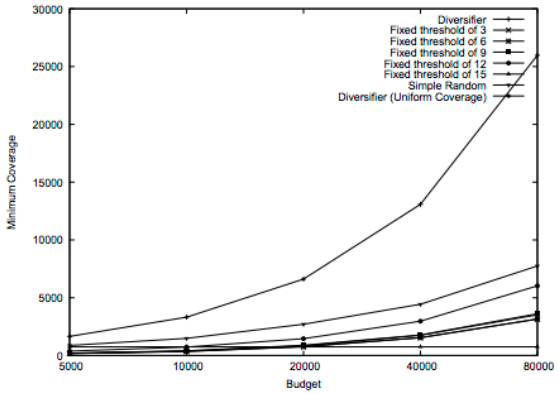


(a) Higher range of budgets between 0.5% and 8%

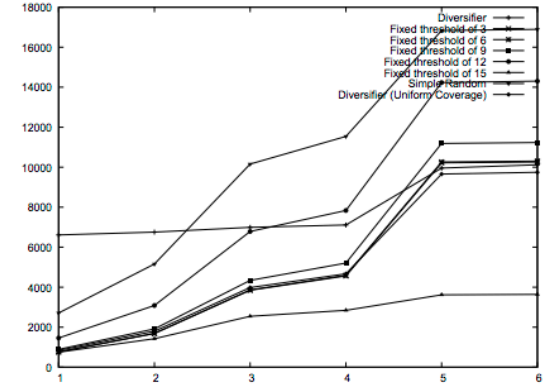


(b) Lower range of budgets between 0.1% and 0.5%

Figure 2: The average minimum coverage achieved by various algorithms over 100 real world data sets of $1M$ items each.



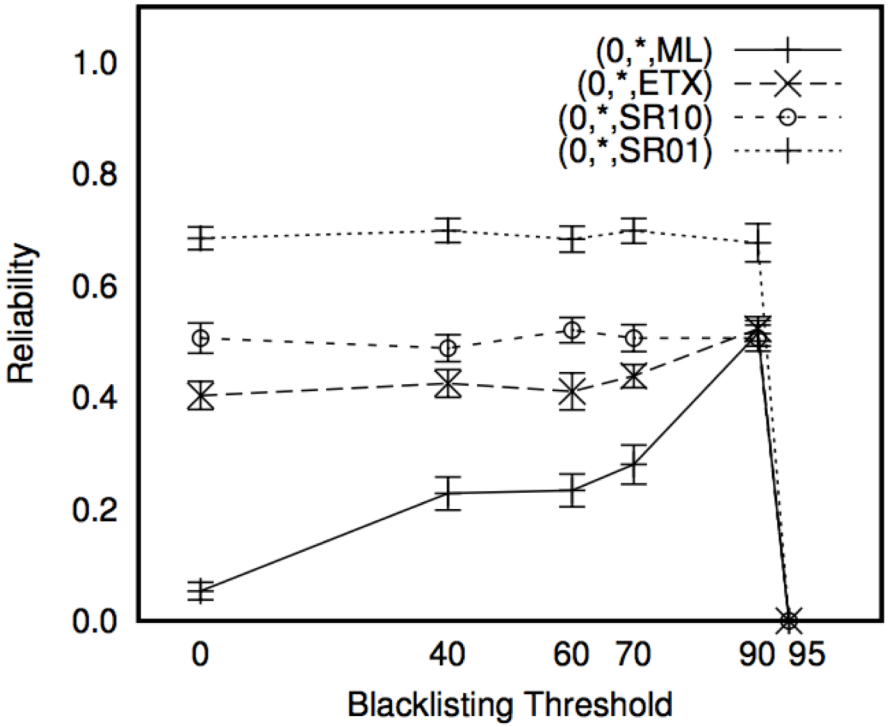
(a) Minimum coverage with varying budgets



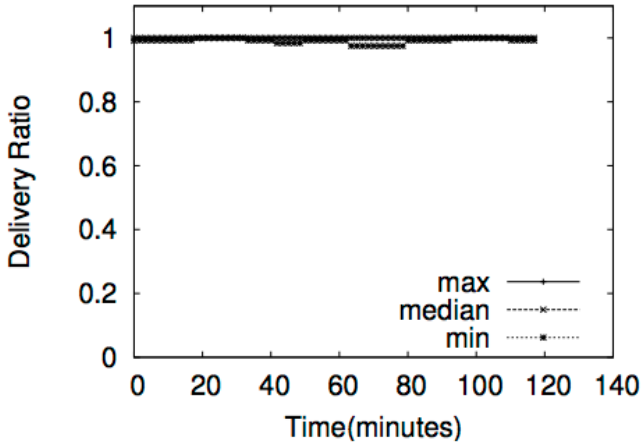
(b) Coverage on the least covered features

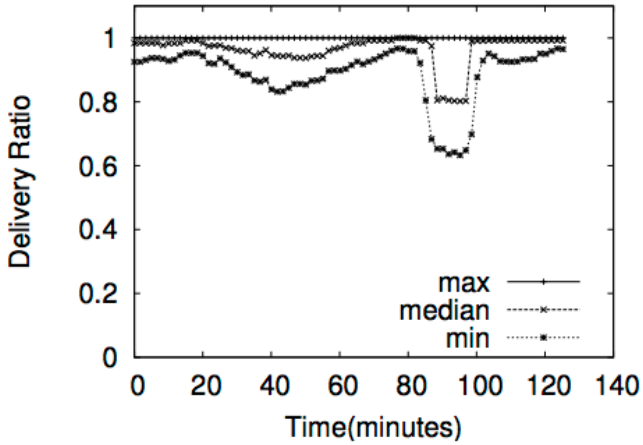
Figure 4: Experimental results for the Independent data set

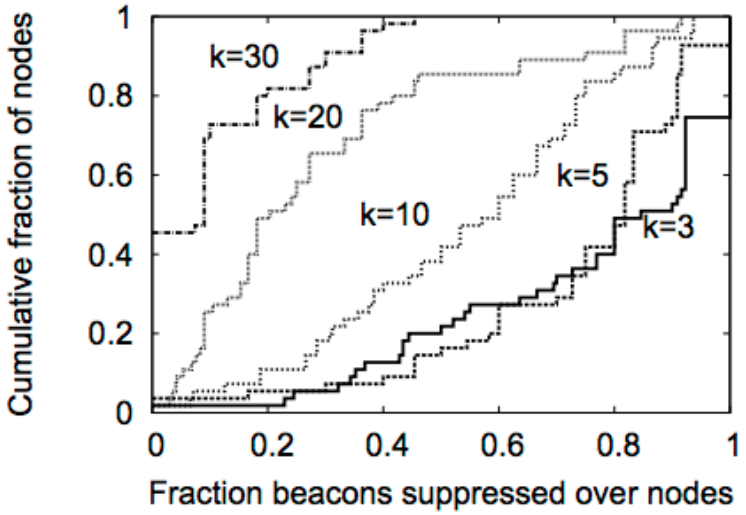
Legend overlapping data

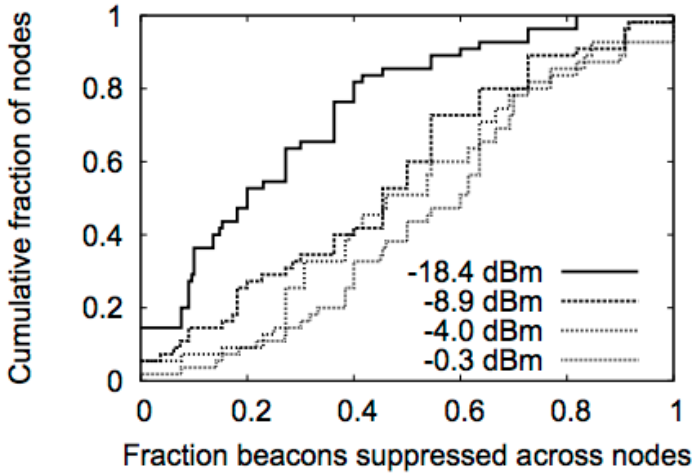


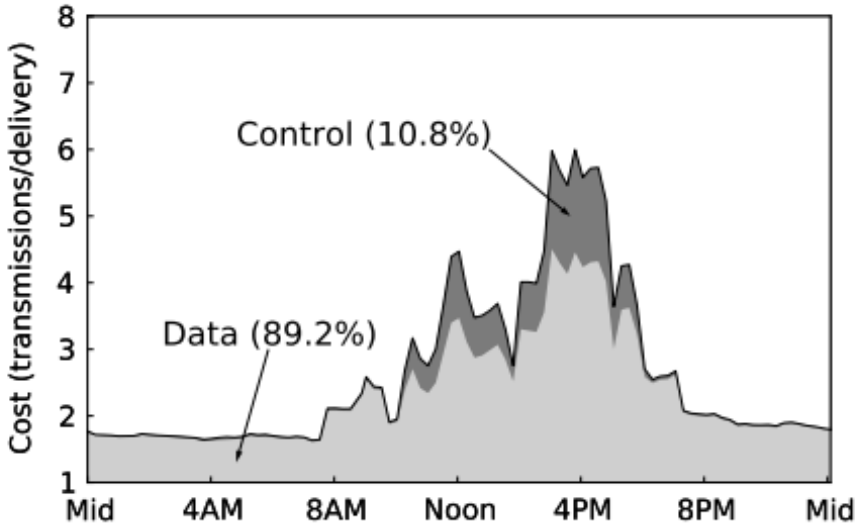
(c) Reliability with different blacklisting thresholds


Delivery Ratio
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
Time(minutes)
max
median
min


Delivery Ratio
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
Time(minutes)
max
median
min


Cumulative fraction of nodes
Fraction beacons suppressed over nodes
k=30
k=20
k=10
k=5
k=3
0
0.2
0.4
0.6
0.8
1


Cumulative fraction of nodes
Fraction beacons suppressed across nodes
-18.4 dBm
-8.9 dBm
-4.0 dBm
-0.3 dBm
0
0.2
0.4
0.6
0.8
1


Cost (transmissions/delivery)
8
7
6
5
4
3
2
1
Control (10.8%)
Data (89.2%)
Mid
4AM
8AM
Noon
4PM
8PM
Mid

We saw two common styles

Arrows and text

Legends

Tools

matplotlib

Gnuplot

Excel

Inkspace

Powerpoint

Learn about: Vector format, high resolution graphics

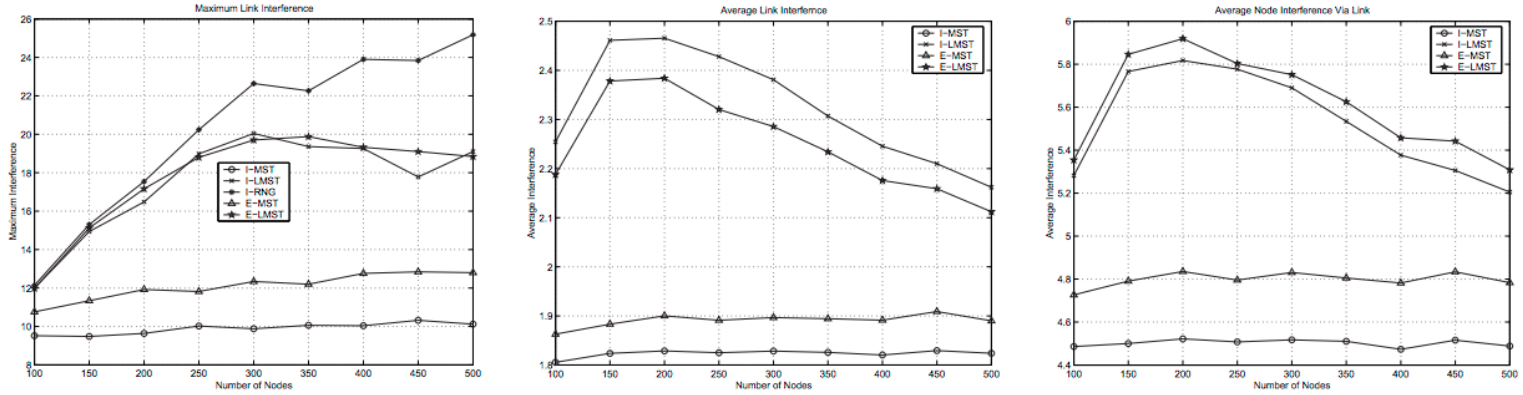
Screen captured images

Zoom in before capture

Start with a large image

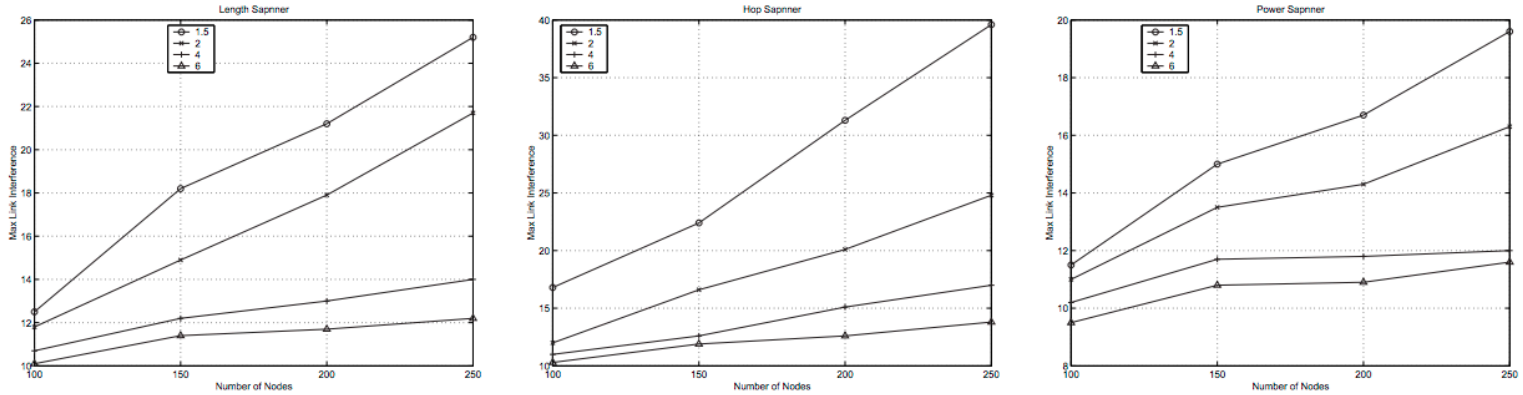
Ideally start with a vector image

Font size



(a) MMLIP problem (b) MALIP Problem (c) MANILP Problem

Fig. 4. Performances of various structures for a number of link-interference related problems.



(a) length spanner (b) hop spanner (c) power spanner

Fig. 5. Minimize the maximum link interference with different spanning ratio requirements.

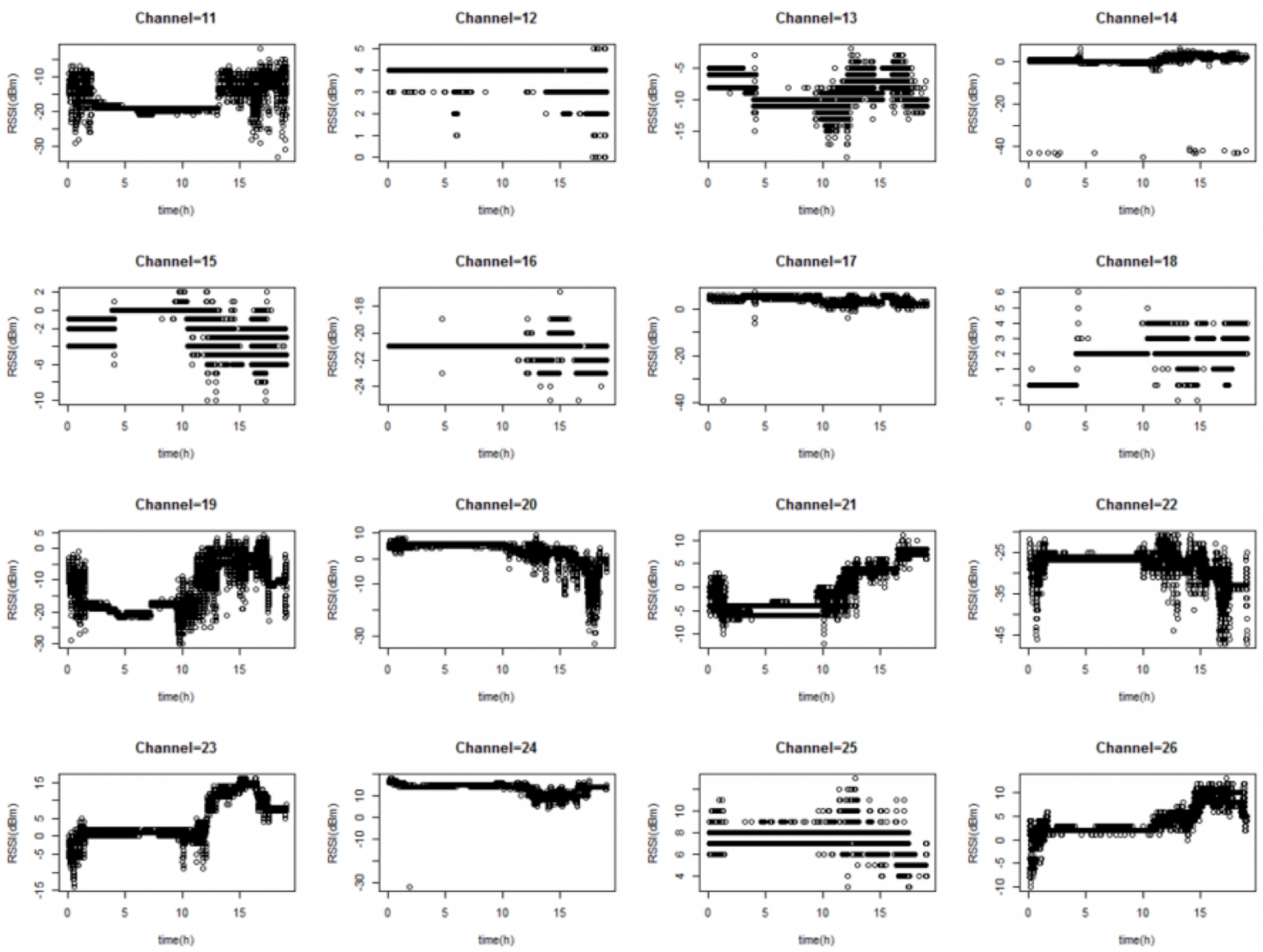
Unusual placement of legends
Font size of axis labels too small

Li 05

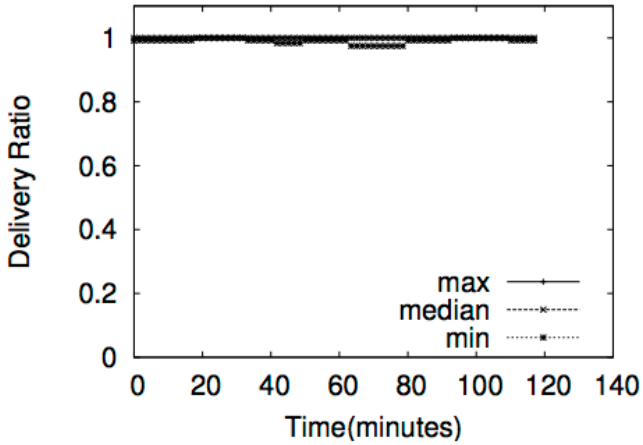
Just one idea to improve all your graphs

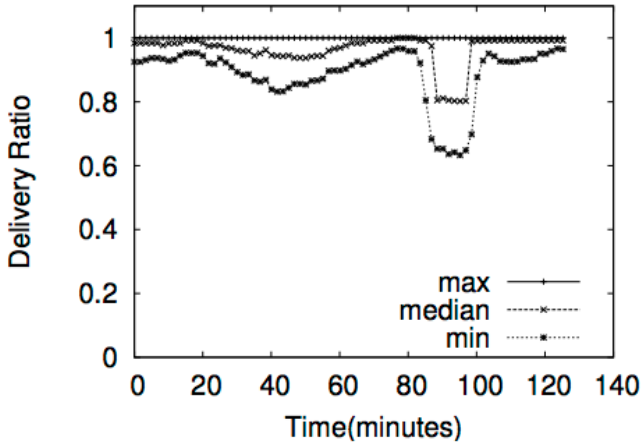
Increase the font size

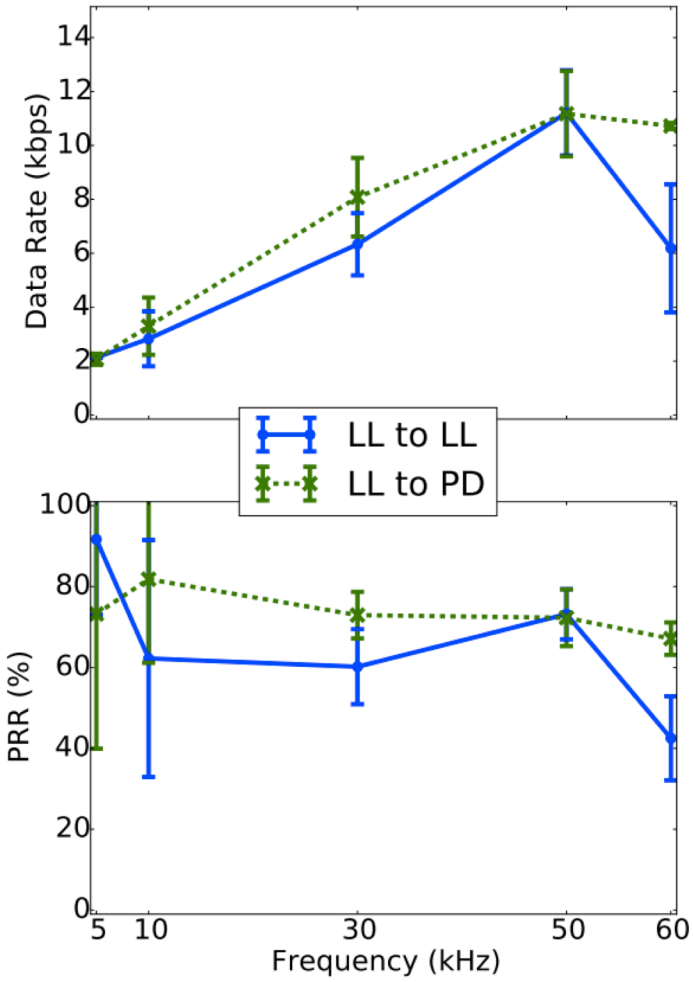
Range

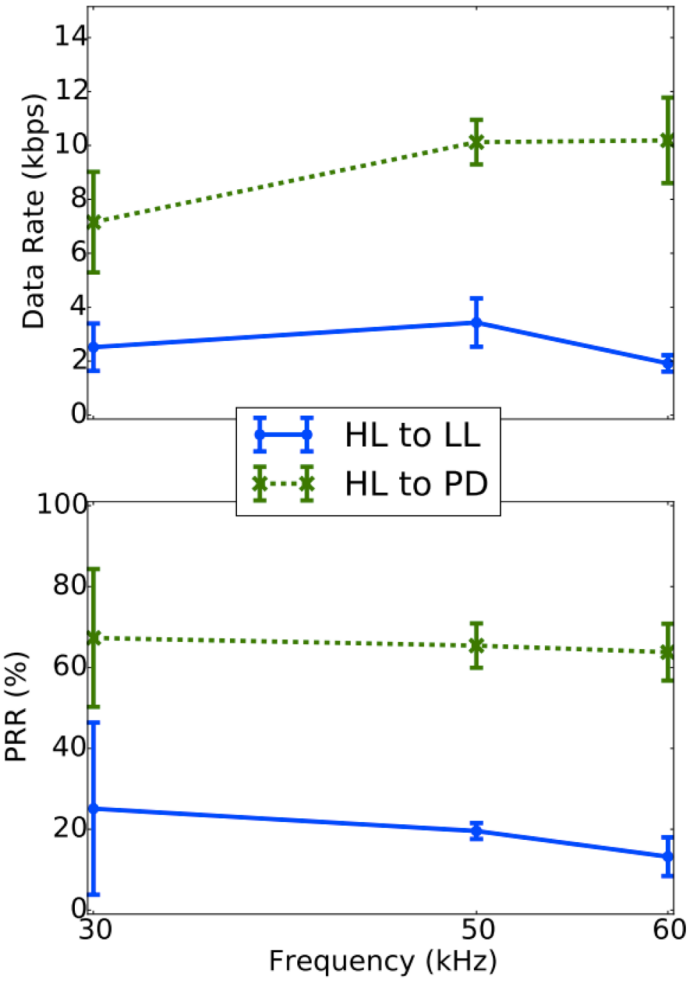


These graphs do not use consistent y-axis range so hard to compare across graphs


Delivery Ratio
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
Time(minutes)
max
median
min


Delivery Ratio
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
Time(minutes)
max
median
min





Idea #1 Range of the metric

Idea #2 Range of the observed values

Caption

Should be mostly self-contained

Don’t just describe the lines

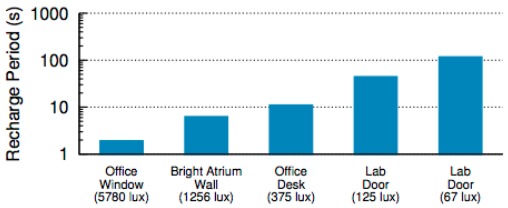


Figure 6: Recharge rate in varying lighting conditions. We measure the time the solar cell based energy-harvester takes to recharge in opportunistic trigger mode under different lighting conditions. As expected, the brighter the room the faster the recharge rate. Rooms with natural light (atrium and office) can support relatively fast recharge rates (in the 10s of seconds). Rooms with only artificial light (lab) cause the sensor to recharge more slowly, but can still support a sample every two minutes.

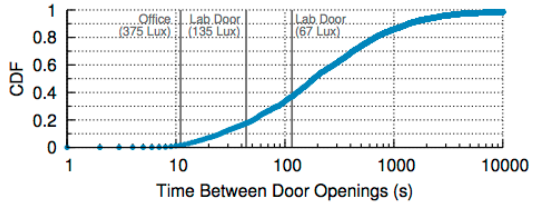
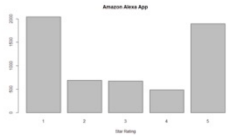
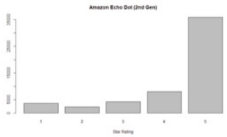


Figure 7: CDF of the interval between door open events. Plotted on a log scale x-axis is the CDF of time intervals between subsequent door opening events of a door over a month period. Also shown are the recharge times for the solar based energy-harvesting power supply in different lighting conditions. Sensors in rooms with natural light would be able to detect most door open events, and even in moderately lit rooms at least 65% of door open events would be detected.

Graphs Case Study

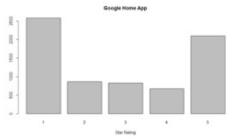


(a) Alexa App Ratings Distribution

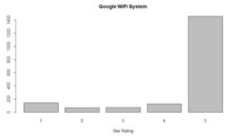


(b) Amazon Echo Dot Ratings Distribution

Fig. 1. Amazon Alexa App and Device Rating Distribution

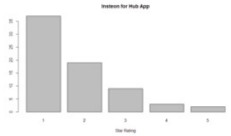


(a) Google Home App Ratings Distribution

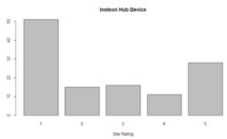


(b) Google WiFi System Ratings Distribution

Fig. 2. Google Home App and Device Rating Distribution

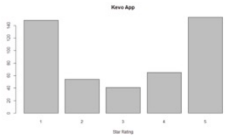


(a) Insteon for Hub App Ratings Distribution

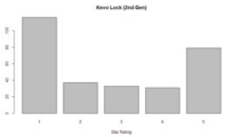


(b) Insteon Hub Device Ratings Distribution

Fig. 3. Insteon App and Device Rating Distribution

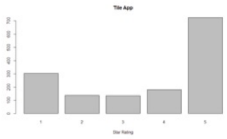


(a) Kevo App Ratings Distribution

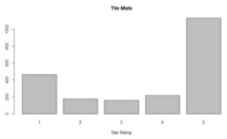


(b) Kevo Lock Ratings Distribution

Fig. 4. Kevo App and Device Rating Distribution



(a) Tile App Ratings Distribution



(b) Tile Mate Ratings Distribution

Fig. 5. Tile App and Device Rating Distribution

HW10

Describe the results from your research.