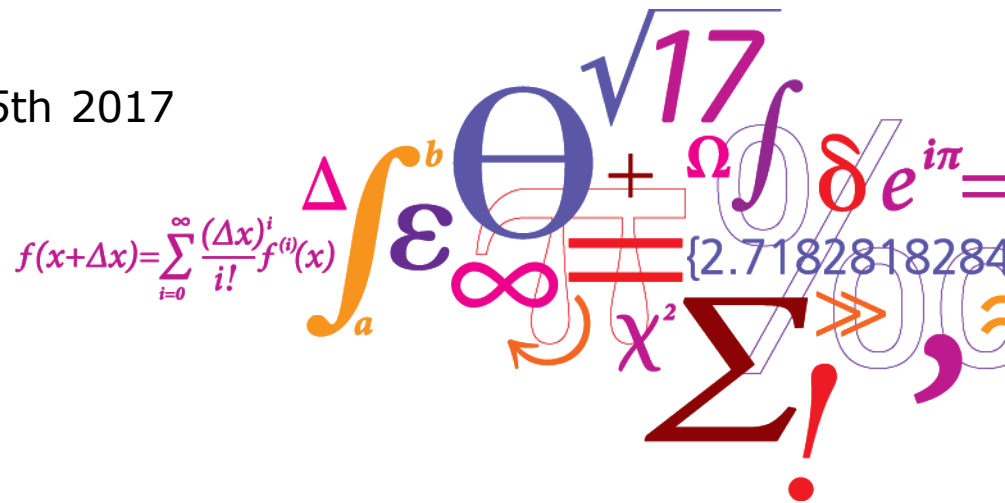


# Results of Structured Review of Electricity consumption classification using smart meter data

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PhD/Post Doc meeting DTU March 15th 2017



classification profiling  
segmentation  
learning feature  
data supervised Statistics monitoring  
machine time series mining statistical  
Residential clustering  
construction extraction electricity  
consumption analytics  
customer Analysis Smart  
unsupervised

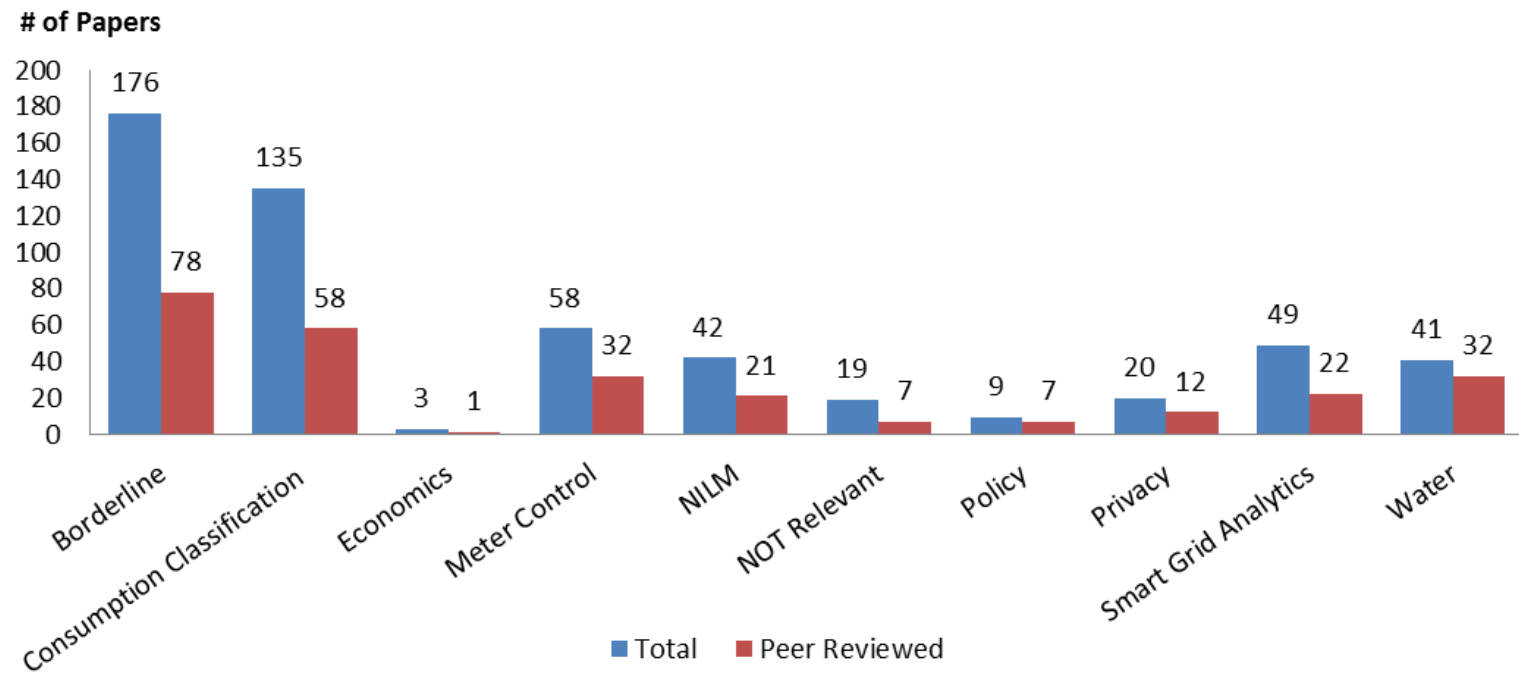


# Review Waterfall

30 search phrases, Thomson Reuters Web-of-Science

Waterfall statistics	Bulk	reduced
Initial number of articles	3922	-
Unique	2099	1823
Screening I: Title	552	1271
Screening II: Abstract	311	241
Removal of af non-peer-reviewed	136	175
Screening III: Borderline data set description	71	65
Screening IV: Reading articles	34	37
Final number of articles.	34	

# Distribution of paper topic



# Identified Methods for Classification

Metode	Total
K-Means	22
hierarchical	10
fuzzy k-means	4
Follow-The_leader	3
Neural Network	2
K-medoid	2
Mixture Model	3
Fast Fourier Transform	1
KNN	1
Ant Colony	1
PC-Kmeans	1
<u>Adaptive Vector Quantization</u>	<u>1</u>

# Data summary

Quantity	Country	Type	Length	Recording Frequency	Final Size (meters)	K-mean	Heirarchical	Follow the leader	Mixture models	Fast Fourier Transform
1	Brazil	Mix	1 month	15 min	2000	x				
2	Canada	Mix	12 months	60 min	62, 923				x	
1	Denmark	Mix	36 months	60 min	4500					
1	Finland	Mix	12 months	60 min	3989	x	x			
1	France	Residential	UNKNOWN	10 min	100	x				
1	Germany	Residential	UNKNOWN	15 min	215	x				
1	Greece	Industrial	10 months	15 min	292	x	x			
1	Ireland	Residential	>24 months	30 min	3941, 3440, 3622, 3487	X		X	X	
1	Japan	Residential	18 months	1 min	1072	X	X			
3	Korea	Mix	27 months	15 min, 60 min	1735, 1205, 135	x	X			
2	Portugal	Residential	48 months	15 min	265, 1022	x	x			
1	Romania	Industrial	1 day	15 min	234	x	x	x		
2	Spain	Mix	24 months	60 min	711, 230	x				x
2	UK	Residential	18 months	30 min	5000	x				
1	UK, Bulgarian	Residential	12 months	7 sec	197	x	x		x	
5	USA	Mix	> 8 months	1 min, 10 min, 60 min	952, 123150, 952, 103, 2000	x	x			

# Data Description Score

Kategori	Attribut	Hypighed	% af artikler"
"Geografisk" information	Land	33	97%
	Region	27	79%
	Ophav	27	79%
"Data" information	Indledende størrelse	33	97%
	Tydelig reduktion	32	94%
	Manglende værdier	17	50%
	Endelig størrelse	31	91%
"Tids" information	Registreringsfrekvens	33	97%
	Start	23	68%
	Slut	22	65%
	Tidslængde	30	88%
"Type" information	Type	32	94%
Reference data	Henvisning	13	38%

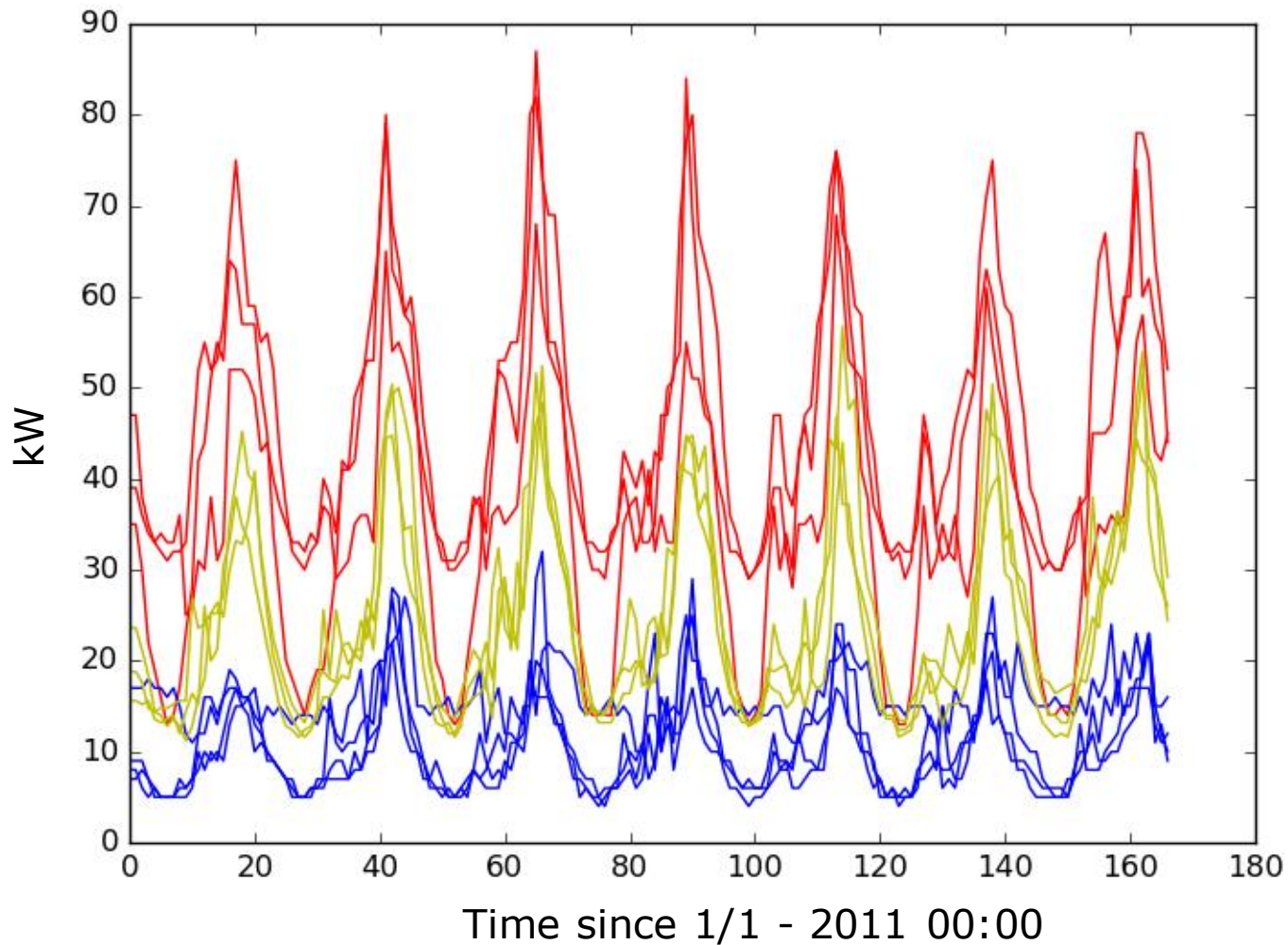
Score	Qty
7	4
8	1
9	3
10	8
11	8
12	7
13	3
Grand Total	<b>34</b>

# Data Description Score Case

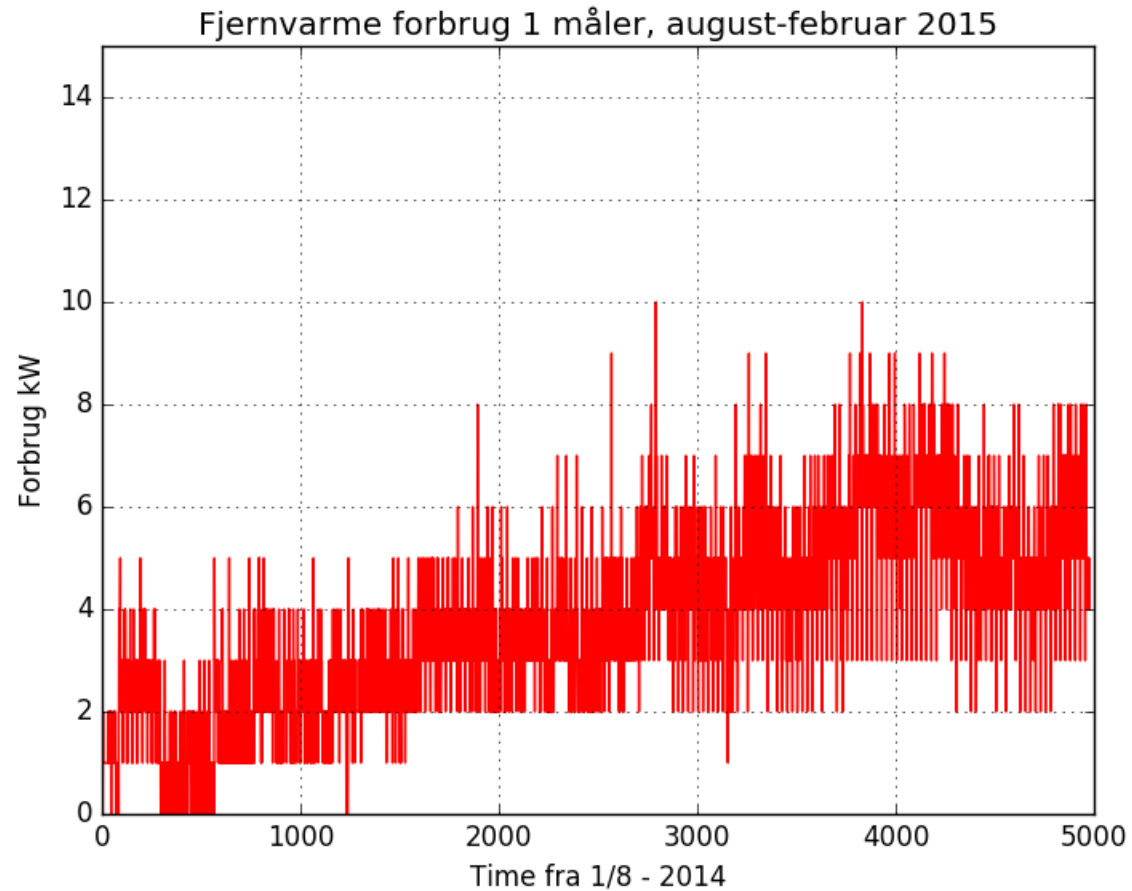
Reference Article #	[7]	[8]
Country	x	X
Region	x	x
Supplier	x	
Initial Size	x	x
Clear Reduction	x	x
Missing Values	x	x
Final Size	x	x
Recording Frequency	x	x
Start	x	x
End	x	x
Length	x	x
Type	x	x
Referral		x



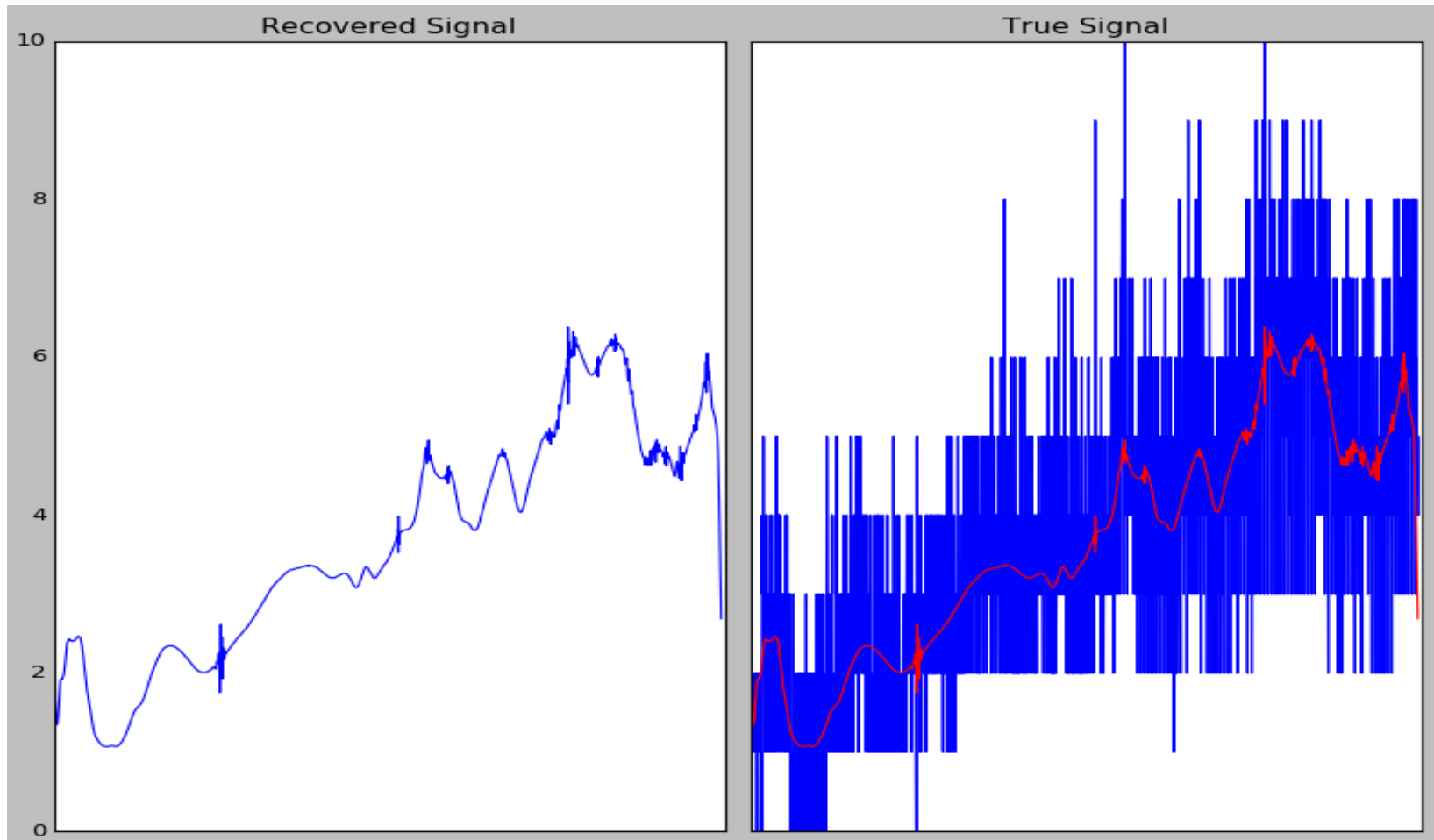
# Classification of 10 meters in 3 groups with K-means



# District heating

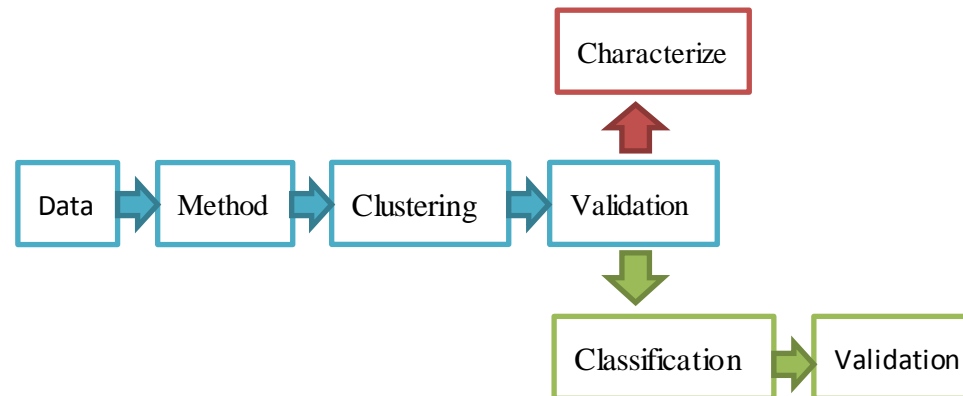


# Curve fitting

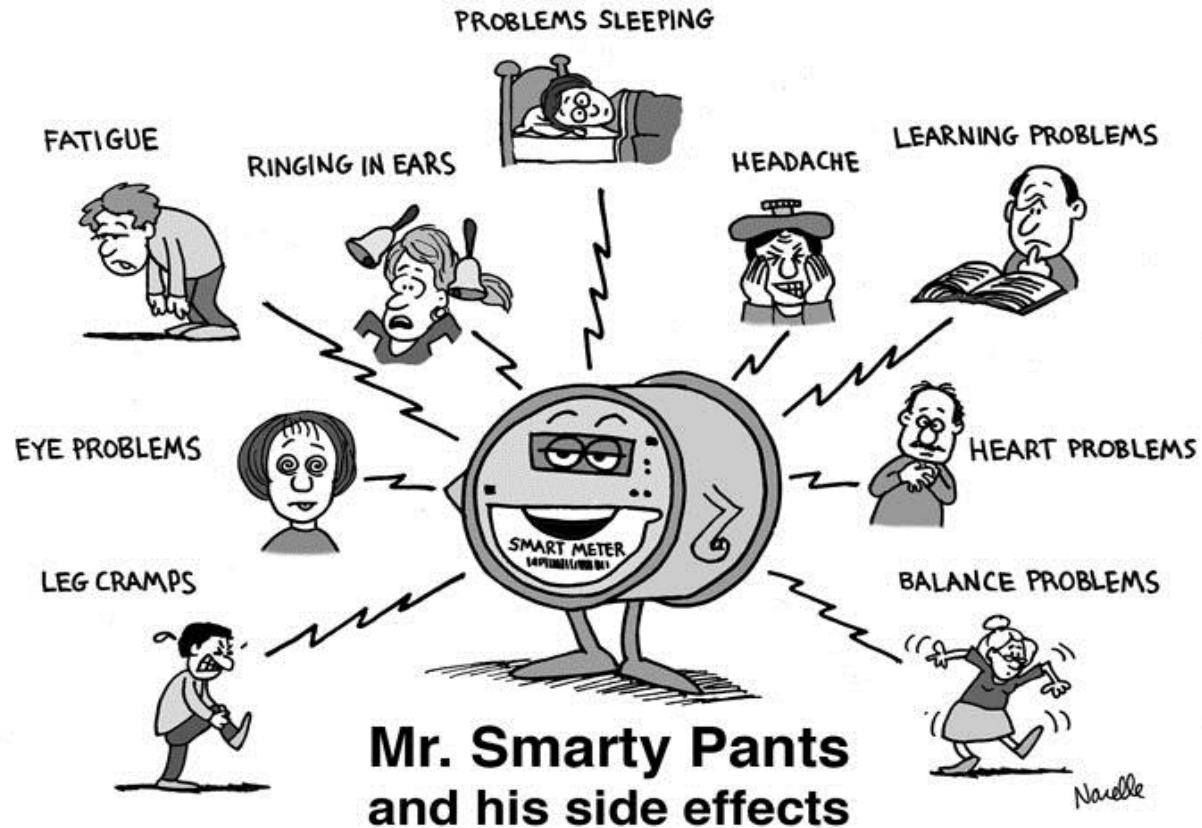


# Findings

- Classification is possible
  - Simple techniques applied
- **1** article recognize the data could be autocorrelated
- Poor data description in studies analyzed
- SoP ->



# Thank You!



**Mr. Smarty Pants  
and his side effects**

<http://stopsmartmeters.org/>

<http://www.stopsmartmeter.dk/>