Data, Metadata

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Basic structure for analysis

The data matrix

	Weight	Height	Sex	Eyes
John	85	1.85	M	azul
	.	.	.	.
	.	.	.	.

Point cloud (video)

Rows: Individuals (study units) (i1….in)

Columns: Variables (characteristics of individuals) (X1..Xk)

Cells: Value of variables for individuals (xik)

https://www.youtube.com/watch?v=4pnQd6jnCWk

Type of variables

- Numerical: Quantitative, measure

Categorization

Discretization

continuous (real quantity): *Weight, Height*

discrete (natural quantity): *Age, shoes size*

Mean/StDev

Histograms

- Categoric: Qualitative, adjective

(evenctually codified)

Ordinal (ordering over modalities): *Socioecnonomic status*

Binary (two modalities): *wear glasses*

Nominal (unordered modalitites): *Hair color*

Percentages

Tables

BarPlots

RECategorization

- Date: Special formats, only some softwares
- Other variables

(no standard, rarely used in standard data mining applications)

- Fuzzy variables
- [illegible] variables
- [illegible] variables
- [illegible] variables
- Distributional variables
- Interval variables/Ratio variables (means, standard dev, dotplots)
- Textual data

Loss information

Better avoid

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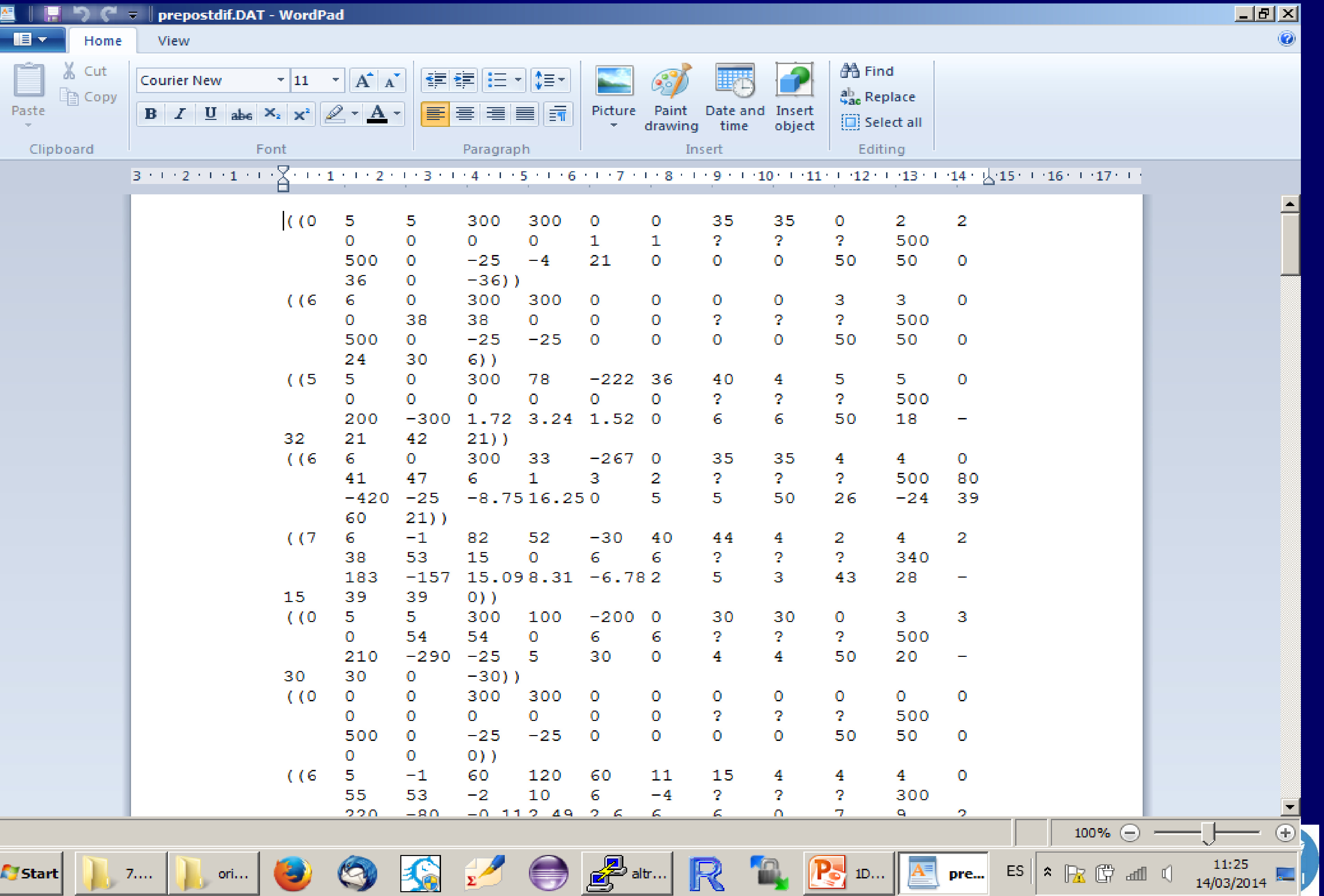
From Data to Decisional Knowledge

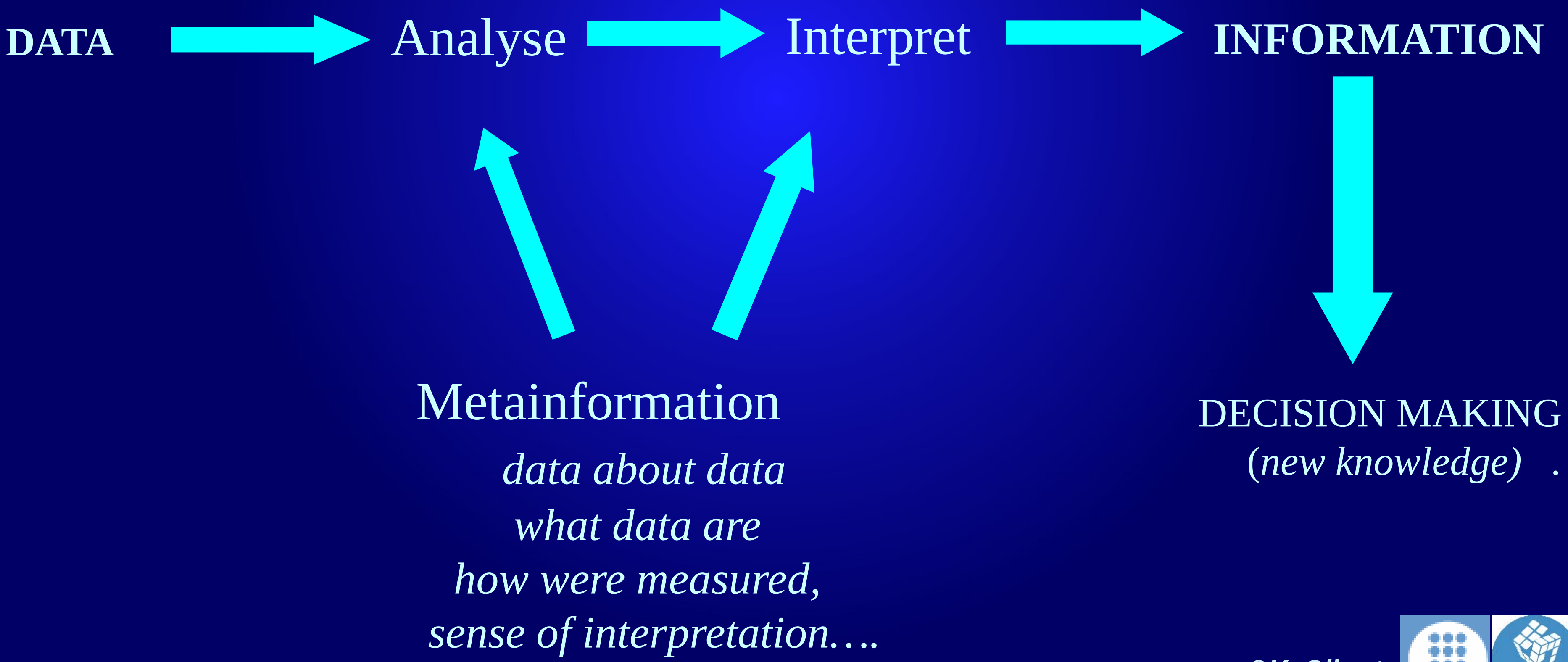
DATA <> **INFORMATION**



```
((0    5      5      300    300    0      0      35     35     0      2      2
       0      0      0      0      1      1      ?      ?      ?      500
       500    0      -25    -4     21     0      0      0      50     50     0
       36     0      -36))
((6    6      0      300    300    0      0      0      0      3      3      0
       0      38     38     0      0      0      ?      ?      ?      500
       500    0      -25    -25    0      0      0      0      50     50     0
       24     30     6))
((5    5      0      300    78     -222   36     40     4      5      5      0
       0      0      0      0      0      0      ?      ?      ?      500
       200    -300   1.72   3.24   1.52   0      6      6      50     18     -
32     21     42     21))
((6    6      0      300    33     -267   0      35     35     4      4      0
       41     47     6      1      3      2      ?      ?      ?      500    80
       -420   -25    -8.75  16.25  0      5      5      50     26     -24    39
       60     21))
((7    6      -1     82     52     -30    40     44     4      2      4      2
       38     53     15     0      6      6      ?      ?      ?      340
       183    -157   15.09  8.31   -6.78  2      5      3      43     28     -
15     39     39     0))
((0    5      5      300    100    -200   0      30     30     0      3      3
       0      54     54     0      6      6      ?      ?      ?      500
       210    -290   -25    5      30     0      4      4      50     20     -
30     30     0      -30))
((0    0      0      300    300    0      0      0      0      0      0      0
       0      0      0      0      0      0      ?      ?      ?      500
       500    0      -25    -25    0      0      0      0      50     50     0
       0      0      0))
((6    5      -1     60     120    60     11     15     4      4      4      0
       55     53     -2     10     6      -4     ?      ?      ?      300
       220    -80    -0.11  2.49   2.6    6      6      0      7      9      2
```

From Data to Decisional Knowledge

DATA <> INFORMATION



DATA → Analyse → Interpret → **INFORMATION**

DECISION MAKING
(new knowledge) .

Metainformation

data about data
what data are
how were measured,
sense of interpretation….

Metadata

Data Origin: Secondary source/Primary

Inclusion criteria: Representativity? Target?

Size of data: nxK (n>10K?)

All variables:

- What is it measuring (Measuring tool or procedure)
- Measuring unit
- Representation of missing data
- Meaning of variable

Quantitative variables:

- Range of possible values

Qualitative variables:

- Set of possible modalities
- Representation of modalities
- Meaning of modalities

Role of variables: Response/Explanatory

Still an open problem

Software do not support

- External project documentation manually managed
- Relational Data Base for very complex Data Matrices *[Gibert, MMR 92]*

Gibert, K., & Marti-Recober, M. (1992). A System for Production and Analysis of Statistical Reports. In Computational Statistics (pp. 363-368). Physica-Verlag HD.

Metadata File

url: *www.xxx.ssss.www*

Inclusion criteria: *People in [18,65] years, no hard attacks, no smoking, no cholesterol, married, with sons or daughters….*

n*: nro of rows*

K*: nro of columns*

Variable	Modalities	meaning	Type	Measuring unit	Missing code	Measuring procedure	Range	Role
Age		Age of marriage	Num	years	“*”		[1,105]	Explanatory
Sex		Gender	Quali		Unknown			Explanatory
	M	Male						
	H	Female						
FeC		Level of Iron in blood	Num	µg/dl	NA	Biochemical analysis on blood sample measuring transferrine ……	[30, 200]	Explanatoyr
Anemy		The person has anemy diagnosis	Boolean		Unknown	Levels of Fec<xxx and …….		Response

First insight to Data

- Look at Metadata
- Determine rows and columns to be kept for the analysis
- Basic descriptive analysis of remanining variables
  - Inspect anomalies, errors, missing data, outliers
- First report about data quality
- Preprocessing
- Verify after each processing step
- Final descriptive analysis *(report data improvements)*

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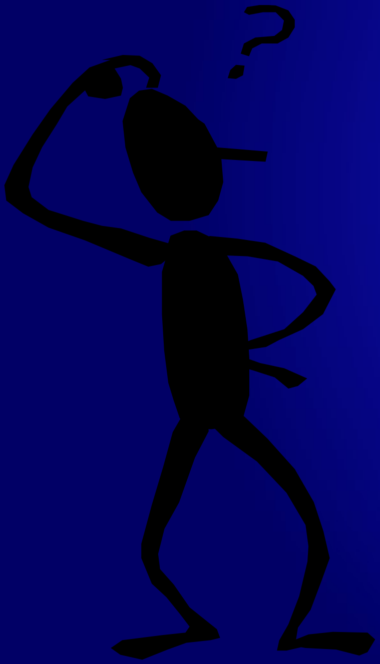

Are there any questions?...