



Predictive Medicine: The Contribution of Algorithms

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<https://allab.di.ubi.pt/>

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predict $\approx$ *pre+dicere*

Predictive algorithms for health

- Algorithms have recently been described as the new medical tests. Nevertheless, most of the times many of us only quantify our biosignals (e.g. through blood analysis, imaging, measuring body temperature, etc.) when we sense that our health is at stake, i.e., in case of a declared or sensed imminent disease.
- It has also been reported that predictive analytics are one of the keys to personalized medicine, therefore, a perfect health test should be able to predict illness before it actually causes damage.

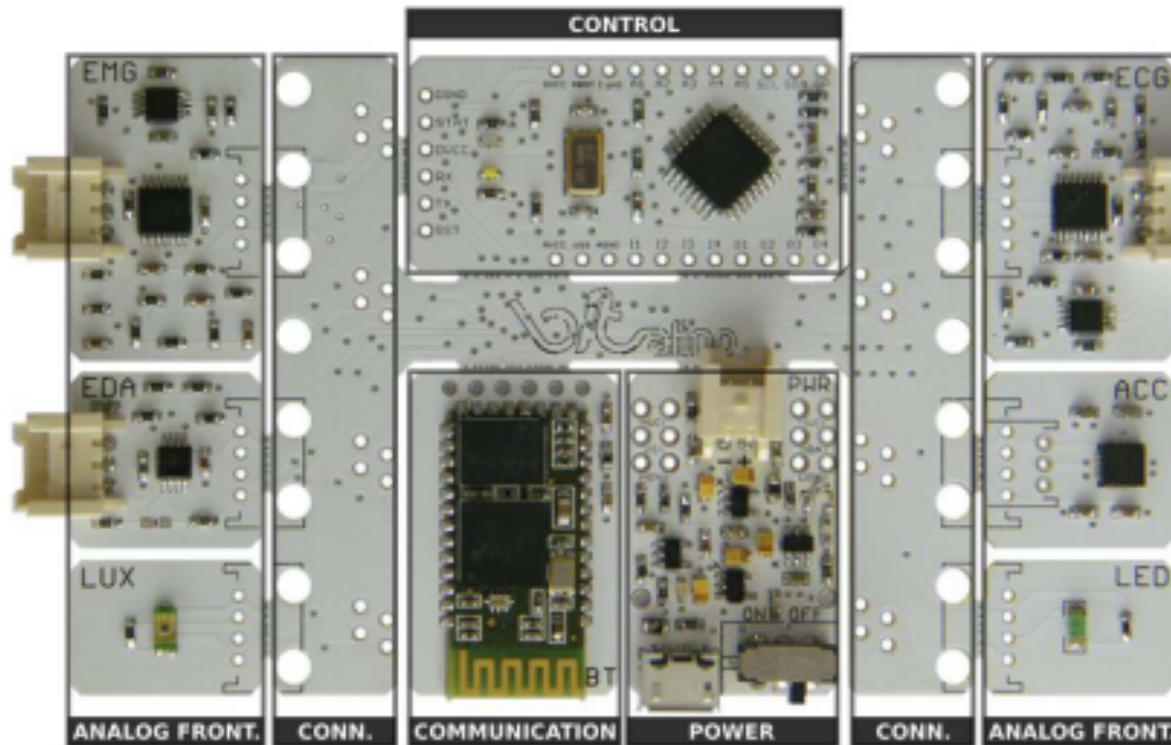
- Assessing the cat's tail and the 4 Ps of medicine
 - Preventive
 - Participatory
 - Personalized
 - Predictive
 - Precision

- AI
- Apps

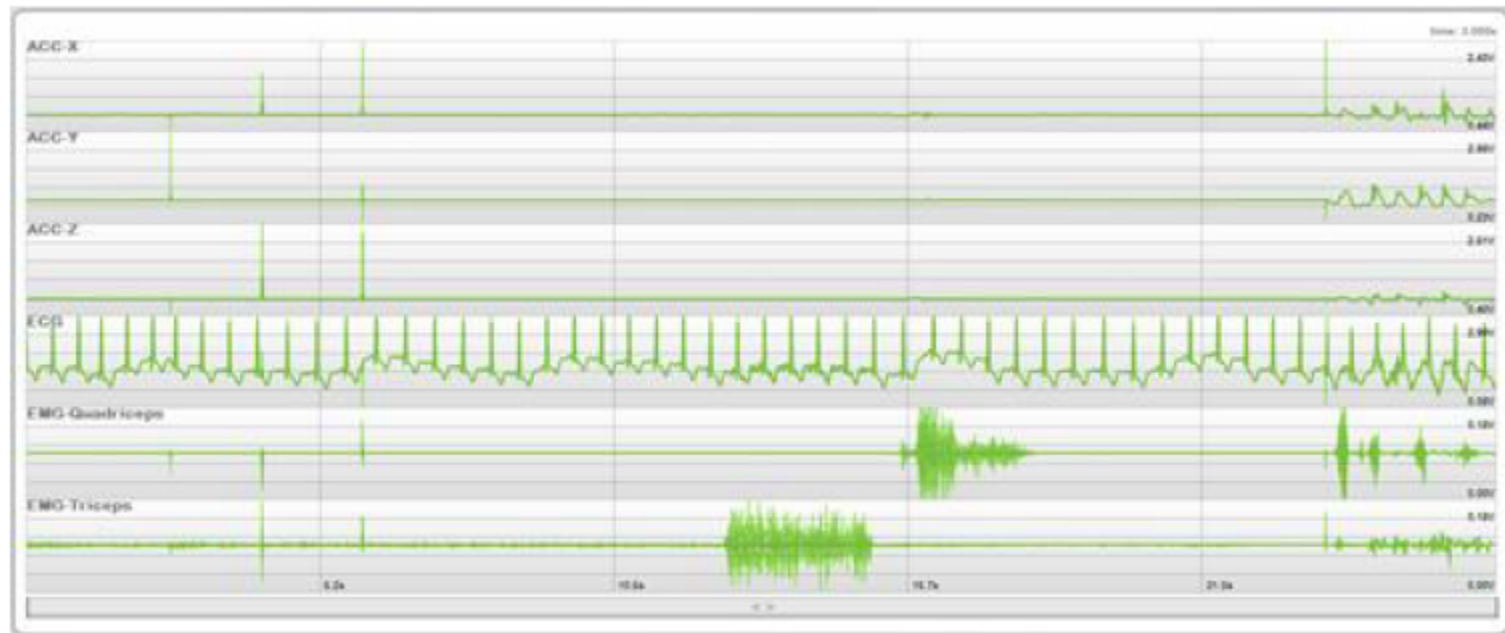
- Assessment of mobility of elderly using off-the-shelf equipment
- Pain monitoring
- Efficiency of training
- Thermography for premature diagnosis of diabetic foot
- PDLC

Wearable and pervasive devices + analytics + cloud
= Personalized health care

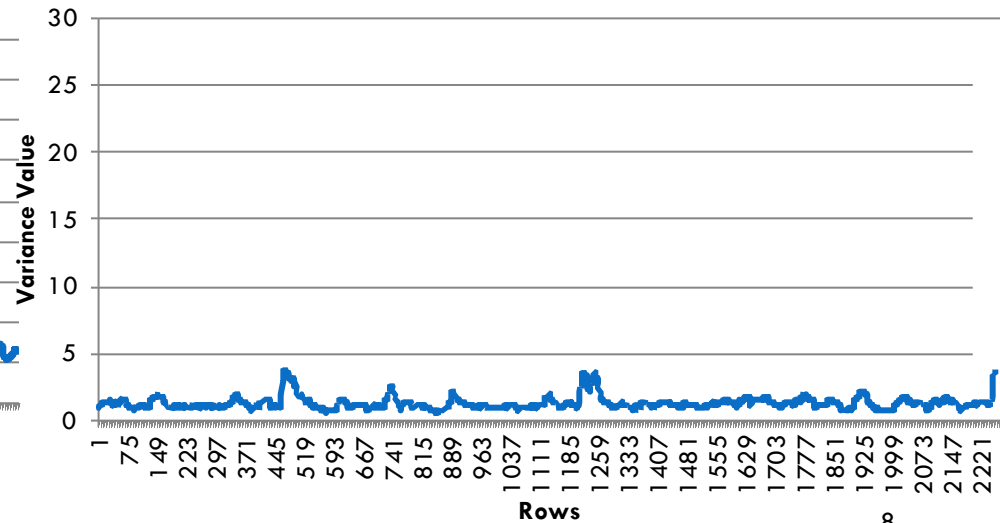
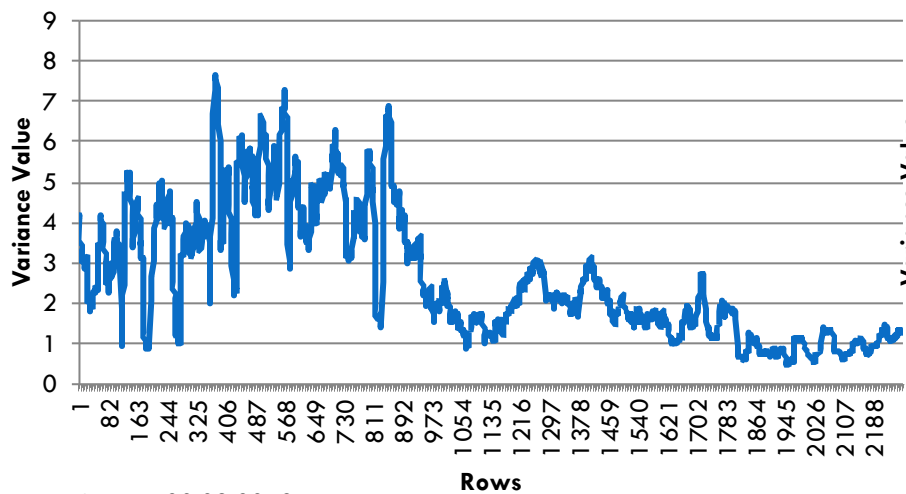
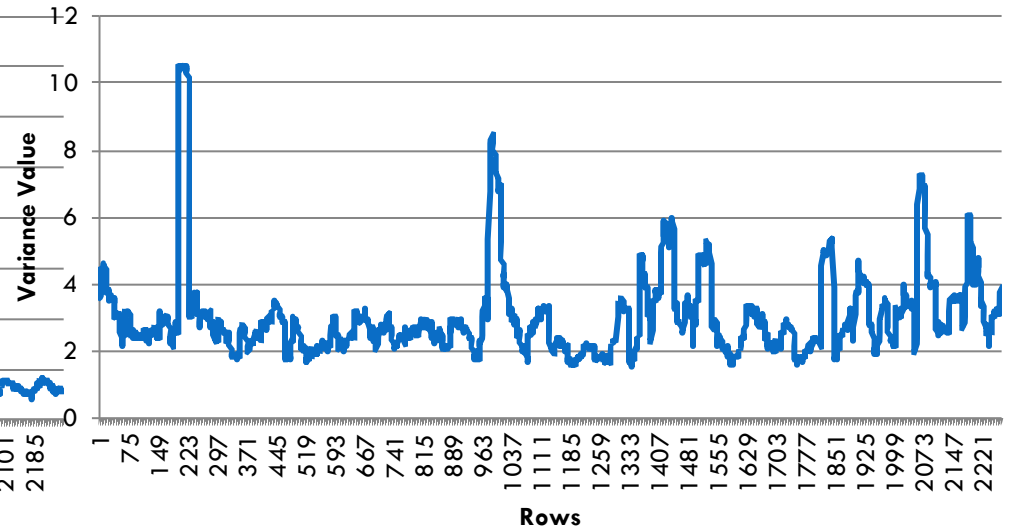
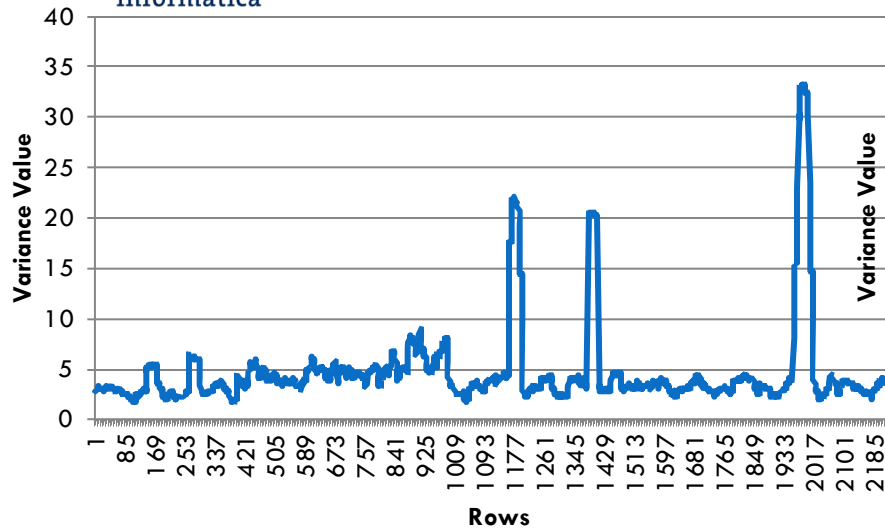
- **BITalino**



- Typical results



Departamento de
Informática



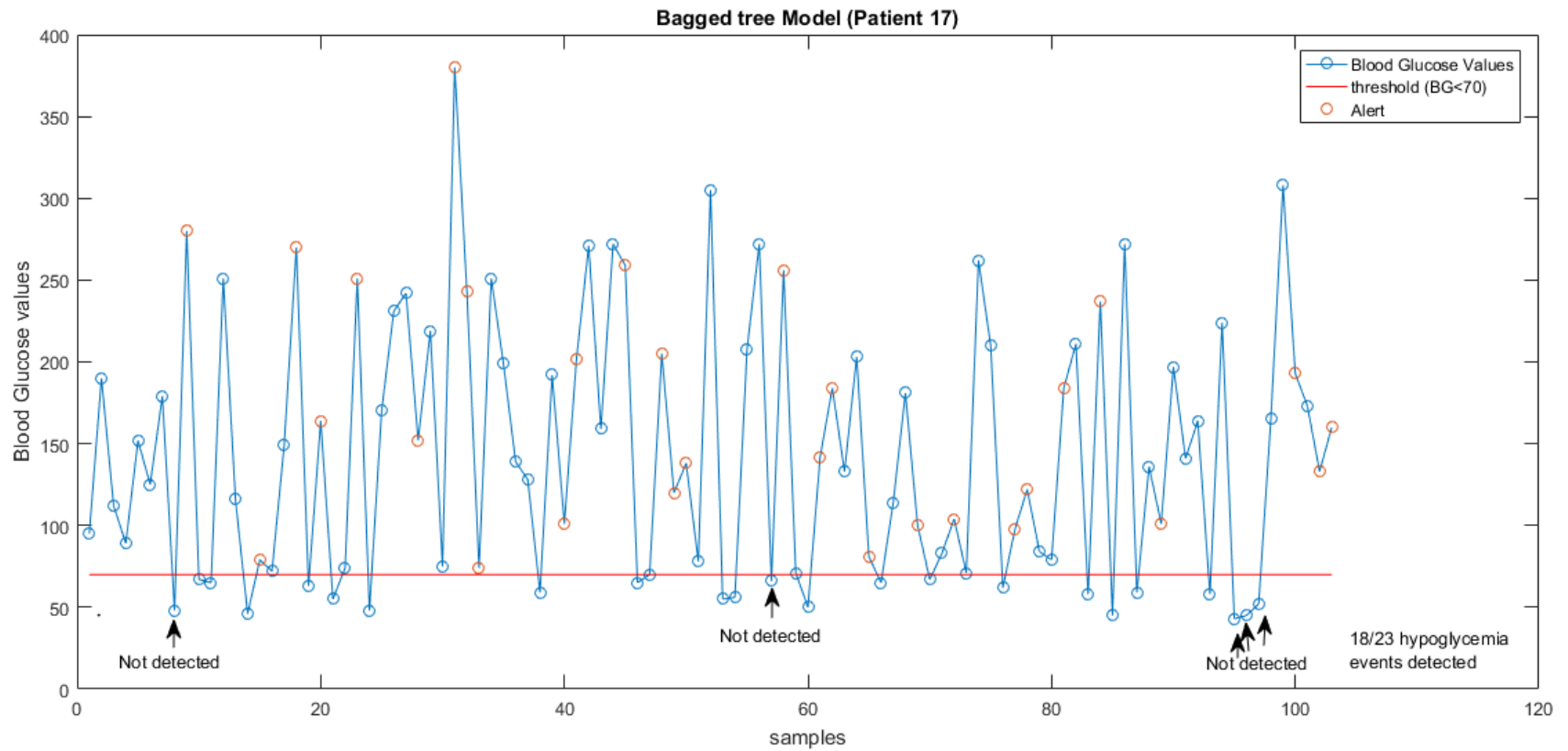
- Automated diagnosis

	Mean	STD	Median	Amplitude
MITDB	3,6403 ($\sigma = 0,2569$)	0,3808 ($\sigma = 0,1144$)	3,7141 ($\sigma = 0,2737$)	2,1560 ($\sigma = 0,3429$)
CHFDB	4,3149 ($\sigma = 0,1309$)	0,1243 ($\sigma = 0,0516$)	4,3324 ($\sigma = 0,1274$)	0,9266 ($\sigma = 0,3328$)
MVEDB	4,2892 ($\sigma = 0,1263$)	0,1291 ($\sigma = 0,0351$)	4,3086 ($\sigma = 0,1297$)	0,9229 ($\sigma = 0,2113$)
NRSDB	4,3138 ($\sigma = 0,0755$)	0,1704 ($\sigma = 0,0333$)	4,3585 ($\sigma = 0,0751$)	1,3309 ($\sigma = 0,2247$)

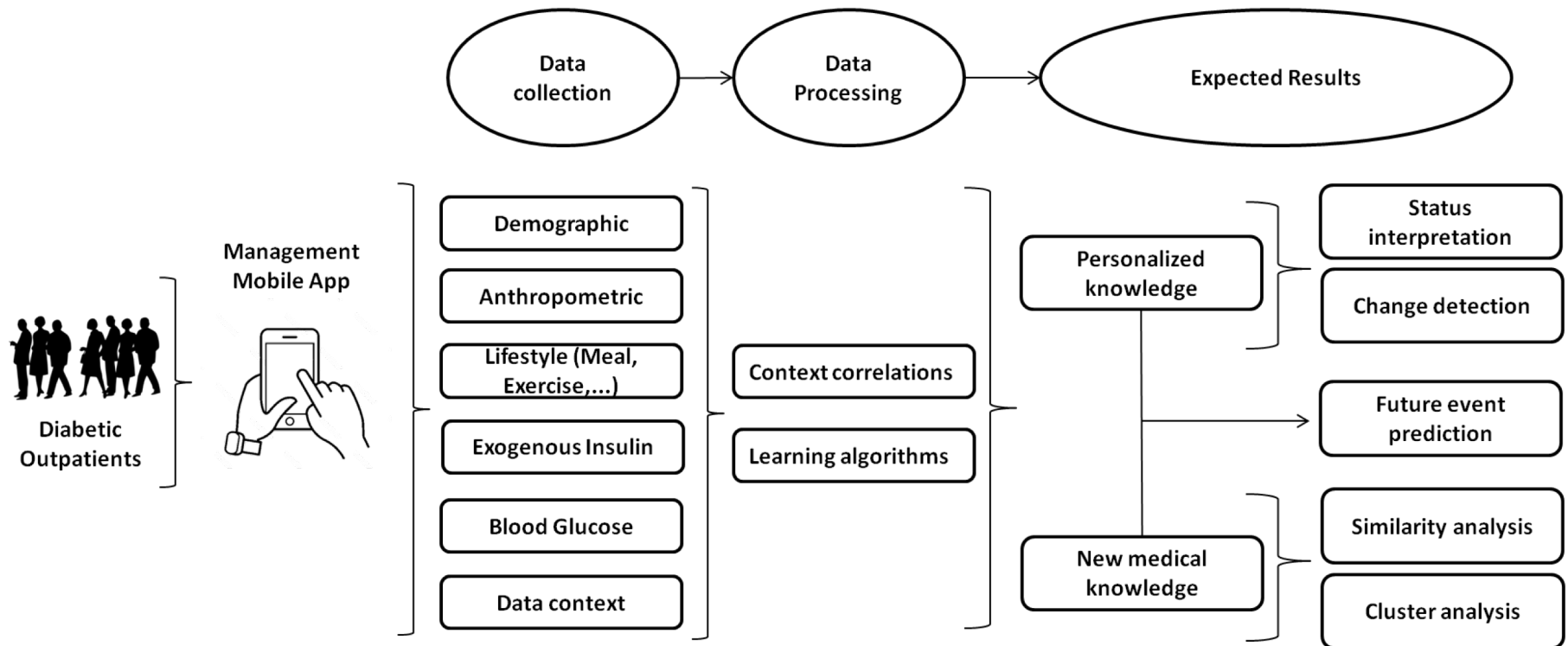
MIT=Arrhythmia CHF=Congestive Heart Failure

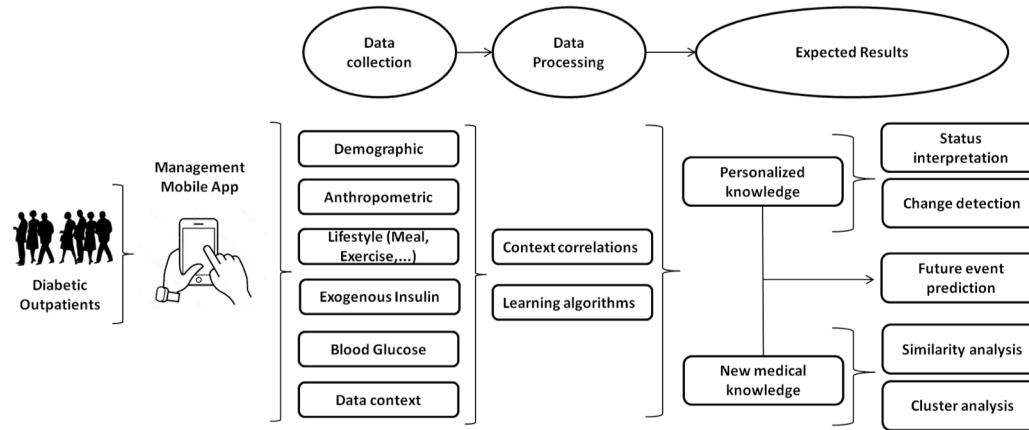
MVE=Malignant Ventricular Ectopy NSR=Normal Sinus Rhythm





• Prediction of hypoglycemia events





Conclusions, Invitation & Questions ?

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