## How is Machine Learning Improving Patient Lives?

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For 18 years, I have been the Management Chief of IT at a public hospital in Lorca, a town near Murcia in Spain. I have worked and provided a range of solutions to support infrastructure (Hard & Soft) of a hospital. Getting the support to the HIS (Hospital Information System) Troubleshooting with a methodology (ITIL V.2.) and defining and analysing the administrative and clinical management process.

I am interested in clinical processes so I learned Snomed-CT (a clinical terminology), to normalise the clinical concepts and represent the electronic health records using a norm CEN/ISO13606, designed to achieve semantic interoperability in the electronic health record communication.

Three years ago, I changed my role, applying to be a Data Scientist, analysing processes, identifying and creating KPIs (key performance indicators) to develop scoreboards and dashboard with a Open Source Business Intelligent "Pentaho". This helped us in the decision-making process.

This led me to discover the power of data and how I could apply Machine Learning Algorithms to improve results, get predictive solutions, analyse processes and data and to apply this to clinical projects and administrative hospital processes. With the onset of "Big Data", we are in a new world of possibilities to improve the lives of the patients.

Like the John Paul Young song "Love is in the air, everywhere I look around... ", "data is in the air, everywhere I look around..." and inside a hospital environment we need  insight. The main process to understand is the way to transform "Data -Information-Knowledge". We have many and different, kinds of data, and we can apply many Machine Learning Algorithms (supervised and unsupervised learning), Deep Learning, and Reinforcement Learning.

We can apply Machine Learning Algorithms not only to clinical processes or targets, like classical studios of "blood glucose", "cancer studio", "cardiology graph" and many more, we can also apply it to administrative and financial processes, like reimbursement of the re-entry patient, prediction of collapse at the Emergency door and study how to improve the patient surgery waiting lists  and appointments.

This algorithm helps us to make the best decisions and improve processes to get the best results for the final target "patient management". It also supports better precision for the best diagnoses, reduction of the time to wait for surgery, an appointment and better "Patient Health".

It's complicated to achieve this in a public hospital, but we strive for it, to improve our skills. We are impressed with the free    MOOC of Machine Learning from Coursera or EDX and trying to participate in the Kaggle Challenge such as the "Data Science Bowl 2017", to improve lung cancer detection, with Deep Learning algorithms.

Projects we are developing include:

A semantic search engine of Clinical Concepts from the plain text of the reports of the Electronics Clinical Records. Using NLP, Deep Learning and a clinical terminology Snomed-CT, this product, will be able to help physicians to get different relations of clinical concepts from many EHRs

and improve the codification systems of the diagnostics and procedures for a clinical terminology "Snomed-CT".

Another project is, applying open source platforms and solutions, like "AzureML" to develop a solution and predict, when we are going to have a "collapse" at the Emergency door. This is analysis with a supervised learning algorithm of classification.

These projects, applied to Machine Learning Algorithms help us improve the patients' management and patients' health.

**What is your top management tip?**

Data is here so search for its insights. Don't focus on the problem, look for the solution. To do this we need to have a Hackers' Spirit and the pride to overcome challenges.

**What would you single out as a career highlight?**

I like to think that my career highlight still hasn't happened! But to name one, it was the development of a syntactic web search of reports from an emergency server called "N.A.C.H.U.S". For that, I won First Prize for oral communications at a National Congress of Health Informatics "InforSalud-2012". Another highlight was when I went from Management Chief of IT to being a Data Scientist and discovered the power of the data and Machine Learning.

**If you had not chosen this career path you would have become a…?**

Maybe a chemist like my father or dentist likes my friends.

**What are your personal interests outside of work?**

I like running and cooking. When I'm running the best ideas appear and I like discovering new tastes and flavours in food so I like going to bars and tasting "Tapas", classical Spanish food with beer.

**Your favourite quote?**

"Live as if you were to die tomorrow. Learn as if you were to live forever" from Mahatma Ghandi.

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