On My Current Research

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Sexual minorities research project

Main Points

1. Can we use the internet to reach them in the Middle East ? yes ,but more educated participants. The vast majority hide their sexual orientation.
2. To what extent do they have risky sexual behaviors e.g unprotected sex ? more than half never use it; Guilt feeling relates
3. Ever testing HIV? only 34%

Interning at Egybiotech company

- Private research company with a broad research portfolio including cancer research and genetic epidemiology.
- The company conducted multicentric studies funded by UNICEF and UNAIDS.
- Learnt team work and working in a research environment

Panel of autoantibodies for early detection of liver cancer

- Oncimmune UK developed autoantibody assay for early detection of liver cancer.
- Liver cancer is common in Egypt due to hepatitis C epidemic.
- Egybiotech validates the assay through a multicentric study involving cases, attention controls and health controls.

Egyptian Cancer Research Network (ECRN)

- My research group at Alexandria University established a collaboration with 11 Egyptian universities.
- Learnt to work on the national level

The Biorad project

- A Panel of Biomarkers as novel tool for early measurement of radiation exposure.
- Funded by NATO Science for Peace and Security Programme
- Collaboration between Regina Elena National Cancer Institute (Italy) and High Institute of Public Health (Egypt)

As a student doctor

- Very research oriented
- Qualitative analysis of patient doctor communication.
  - What do Arab patients seek when they go online ?
  - What do we miss in disease history taking ?

R: the statistical software

- Have used it for 3 years.
- Worked with many packages including ggplot2, shiny, RGTk2, ReporteRs, sweave...etc
- Reproducibility matters.
- Wishes to participate in bioconductor development.

Python

- Used it for things like web scraping.
- Can use any well documented package.
- Worked with regular expressions, XML, Json, gwidgets ...etc

C++

- Basic understanding of oop and templates.
- Used QT, sqlite and familiarized myself with OpenCV.
- Want to invest time with C++ for:
  - Fast parallel simulations
  - developing functions for bioconductor packages

Data science and machine learning

- Data Enthusiast
- Learnt many ideas in statistics and machine learning such as GLMs and clustering.
- Looking for a chance to apply in a big project.
- Bayesian thinker or wishes to be one of them.

Other computer skills

- Logic programming with prolog
- Agent based modelling with Netlogo
- Academic software and latex
- Linux fan
- Started learning emacs lisp

Elective courses at my school

- Over 1000 students prioritize 50 courses.
- Consider dublicates, entry mistakes, missing data,..etc even engaged students can go together!!
- Very easy in R with beautiful output

Online health related questions

- Several patients go online to ask questions. Can we use these data to learn something about our health system ? Can we predict a phenomenon?
- Scraped thousands of online questions by Arab patients using python.
- Arabic text mining !

A clinical decision support system

- Several Diseases with several features. If you have some features about a new patient what is the best next feature to search for in that patient in order to diagnose him correctly.
- Replace sensitivity and specificity with weights
- Wrote a simple QT application to allow filling the sqlite knowledge database by the expert.
- Interactivity matters

Automating Medicine

- Several people attempted rule-based expert systems, ANN, graphical models ...etc
- I believe the problem is with the knowledge representation of Medicine itself not the software.
- Multi-omic approach can fix it, if we stopped categorizing Medicine into disease, but rather used a continuous representation of illness.

Evolutionary Medicine

- Understanding disease from this prospect will extremely advance Medicine.
- Cancer itself is nothing but a natural selection process of rapidly growing cells.
- I want to learn for the internship to work with sequencing data, so that I can do comparative genomics to inspect for hidden sources of disease and vaccine development.

Two final words: Hierarchies and cellular automata

"Once you know that hierarchies exist, you see them everywhere" Kreft and de Leeuw

"What I cannot create, I do not understand." Richard Feynman

Why Huber group ?

Everything here matters to me.

Multidisciplinary team, Multi-omic approach, image analysis, systems biology, machine learning and computer science ...etc