MINI REVIEW

Artificial Intelligence (AI), Genomics and Personalized Medicine

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ABSTRACT
The Future of Treatment lies in Technology. The hottest Technology that’s revolutionizing our lives indirectly via Google, Apple is AI or more specifically Deep Learning (DL). There is nothing more important than Human Health, and Human Wellness is defined by the Health, or in other words, the Medical Systems. Medicine has gone past the normal Clinical Allopathic practices for the general population, being more Personalized at the gen’omics” level. With Alternate forms of medicines finding traction esp. in the Indian subcontinent, and certain of practices like the cupping hijama, as seeing during Rio 2016 Olympics, an inclusive approach – using AI in Genomics extending in to All reliable practiced form of medicine is the approach forward.

KEY WORDS: Genomics, Artificial Intelligence, Integrated Medicine, Machine Learning, Modern Medicine, Data-Driven Medicine, Deep Learning.

Introduction
The concept of personalized medicine has evolved with current trends in genomics giving the extra bit of personalization, in theory at least. While classical genomics inclusive of Big Data (without using Mi/Al) still is years away from delivering tailored personalized medicine (Alyass et al., 2015) – that data to crunch, the different variations and scenarios with different genome sets doesn’t make things simpler.
All the while when we have lots to “crunch” deduce and try, we have not to fully explore the solutions - modern & alternates. And the high end “solutions” that currently being specialized is majorly in modern medicine.

Background
The Indian subcontinent is filled with “alternative forms of medicine – with many institutional teaching and practicing them. Issue does remain in standardization and clinical trials as per Allopathic standard, due to which they lack enough recognitions in those circles. From the recent nature article (Nature India, 2016) speaks of fairly direct natural extract for cancer treatment, the natural/alternate forms do find traction in the Indian subcontinent, and have had selective relative impact in treating various ailments, though disputable in some circles. In places like the Middle East have had the Unani form as well, the focus here being different “body types " responding differently to ways of medicine -some respond better to homeopathy vs. Ayurveda etc.
Renowned hospitals like the Amrita (Amrita Hospital website, 2016) give Integrated Medical treatment- combining Modern and Alternative form, which is in turn, a common man’s personalization (reference). Artificial Intelligence in medicine (AIM) (Coiera, 1997) helps what’s called Data-Driven Medicine. And currently, it’s set to modern methodology of treatment based of their cases’ database derived from modern medical techniques only.
Modus Operandi
Here we face two AI fronts:
A. Part where in the Machine Learning (Deep Learning to be
precise) needs to be oriented inclusive of the
proven/documentated success cases in Alternative forms be in
Ayurveda, Unani and/Homeopathy, encompassing a greater
& more challenging deviations .Here, the challenges would
be for the practitioners of different forms of medicine to
“train” or teach the AI to “learn” deeply. It’s here where we
define Deep Learning defined as branch of machine learning
based on a set of algorithms that attempt to model high level
abstractions in data by using a deep graph with multiple
processing layers, composed of multiple linear and non-
linear transformations (Yu et al., 2014). One should note
that, it final “treatment” still comes from the human doctor.

B. The wider Genomics part wherein active efforts to see
how the isolated metabolite works at the “omics” levels –
genomics, transcriptomics – in the Geographical Areas of
Focus: Middle eastern’ GCC Countries like the UAE, KSA
having a sizeable expat population can play host to the
myriad of phenotypes present in their mixed, population-Arab
European Asian mix (Kapiszewski , 2006). As for the local
UAE population studies, cue can be taken from The Qatar
genome 4 where in some families (like Suawaidis) share
ancestry across the borders. In matters of transcontinental
diversity and well as ease of access to the “local” Indian
subcontinent population (of India, Pakistan, Nepal, Sri Lanka)
efforts in the UAE in the above direction and collaboration
with parent countries would bear considerable fruit.

The GCC is unique, in terms of proximity and expat
population, and standards of Health care set, with many
expats – both Indian and non-GCC Arabs- living their whole
active lives here. And of course, the data from “alternate”
treatment being followed in the GCC region – Unani for
example, can be integrated into the Indian databases,
addition to its richness.

Why Data and Data Diversity matter
In both the front of AI, Data matters — the more the cases
handled and treated (along with Genomics’ processed Data),
only then can the AIM can learn more, finer, and improve on
accuracy. And for Data diversity, both the GCC and Indian
Subcontinent population along with the different “integrated”
medicine document methods, must be taken into
consideration. The second part of AL/DL goes of course to
the post Next-Generation Sequencing+ part wherein time,
speed, and accuracy matters. Effort must be set into motion
for having wider, broad based collaboration set at the inter-
continental and interdisciplinary levels.

How do we start?
It would with AIM with the likes of IBM Watson (IBM Watson
Health Website, 2016) to have the physicians from all forms
of medicines to start engaging with such high-end
technologies, and then move ahead with higher Machine
Learning/ Deep Learning processes.

Why the need to surge
Here we are in a race against time, a time wherein ever
complex cancer leads the worlds death cases (Cancer
Research UK Website, 2016). We are at a unique juncture in
history wherein highly efficient machine learning is being
deeply genomics crunching big data, pacing personalization
of medicine- only integrating medicine of all proven forms
can do justice to the term “personal”

Conclusion
It’s actually a beginning – a wider scale integration of
advanced computerized systems into health care is to be
designed. While the tech side of it can follow a top-down
approach, only a standardization and perfection of the
methods – both in Allopathic and (more) in Alternate forms of
treatment. This should ideally come from the Health
Departments. Parallel collaborative efforts between countries
esp. with diverse population can lead to richer datasets. Only
with rich accurate data can we build systems – AI & DL –
that gives us faster and much more personalized treatments.

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