

Artificial Intelligence in Medicine - How to educate augmented doctors

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Who am I?

- ▶ M.D., Psychiatry
- ▶ Research on machine learning/ Bayesian/ network models in psycho(patho)logy (Prof. Paul Linkowski)
- ▶ Lecturer ULBruxelles, Medical Technologies (Medical IT chair, Prof. Olivier Lemoine) UMons, AI & Health (Certificate of Artificial Intelligence) Ecole Supérieure de la Santé (Lausanne), Pathophysiology

Did you just say “Augmented Medicine”?

- ▶ Artificial Intelligence in medicine
- ▶ Genomic Medicine
- ▶ Big Data
- ▶ Precision medicine

Well, that is far, far away from now! Right? (1)

Things that augmented medicine tools can do today: (1)

- ▶ Detect atrial fibrillation (Alive Cor, Apple Watch)
- ▶ Diagnose brain tumors (Icobrain)
- ▶ Grade cancer on histopathology (Paige.ai)
- ▶ Perform data trials (Doc.AI)
- ▶ Optimize treatment shift for cancer (IQVIA - CODE)

Well, that is far, far away from now! Right? (2)

Things that augmented medicine tools can do today: (2)

- ▶ Predict hypoglycemia episodes (Guardian - Sugar.IQ)
- ▶ Early detection of epileptic seizures (Empatica)
- ▶ Auto-fill a complete history taking (Bingli)
- ▶ Redirect patients to emergency departments with shorter waiting lists (NHS)
- ▶ Perform a differential diagnosis on common symptoms (Babylon)

Ok. What about tomorrow?

All previous missions are accomplished by specific algorithms that optimize a solution for a specific problem.

- ▶ Prediction shift (for all previous apps)
- ▶ Artificial General Intelligence
- ▶ Homo amortalis incoming? (Neuralink)

The challenges

- ▶ Advances in AI driven by tech giants (GAFAMI/BATX) and their academic/hospital partners
- ▶ Europe lacks a tech giant of her own (MedTech market 1000 Billion \$)
- ▶ European health institutions strive to assume the cost of the digital evolution
- ▶ Several private medical schools (Kaiser Permanente/Humanitas) developed medicine/engineering programs
- ▶ A new profile of healthcare leader is arising: the augmented doctor
- ▶ The limited envelope of higher learning in Belgium

Challenges part 2: resistance from medical professionals

AI-powered medicine is frowned upon by many clinicians.

- ▶ Threats on the workforce
- ▶ Dehumanization of medicine
- ▶ Risks of continuous medical surveillance and Security concerns
- ▶ Malpractice responsibility (legally-responsible AI vs producer/doctor responsibility)
- ▶ A moral obligation to use AI in the future?

Moving forward with our fears: why AI will not steal our job (but will change the way we do it)

If history taking, diagnosis and treatment is automatized, the definition of doctor stays unchanged.

We are left with our original roles: communication, health advocacy, management, research, collaboration, and medical expertise.

Why do we need to educate augmented doctors?

- ▶ Lighthouses for digital strategy in healthcare institutions
- ▶ Managers of the digital transition
- ▶ Educators of patients and peers
- ▶ Safety nets in bioethical issues
- ▶ Drivers for research projects

How to educate an augmented doctor?

Existing programs have divided the medical curriculum in 2 parts

- ▶ Medical Sciences/Engineering Bachelors degree (which lasts 4 years): medical students undergo training in hard sciences with engineering students. IT + statistics (+ bayesian approaches) + Mecha-tronics and AI
- ▶ Clinical rotations stay unchanged for 3 years in the Master's Degree / M.D

The difference lies in a novel approach of the bachelor's degree !

Re-training our existing doctors

The crucial importance of making the digital transition accessible to all doctors

- ▶ University Certificates driven by medical faculties
- ▶ Ongoing education (webinars, podcasts, etc.)

Experienced healthcare professionals have much to say in the digital transition!

Risks of not educating augmented doctors

More and more healthcare institutions are including CMOs in the medical leadership.

- ▶ The war on AI?
- ▶ or war between AI-powered doctors and regular ones?
- ▶ The turning point on legal, bioethical, clinical and social standard
- ▶ The competency shifts initiated by tech giants will isolate European healthcare institutions if no wake-up call
- ▶ Re-placing academia as the heart of scientific developments in the AI field

We need European-made experts to deal with these challenges by OUR OWN standards of care.

Thank you for your attention !

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