



Responsible AI: Opening the Medical “Black Box”

This is a summary of the discussion that occurred on January 23, 2020 between Dr. Hsiu-Khuern Tang (Hitachi America, Ltd) and Professor Nicholson Price (University of Michigan), moderated by Dr. Ilana Harrus (AAAS).

- Four main ways artificial intelligence (AI) can interact with the medical system:
 1. **Pushing boundaries:** Doing things beyond what humans and doctors can do now. Example: predict that a patient is going into cardiac arrest to allow early intervention.
 2. **Democratizing medical expertise:** AI could amplify the knowledge available. Example: a general practitioner could use AI to accomplish something that only a dermatologist could traditionally do.
 3. **Allocating resources:** Resource and workflow management. Example: If there is only one bed available for patient admission in a hospital, which patient is the most likely to benefit?
 4. **Automating drudgery:** Freeing the medical profession from the tedious bureaucratic tasks that are required, such as administrative recordkeeping.
- There is a need for a constant dialogue between researchers and medical professionals.
- Need to be aware of the technical issues on training algorithms on one subset of people while applying them to another portion of a population. Solutions include re-training the model on every different set of population (not always feasible), using data from the initial environment and adjusting it with data from the targeted environment.
- Need to understand what the model is figuring out and how to explain the results (issue of explainability). This makes the predictions/results more robust.
- Models are not static. They are part of a system which is evolving and improving.
- Important to characterize how a model might fail.

- Important to note that in some cases, the “black box” analogy for AI may be irrelevant. Example: Alerting a doctor to a patient’s deteriorating condition, something that they would not have known otherwise.
- Regulations on health care:
 - Some regulations in Europe exist on the “right to explanation” but are concerned more with cases involving government than healthcare.
 - The closest example in the US is a Food and Drug Administration (FDA) 2016 regulation on what constitutes a medical device. If information is provided by a device without making a decision, then that device does not count as a medical device and does not need to be regulated as such by the FDA.
- HIPAA (privacy law) is quite inadequate in the era of big data analysis and is not equipped for the privacy concerns that exist today.
- Looking toward the future:
 - AI will be everywhere with a lot happening behind-the-scene.
 - Issues of misalignment of goals and incentives between the different players. Example: when insurance companies use AI, is it for patients’ benefit?
 - Access to care for large sections of the population.
 - Better diagnostics (pneumonia, skin cancer.)
 - Potential issue with hacking.
 - People should be aware of the benefits as well as the dangers.

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