What’s Real About Artificial Intelligence: A Clinician’s Perspective

FDA Public Workshop
Evolving Role of Artificial Intelligence in Radiological Imaging
February 25-26, 2020

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Thanks to FDA for this Workshop

“The FDA is approving imaging algorithms at a rapid clip.”
Claudia Wallis, AI and Digital Health, special report from Scientific American Nature, February 2020

“... there are voices calling for legislation so that bad AI ideas can be blocked before they inflict harm.”
Sanne Blauw, The small wonderful ways AI is changing our lives for the better, The Correspondent, January 2020
AI: Monster or Goddess?
AI as Job-Stealing Monster

- Consumer Electronics Show 2019
  - Bridget Carey, cnet.com

"[They] said that's a job best left to my own doctor."

Phew! We OBs are safe ... but those poor radiologists ...
"It is astounding to think that, in the year 2006 ... obstetricians are still struggling to understand the cause of labor. Maybe computers can help us solve the puzzle of parturition."

World Prematurity Day: Preterm birth rate worsens in US for fourth consecutive year in 2018; 1 in 10 infants born prematurely

Of the 15 million infants who are born before 37 weeks every year, nearly 9 million are left with lifelong harm to the brain.

By Rohini Krishnamurthy
Published on: 03:37 PST, Nov 15, 2019
AI in Fetal Imaging
Today
Rough Evolution of AI in Fetal Imaging

- Does not require a priori knowledge
- Absence of preexisting bias

Biometry/basic anatomy

Acquisition guidance/ user training

Fetal anomalies
Rough Evolution of AI in Fetal Imaging

- Does not require a priori knowledge
- Absence of preexisting bias
- Does require a priori knowledge
- Susceptible to bias

2000

Biometry/basic anatomy

2010

Acquisition guidance/ user training

2020

Fetal anomalies
AI in Fetal Imaging
Tomorrow
Cultural Drive (Humans)

- Not our large brains, intelligence or language that gave us culture but rather our **culture** that gave us large brains, intelligence and language.

Cultural Drive (Machines)

• How can we use the large brains, intelligence and language of machines to identify & rapidly implement novel approaches to make our health better?
Garbage In, Garbage Out
Precise Data Acquisition
Two Examples of the Challenge

Fetal heart

Cervix
The Dream

Fetal heart

Cervix
The Nightmare: Fetal Heart
The Nightmare: Cervix
Low-Hanging Fruit

The Untrained User
Summary: Real AI

Tenets of a culture that supports identification & rapid implementation of novel approaches to make our lives better:

• Garbage in $\rightarrow$ Garbage out (precise acquisition is imperative)

• Clinical relevance (context)

• Marked biological variability (seems impossible to train for every condition*)

• Awareness of biases (unconscious, generalizability (under- or over-training), etc)

• Access for everyone

* true for humans too
Thank You for Listening (and Caring)!

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