How could AI impact healthcare?

• Healthcare is approximately 20% of U.S. GDP
  – Tech is around 10%

• How can we use AI to improve this?
  – Direct interaction with patients
  – Diagnosis/treatment
  – Long-term planning
  – Research/discovery
  – ???
Direct Patient Interaction: Robotic Surgery

- Why?
  - Micro-surgery
  - Sterile
- Is this AI?
- But what about:
  - Preventing errors
  - Speed – surgeons plan, machine executes
  - Remote – delay
  Prof. Yexiang Xue, SARTRES

Direct Patient Interaction: Non-surgery medical devices

- Increasing automation in medical devices
  - New capabilities
  - Reduce error
- But limitations / reliability issues
  - Real world is a messy environment
- Can AI address this?
  - What about errors?
  - Again, research at Purdue
Diagnosis/treatment

- AI systems for medical diagnosis and treatment plans
  - Radiology / image interpretation
  - Incorporation of multiple test results to identify disease
  - Detailed treatment following (complicated) best practices

*AI systems beat human performance*

- Challenges
  - Real world performance often fails to match R&D testing
  - Lack of explainability
  - Impact of errors

Long-term planning/prediction

- Healthcare is expensive
  - Do we really need a hospital on campus?
  - Are there better ways to spend $70 million?

- AI for prediction/planning
  - Population growth
  - Traffic prediction
  - Healthcare needs
  - ???
AI for R&D

- Drug discovery
  - Molecular combinations with therapeutic effect
  - Manufacturability
- Genetics
  - Identifying genetic markers of disease
  - Potential treatments?
- ...

Takeaways

- Healthcare is a huge business
- AI isn’t just the business of tech companies
  - Microsoft, Google, others have tried to move into healthcare
  - Limited success
- Want to make a difference in healthcare?
  - Look towards those who know healthcare
  - On campus: Regenstrief Center for Healthcare Engineering