THE FACULTY OF MEDICINE
Harvard University

HMS/HSDM Faculty Council

Faculty Council Minutes
April 11, 2024

Present: Aguayo-Mazzucato, Bauer, Biddinger, Chen, Cluett, D'Amore, del Carmen, Gehrke, Giannobile, Goldstein, Haberer, Harris, Henske, Ingelfinger, Meyerson, Morton, Murray, A. Nazarian, Royce, Shih, Spring, Stern, Treister

Guests: Drs. Becker, Chang, Gentleman, Huang, Landman, Muto, Shin, Westlund, Mss. Lewis, Scott, Sudbury

Staff: Mss. Ivins, Ryan, Spearman

This Faculty Council meeting was held virtually, via Zoom.

Dr. Josh Goldstein called the meeting to order at 4:01 p.m.

Next, Dr. Goldstein introduced Artificial Intelligence (AI) at Harvard Medical School (HMS). He explained that each of the guests would have 10 minutes to present and demonstrate.

Dr. Goldstein introduced Dr. Bernard Chang, Dean for Medical Education at HMS to present on projects in education and give some concrete examples of how HMS has already started to use AI in various aspects of undergraduate medical education (UME) this year. He gave three examples of AI usage in pilot form and presented images for each:

Example 1: Serving as a tutorbot for students in preclinical classroom courses.
Students use AI to test themselves. The tutorbot generates new practice cases and questions based on the course's content and style.

Step 1: Establish learner role, setting, and framing of specific need
Step 2: The AI tutorbot generates a similar-style case with a related diagnosis and different pathophysiology
Step 3: The AI tutorbot generates conceptual questions for self-testing, as requested

Trying to innovate on the following: Train our local instance of a large language model already on the curriculum and materials put into Canvas, the HMS learning management system, so that students do not need to do the initial introduction and training. In hopes that they can get right on and start testing themselves.

Example 2: Developing individualized learning heatmaps for students on clinical rotations.

Dean Chang presented a rotation specific knowledge heatmap and a clinical learner experience and knowledge heatmap including the following:

- Traditional and AI enabled analytics to extract diagnoses seen on the specific teaching rotations
- AI Enabled Adaptive Learning Content Creation to prepare HMS students for those specific rotations.

The goals of this system include:

- Precision Medical Education: prepare students with precise, adaptive learning content to excel in their clinical rotations.
- Comprehensive Clinical Experiences and Knowledge: using the individual learners clinical and knowledge heatmap help ensure HMS students have the most comprehensive clinical experiences possible.

Example 3: Analyzing student narrative feedback from core clerkship experiences. Dean Chang explained that this example is happening right now. The clerkship leaders use AI to analyze students' narrative feedback and identify cross-site best practices.

Dean Chang closed by mentioning that Dean Daley has been very generous in funding the Dean's Innovation Awards for Use of Artificial Intelligence, in Education, Research, and Administrative Efficiency. This has been key in catalyzing what Dean Chang's team has been able to do in the Medical Education Program.

Dr. Goldstein thanked Dean Chang and asked the Faculty Council (FC) to add their questions into the chat.

Next, Dr. Goldstein introduced Dr. Robert Gentleman, Executive Director, Center for Computational Biomedicine (CCB).

Dr. Gentleman gave an overview of the history and emergence of AI, explaining that we are currently in the fourth emergence of AI and machine learning. Dr. Gentleman focused on larger language models and presented on text embedding and the importance of prompting the AI "brain." Embedding is a process that takes an object, such as a word or an image, and associates it with a numeric vector.

Dr. Gentleman presented on transformers and attention. He added that a transformer model is a neural network that learns context and thus meaning by tracking relationships in a sequential data like the words in this sentence. Transformer models use a method called attention to identify and use (long range) correlations in word usage. Previous methods had shown either a strong effect of nearby word or were very expensive to compute. These innovations led to the large language models (LLMS) or foundation models. He added that one of the most important aspects is that prompt engineering, and other tools can be used as alternative to fine tuning of the model.

Dr. Goldstein thanked Dr. Gentleman, and introduced Ms. Lindsey Sudbury, Assistant Chief Technology Officer for Strategy and Engagement at HMS to present on what HMS IT is doing to enable AI advancements. She listed their project goals:

1. Build environments
2. Work with Dean's Award recipients to validate service offerings
3. Iterate on environments and training/consulting offerings based on feedback
4. Launch services to broader audiences

Ms. Sudbury provided the following updates:

- HMS IT is coordinating access to platforms and service for 33 awards in administration, education and research domain.
- Collaboration with Center for Computational Biomedicine has been a key factor in our success.

Next, Ms. Sudbury presented on Service, Training, and Consultation Matters

- Over 121 hours of consultation have been provided to awardees so far. IT is developing their training focus through custom trainings. Example topics include:
    - Generative AI – From experimentation to implementation
        - Prompting overview with demo generative SQL for data feeds
    - Generative AI – Azure AI Prompt Flow Boot Camp
        - Prompt flow and evaluation development environment workshop
    - Generative AI – Advanced Prompting
        - Presentation introducing advanced prompt engineering technique with prompt template samples and demonstrations.

Ms. Sudbury concluded her presentation by stating:

- AI related questions can be directed to hms-it-ai@hms.harvard.edu
- More information on AI at HMS, including trainings, can be found: https://hu.sharepoint.com/sites/HMSAIHub/ (HMS email required to access)
- HMS is still working on determining how licenses for AI tools can be made available, in the meantime, Harvard University IT has a collection of suggestions and security tips for using free tools: https://huit.harvard.edu/ai/tools

Dr. Goldstein thanked Ms. Sudbury and directed questions to the chat.

Next, Dr. Goldstein asked for and received approval for the March 13, 2024 meeting minutes, as submitted then opened the floor to questions.

Dr. Stern asked a question regarding if, as AI gains traction, will there be a series of educational programs that can be distributed to potential users, in hopes of getting our staff up to speed. Dr. Gentleman explained that CCB goes to departments on the quad to deliver training. Dr. Lisa Henske asked Dean Chang to elaborate on how the students have been using AI. Dean Chang explained that he is surprised at how limited the usage is among the students. The students are very interested, however and their curriculum will be focused on AI applications in healthcare. A few other FC members asked questions and a discussion ensued.

Following the discussion, Dr. Goldstein introduced Dr. Adam Landman, Chief Information Officer and SVP, Digital, Mass General Brigham, to present on the approach to AI at Mass General Brigham (MGB). He started with some context, explaining that healthcare is facing significant headwinds, including financial pressure, access to care, and workforce challenges.

Dr. Landman focused on two types of artificial intelligence: Analytical AI and Generative AI. Analytical AI analyzes datasets to reveal novel insights. This is used mainly for classification, predication, recognition and other models. Generative AI, on the other hand, generates novel content informed by training datasets. This is used mainly for summarization, generation and interaction. Dr. Landman gave examples of each type of AI.

Next, Dr. Landman discussed the opportunity for AI in healthcare. He stated that we are only scratching the surface of applying AI for addressing the Quintuple Aim and MGB strategy. He presented the sample AI use cases by risk. Dr. Landman stated that they are cautiously optimistic about opportunities in AI and also touched on a few of their approaches to use AI to decrease burnout. Dr. Landman presented on other opportunities for AI in healthcare, including:

- Care Team Experience
    - Reduce administrative burden / optimize use of staff time
    - Decrease burnout

- Patient Experience
    - Improve access to care
    - Streamline interactions with health system
- Employee Experience
    - Facilitate use of AI as business efficiency tool
    - Simplify administrative functions

Then Dr. Landman carried out a demo of the AI tool in concert with Dr. Goldstein. In conclusion, Dr. Landman spoke about what is needed to advance health AI and the fact that MGB has joined leaders across industries to promote the responsible use of AI.

Dr. Goldstein read questions from the chat and a discussion ensued.

Dr. Goldstein thanked our speakers and adjourned the meeting at 5:31pm.