AI And Competitive Advantage

- Dr. Nick Street, University of Iowa
- Dr. Kishlay Jha, University of Iowa

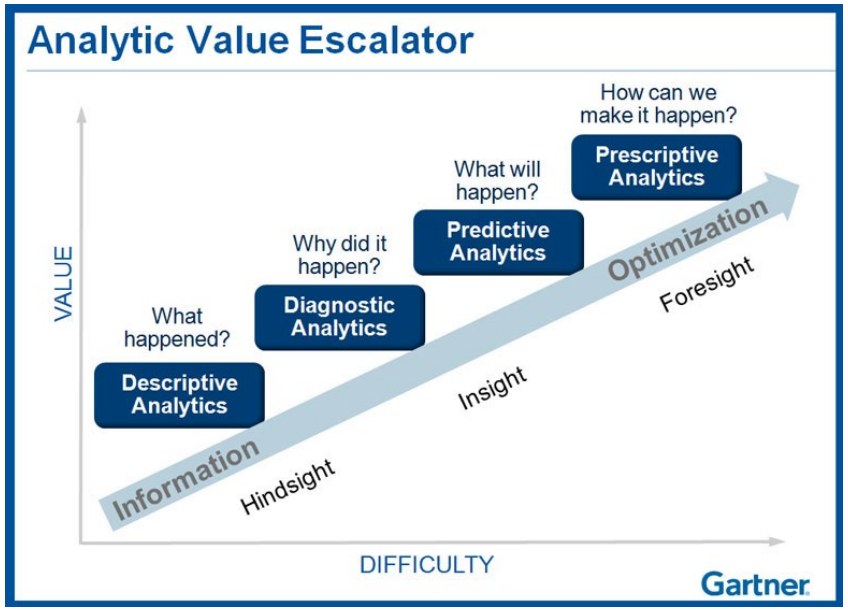
Tippie College of Business

Leverage Tippie for AI Advantage

Nick Street
Associate Dean for Research and PhD Programs
Tippie Children Professor of Business Analytics

DEV25 Conference
May 14, 2025

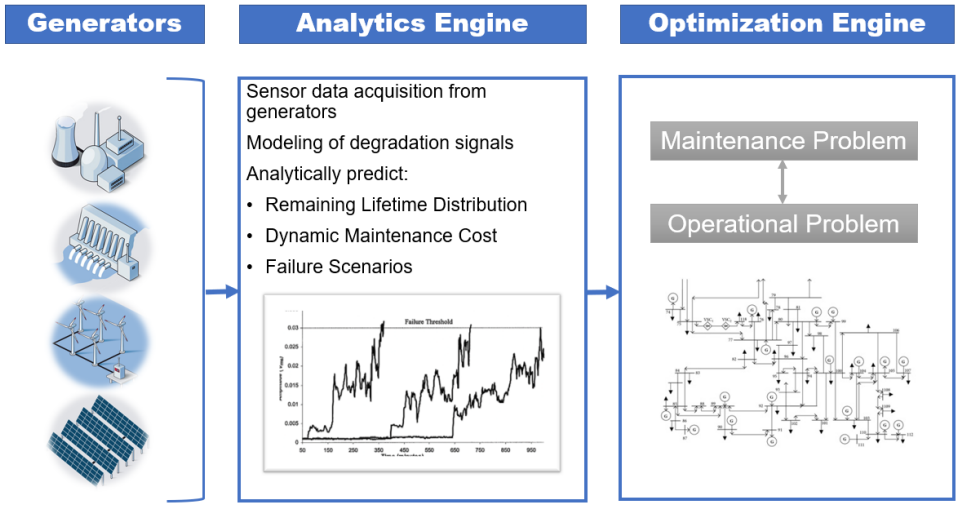
Foundation: Business Analytics



- Creating value from data
  - Data management & wrangling
  - AI & machine learning
  - Optimization & simulation

- Academic options
  - UG major (#26)
  - On-campus MSBA
  - Online / part-time MSBA (#5 / #18)

Thought Leader: Beste Basciftci



Predictive maintenance & operations for power systems under failure uncertainty

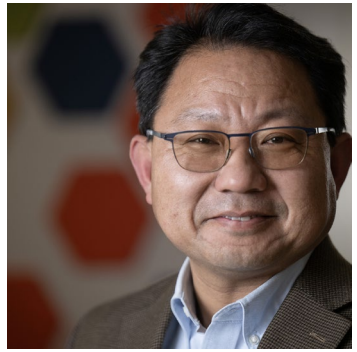
New NSF award

Designing & improving multi-modal transportation systems

Frank Grizel / Press Citizen

Justin Torner

Thought Leader: Patrick Fan



Uses (and builds) LLMs, text & image analysis models to

- screen firm disclosures for risk assessment
- identify buzz-worthy social media posts
- create project descriptions for successful crowdfunding campaigns
- uncover product defect information from user complaints or negative reviews
- identify diagnoses & symptoms from clinical notes
- diagnose mental health issues from social media posts

Tippie Analytics Cooperative

Tippie Analytics Cooperative is the Tippie College of Business' industry-facing arm for all things analytics. We build partnerships throughout the region that result in hands-on projects for our students and data-based business decisions for our clients.

Real experience for students

We teach advanced computational and quant skills at all levels—from undergraduate to master's and doctoral students. We believe solving real business problems multiplies the impact of what students learn in class.

Real impact for businesses

Want to optimize response rates to a marketing campaign? We can help you with that. Want to influence health care decisions through lifestyle choices or predict who's likely to contribute to your charity? We can do that. Correction. We've done that.

World-class faculty

Some of the most sought-after data scientists, mathematicians, and optimization gurus in the country are here at Tippie. Our passionate faculty corps gives our students the mentoring they need to tackle what comes their way.

Michael Altemeier
Executive Director, Tippie Analytics Cooperative
michael-altemeier@uiowa.edu

Patrick Fan
Faculty Director, Tippie Analytics Cooperative
weiguo-fan@uiowa.edu

Tippie MBA Certificates

#8 Fortune
#22 US News

AI & Technology Management

Required courses:

- Data Leadership and Management
- Value Creation Using AI

Elective courses (select two):

- Cybersecurity
- Agile Project Management
- Innovation in Technology
- Digital Economics
- Strategic Management of Tech and Innovation
- Project Management
- Communication with AI and Business Technology

AI & Machine Learning

Required courses:

- Applied Deep Learning

Elective courses (select three):

- Text Analytics
- Social Analytics
- Applied Optimization
- Generative Artificial Intelligence

https://tippie.uiowa.edu/lifelong-learning/certificates

IOWA

College of Engineering

Engineering Applications of Large Language Models

Kishlay Jha
Assistant Professor
Department of Electrical and Computer Engineering (ECE)

DEV25 Conference
May 14, 2025

What are Language Models?

- Language models = building computer programs to analyze, understand and generate human language
- A sub-field of Natural language processing (NLP). NLP is the backbone of many major tech companies

Large Language Models (LLMs)

GPT-2

.. trained on 40Gb of Internet text ..

- Given a prompt, predict the answer

Prompting: x' = "I love this movie. Overall it was [z]"

⇩

Predicting: x' = "I love this movie. Overall it was fantastic"

Large Language Models (LLMs)

ChatGPT

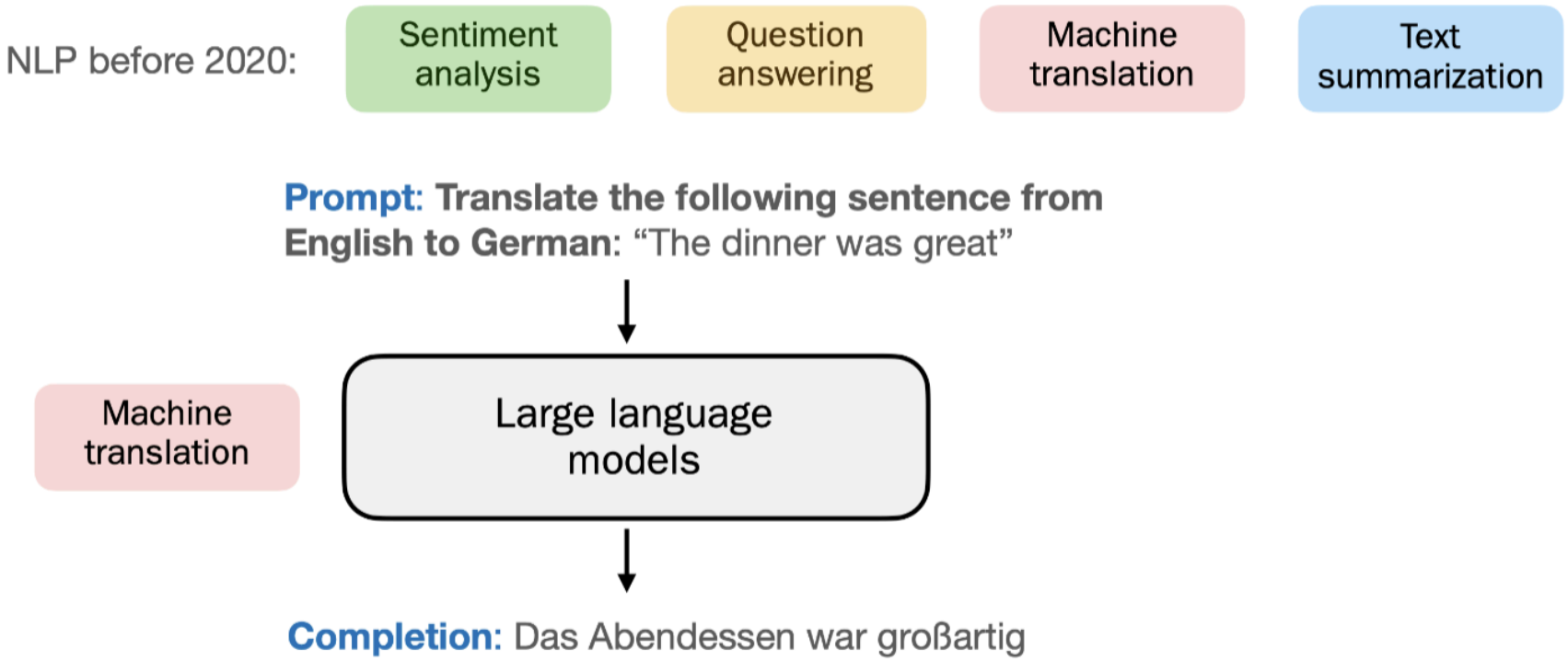
Llama 3

Claude 3

Gemini

Copilot

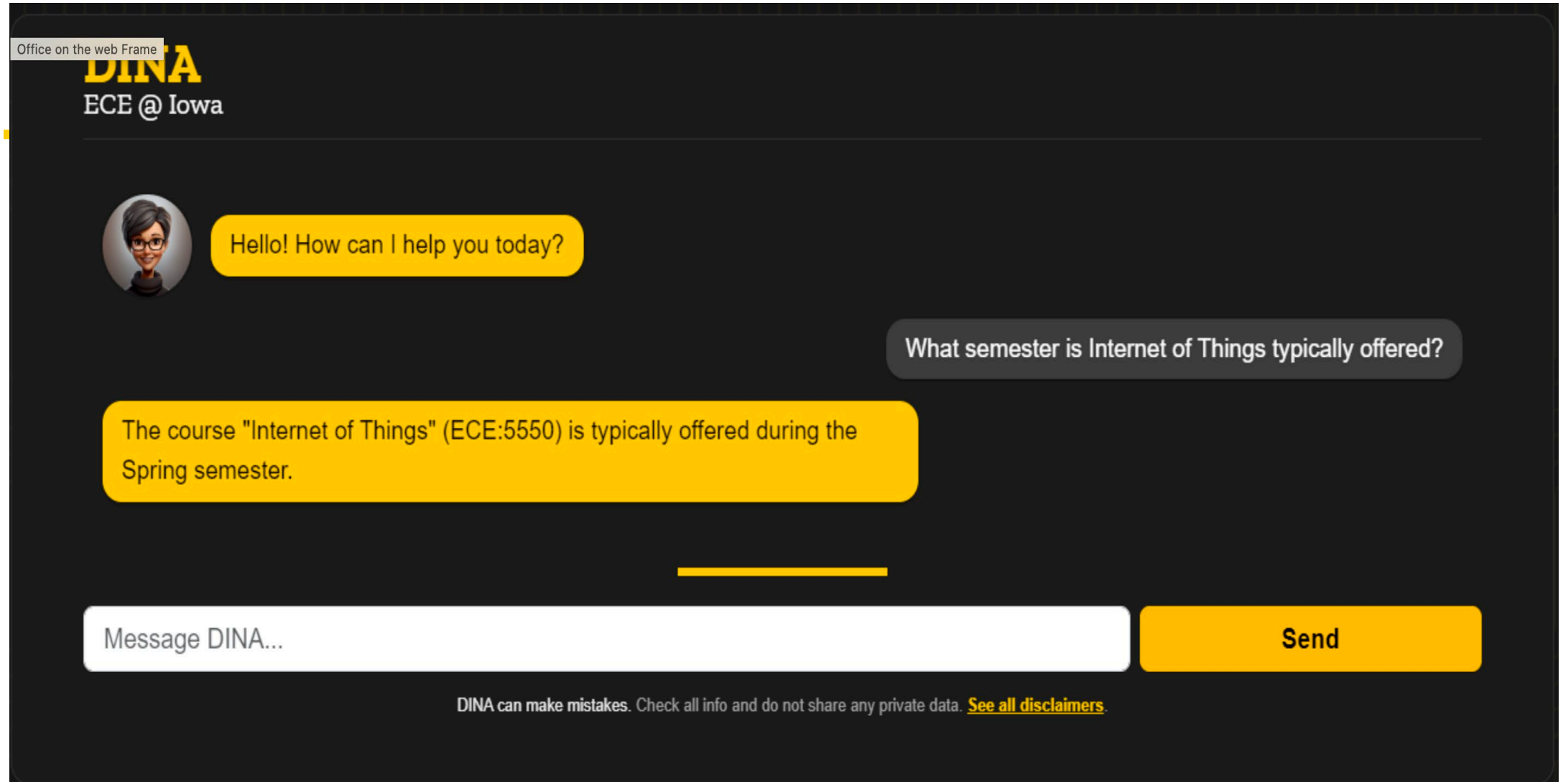
Paradigm Shift: One Model Does it All



Iowa Chatbots – DINA, APEX, …

- UI – ECE Student advising chatbot
  - https://dina.engineering.uiowa.edu/

- UI-Internal Medicine patient Ed chatbot
  - https://apex.iiai.uiowa.edu/


Office on the web Frame
DINA
ECE @ Iowa
Hello! How can I help you today?
What semester is Internet of Things typically offered?
The course "Internet of Things" (ECE:5550) is typically offered during the Spring semester.
Message DINA...
Send
DINA can make mistakes. Check all info and do not share any private data. See all disclaimers.

Research Use Case: Classifying Risk Factors from Clinical Notes using LLMs

- Risk factors influence health outcomes:
  - 30% - 50% of mental and physical health morbidity linked to risk factors
  - Mitigating the impact of risk factors can *potentially* reverse the prevalence of neurodegenerative diseases such as Alzheimer's

Research Use Case: Classifying Risk Factors from Clinical Notes using LLMs

- Despite crucial impact of risk factors, current Electronic Records Systems (EHRs) rarely record them in a "structured" way.

- Risk factor related information are often described in the unstructured text of clinical notes or discharge summaries.

EHR Clinical Narratives

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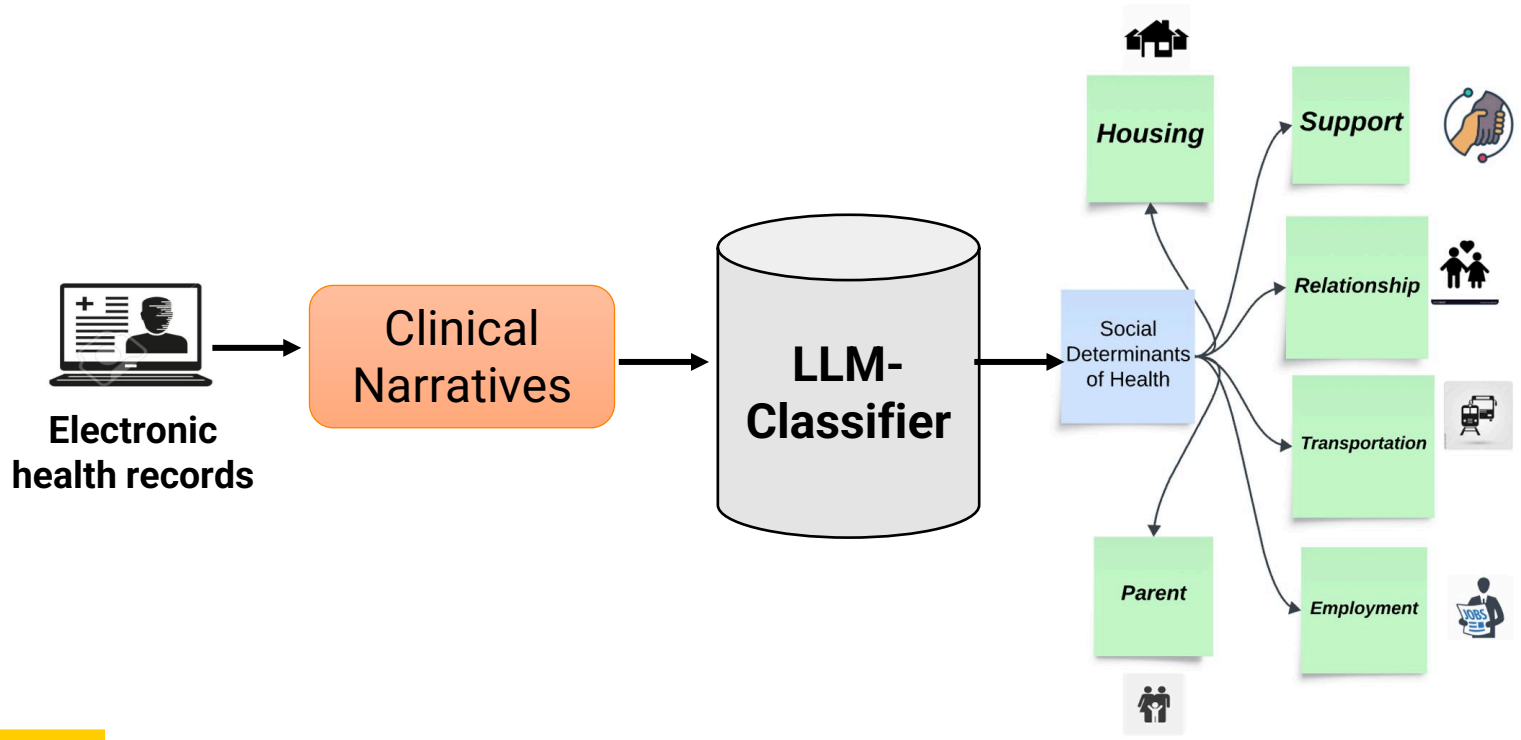
Provide opportunities for using LLMs to automatically extract them

Research Use Case: Classifying Risk Factors from Clinical Notes using LLMs

- **Problem formulation**: From an AI perspective, this is a multi-label text classification problem.



The Iowa Initiative for Artificial Intelligence

Milan Sonka, IIAI Director

milan-sonka@uiowa.edu

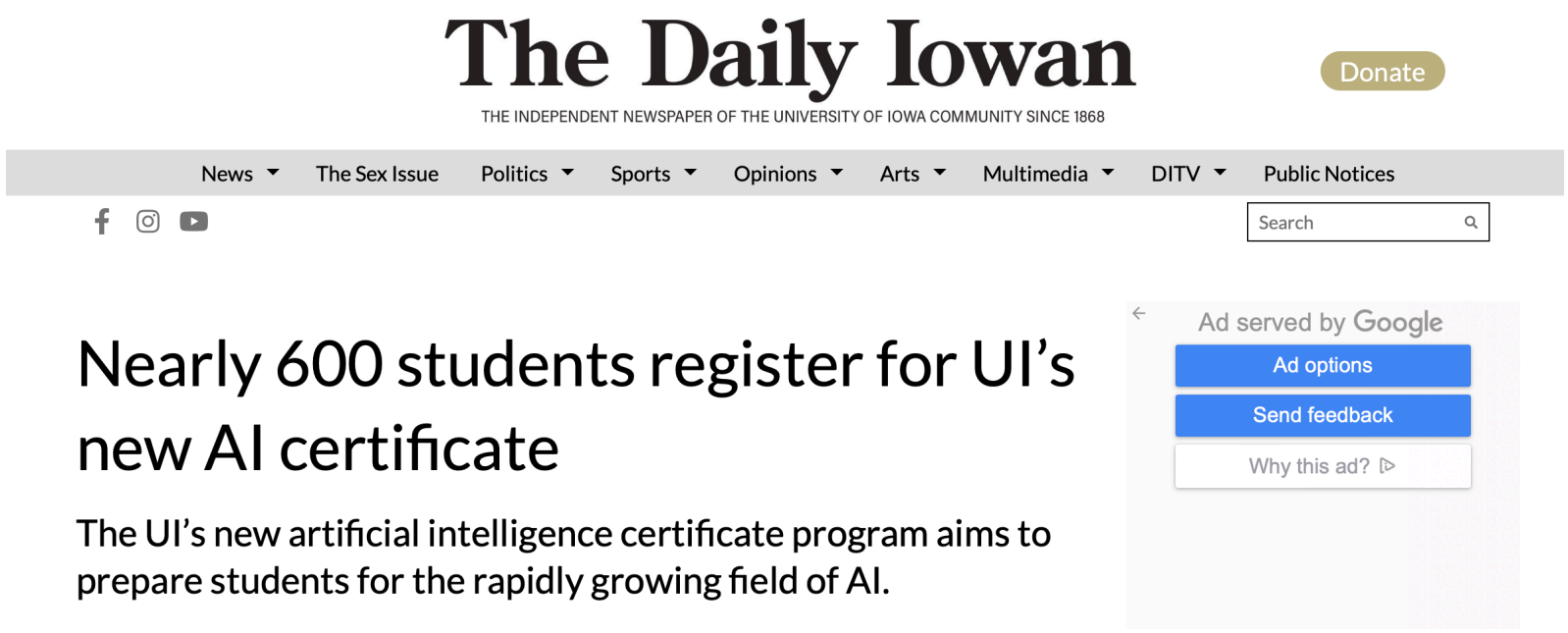
(319) 335-6052

HawkAI Short Courses & Certificates

HawkAI Short Courses, Certificates

Register for Artificial Intelligence (AI) Courses, receive HawkAI Proficiency Certificates

HawkAI Certificate: https://iiai.uiowa.edu/hawkai



Email: Kishlay-jha@uiowa.edu
Web: https://engineering.uiowa.edu/people/kishlay-jha