“What’s conversational AI?”: Investigating Machine Learning in Education
Jessica Van Brummelen and Hal Abelson
CSAIL, MIT

Abstract
- Purpose: to democratize conversational AI technology
- Block-based coding tools simplify mobile app development
- New blocks will simplify Alexa Skill development and neural network implementation
- Middle school workshops will investigate research questions
  - E.g., “Can students learn about the capabilities/limitations and implications of conversational AI?”

Background
MIT App Inventor
- Tool for anyone to develop mobile apps
- Block-based coding: a visual way to program

Conversational AI Blocks
Voice User Interface (VUI) blocks
- Compiled into a JSON interaction model
  - define invocation name as
  - define cancel intent using phrase list
  - define [intentName] intent using phrase list
  - define [slotName] slot using slot type DATE

Amazon Alexa skills
- Voice User Interface defines user interaction
  - JSON on Alexa Developer Console
- Endpoint function defines backend action
  - Node.js JavaScript on AWS Lambda

Endpoint blocks
- Compiled into JavaScript run on Node.js
  - when [intentName1] intent spoken
  - say
  - send to App Inventor

Conversational AI
- Rule-based AI (e.g., question/answer)
  - Control blocks (e.g., If statement block)
- Generative AI (e.g., deep learning)
  - Machine learning blocks (e.g., LSTM block)

Machine Learning Blocks
Long Short-Term Memory (LSTM) Extension
- Generative AI using text as input

Curriculum
- Incredible growth in AI over the past 10 years
  - What will the next 10 years look like?
  - How can we prepare students for this future?

- Teach skills for the future of work
  - What is AI?
  - What are AI’s limits and capabilities?
  - How can we use AI to do good?

- Teach high-level AI concepts
  - What is rule-based AI?
  - What is machine learning?
  - What is generative AI?

- Explore research questions
  - With reasonable abstraction, can students develop conversational AI applications?
  - Can students learn about the capabilities and implications of conversational AI through conversational AI app development?

Dr. Seuss-esque text generation
"Big elephant sharp.
I have for the fish."

Nancy Drew-esque text generation
"Nancy exclaimed.
I page the caretaker."

"Look" Extension by Kevin Zhu and Kelsey Chan
- Visual classification network with MobileNet

"Alexa, what's that animal?"
Surprisingly, Karabo is not a skunk, he's a zorilla!

“Look” Extension
"Alexa, what’s that?
Did you know that bananas are technically berries?"