"What's conversational AI?": Investigating Machine Learning in Education

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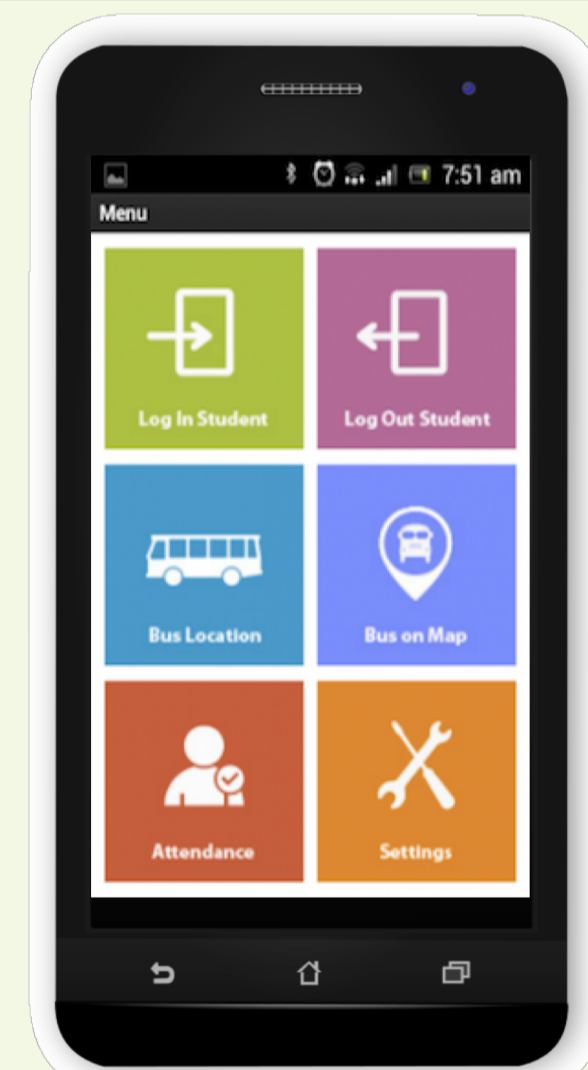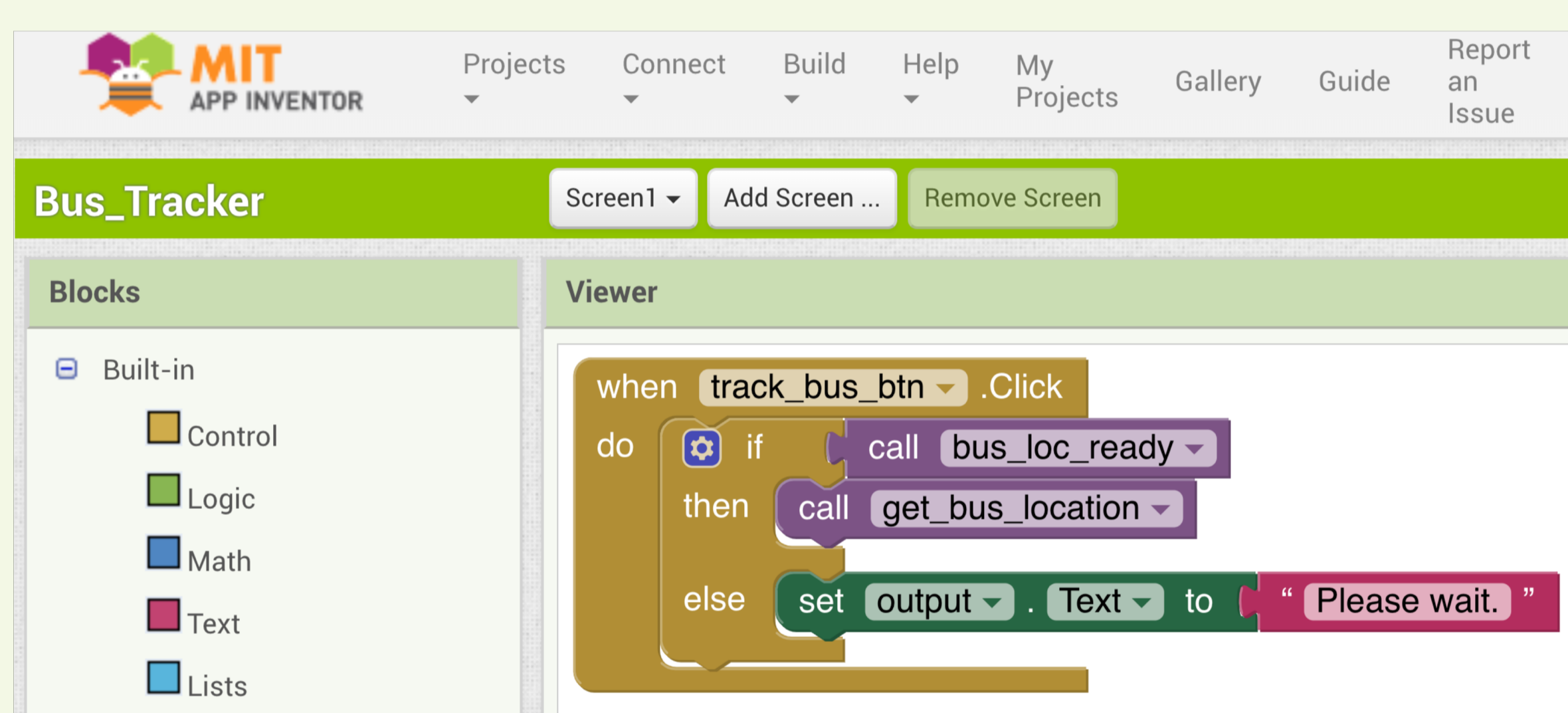
Conversational AI
- Rule-based AI (e.g., question/answer)
  - Control blocks (e.g., If statement block)
- Generative AI (e.g., deep learning)
  - Machine learning blocks (e.g., LSTM block)

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

Conversational AI Blocks

Voice User Interface (VUI) blocks
- Compiled into a JSON interaction model

Endpoint blocks
- Compiled into JavaScript run on Node.js

Machine Learning Blocks

Long Short-Term Memory (LSTM) Extension
- Generative AI using text as input
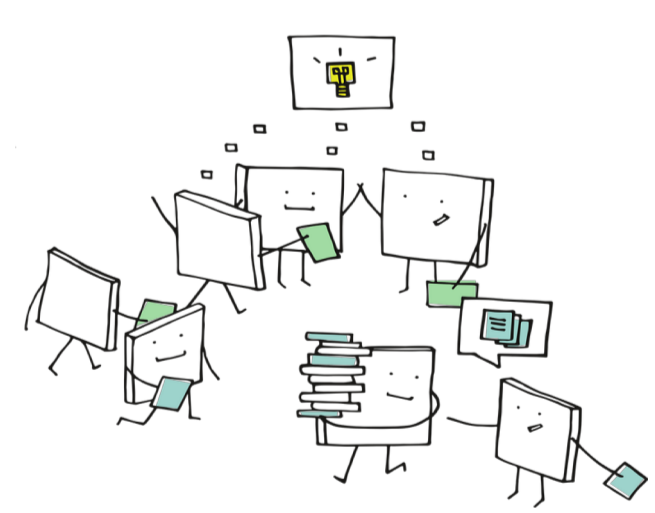
Dr. Seuss-esque text generation
> *Big elephant sharp.*
> *I have for the fish.*

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

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

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?