“What’s conversational AI?” with MIT App Inventor and Amazon Alexa

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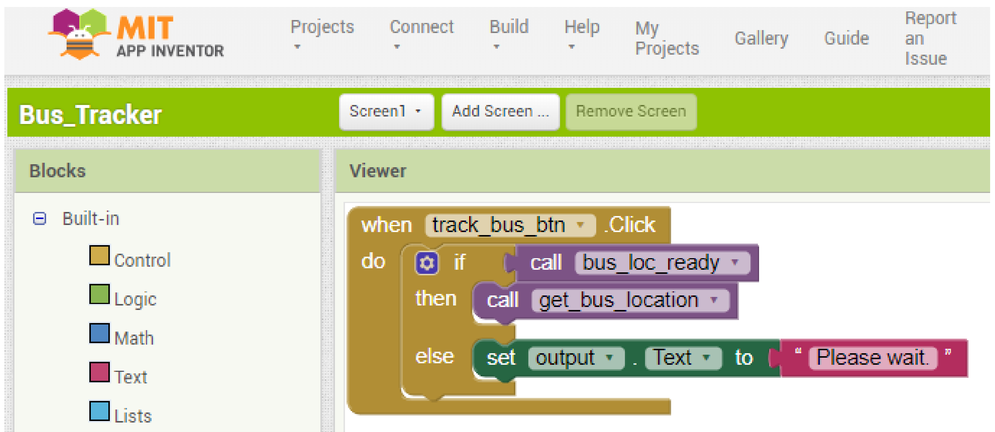
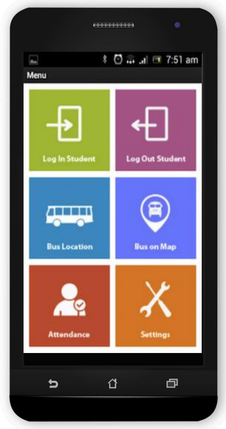
Abstract

This work aims to democratize conversational AI technology. Currently, **MIT App Inventor’s block-based coding tools** empower anyone to develop their own mobile apps. Soon, users will also be able to **program their own Alexa skills, conversational AI, and neural networks** using blocks. Through middle school workshops, research questions, such as "**Can students learn about the capabilities, limitations and implications of AI through developing conversational AI mobile apps?**", will be explored.

Background

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



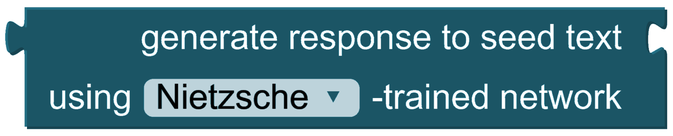


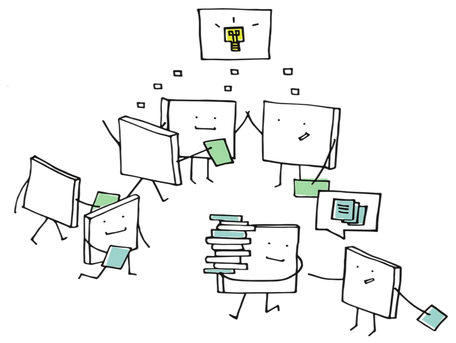
Conversational AI
- Rule-based AI (e.g., question/answer)
  - Control blocks (e.g., If statement block)
- Generative AI (e.g., deep learning)
  - Machine learning blocks (e.g., LSTM block)

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

Machine Learning Blocks

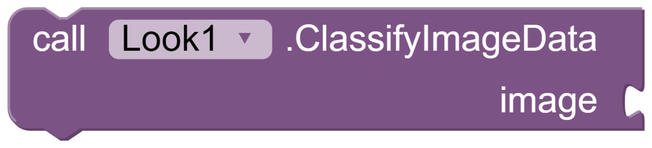
Long Short-Term Memory (LSTM) Extension
- Generative AI using text as input





- E.g., Nietzsche-esque text generation
  - ❝ *What dream the will to the origin of the self-diver in love the sees and an according to the self*

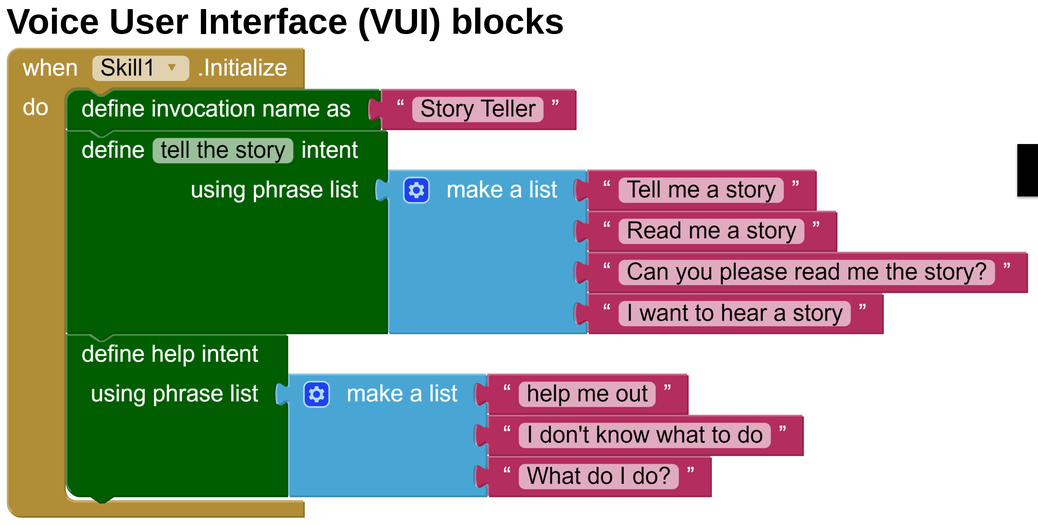
“Look” Extension
- Visual classification network with MobileNet
- Give Alexa “eyes”



Conversational AI Blocks

MIT APP INVENTOR

Voice User Interface (VUI) blocks



Endpoint blocks

amazon web services

JSON Interaction Model

```
{
    "interactionModel": {
        "languageModel": {
            "invocationName": "story teller",
            "intents": [
                {
                    "name": "tell the story",
                    "slots": [],
                    "samples": [
                        "Tell me a story",
                        "Read me a story",
                        "Can you please read me the story",
                        "I want to hear a story"
                    ]
                },
                {
                    "name": "AMAZON.HelpIntent",
                    "samples": [
                        "help me out",
                        "I don't know what to do",
                        "What do I do"
                    ]
                }
            ],
            "types": []
        }
    }
}
```

Node.js JavaScript

```
const handlers = {
    'story_teller': async function () {
        let voiceOutput = '';

        if (currentSentence == 1) {
            voiceOutput = 'Karabo the zorilla ' +
                'walked through the forest.';
        } else if (currentSentence == 2) {
            voiceOutput = 'A lemur leaped past ' +
                'yelling, "Xmazing zorilla!"';
        }
        currentSentence = currentSentence + 1;
        sendToAppInventor({
            'currentSentence': currentSentence
        });

        this.response.speak(voiceOutput);
        this.emit(':responseReady');
    }
};
```

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?