

Introducing Artificial Intelligence through Robot Programming at K-12 level



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Abstract

A Cozmo robot provides a platform for users at all levels to gain experience and knowledge on working with Artificial Intelligence (AI). Since technology is growing and expanding further every day, a fun and easy way to understand difficult concepts would be a useful tool for many users to learn. We've all experimented with Cozmo in order to discover how it works and by using that, how we could implement it into a learning environment from students. We've found a variety of proposed solutions fitting for different preferred learning methods and experience levels.

Introduction

Artificial Intelligence (AI) has helped create advancements in today's society. AI is an area in computer science that focuses on creating human-like intelligence within machines. Anki introduced Cozmo "the little bot with a big brain and even bigger personality" in 2016. Cozmo exposes students of all ages to AI by providing an interactive and sophisticated design. It allows them to be exposed to coding and introduces more logical reasoning when building simple codes. Machine learning is beginning to be one of the biggest steps in computer science because it is advancing so quickly and changing industries. Teaching K-12 students how to work with Artificial Intelligence robots can expose them to future technology careers.

Cozmo Coding

Cozmo Code Lab allows younger children to mix and match actions for the Cozmo to perform. Some features that the Code Lab has include allowing the Cozmo to perform facial expressions, math equations, loops, variables, functions and much more. Cozmo also comes with three cubes which mimic the actual tech code stacks. The built-in games teach users how each function works and the limits of those functions, much like a person might play with code in traditional programming languages like Python and Java.



Software Development Kit (SDK) Coding in Python

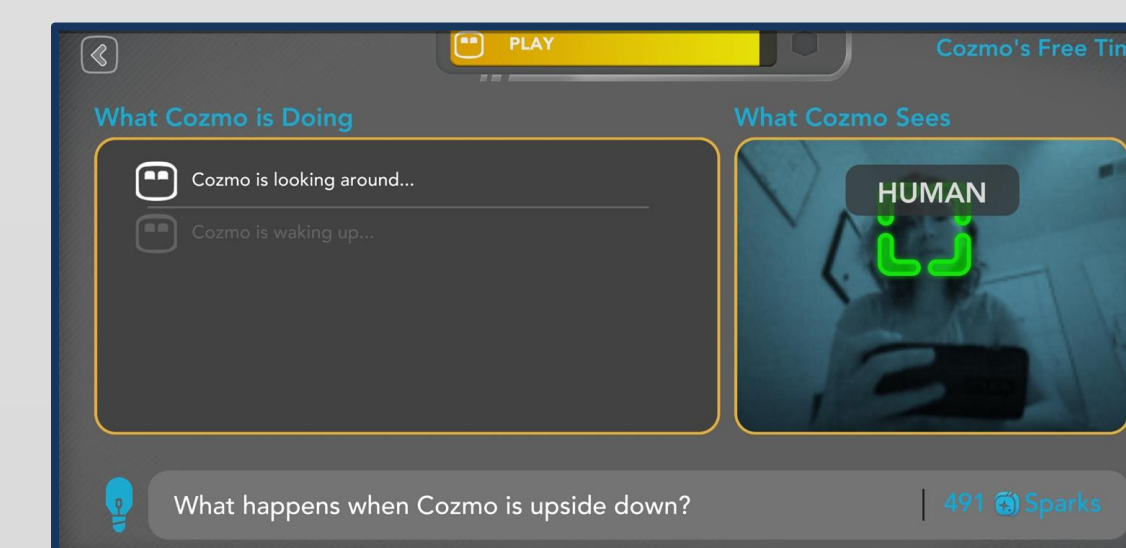
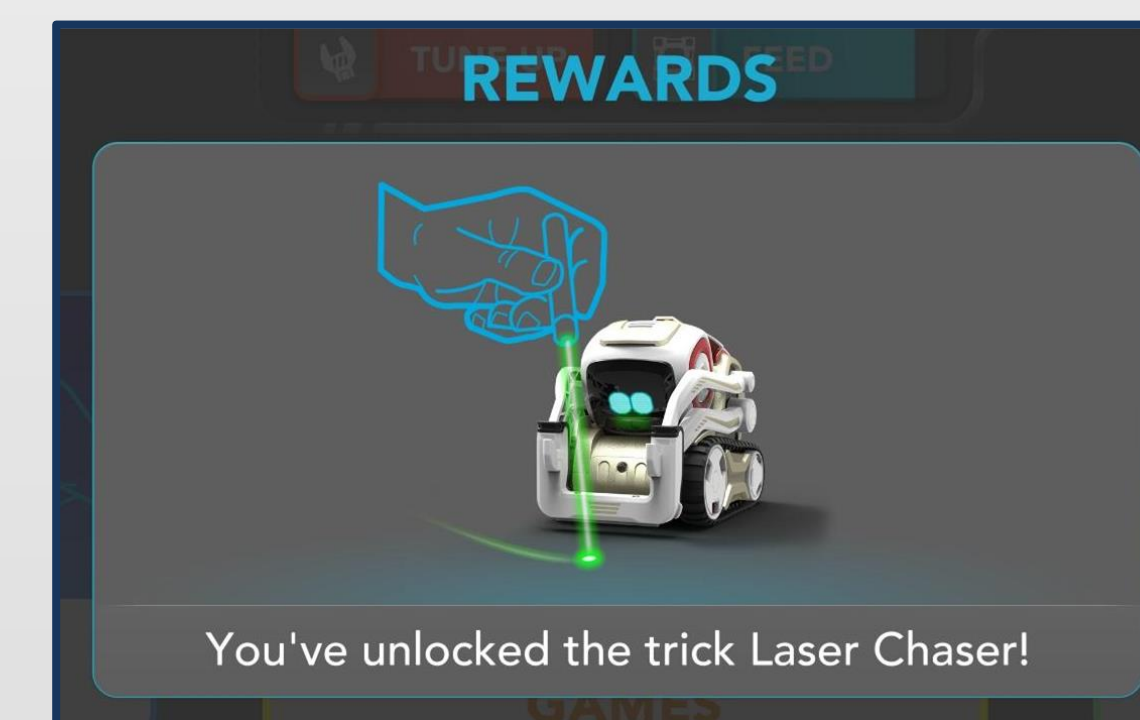
Through Cozmo's SDK, young students can be exposed to human-robot interaction by programming in Python. For example, the below code commands the robot to say "Hello World".

```
'''import cozmo
def cozmo_program(robot: cozmo.robot.Robot):
    robot.say_text("Hello World").wait_for_completed()cozmo.run_program
(cozmo_program)'''
```



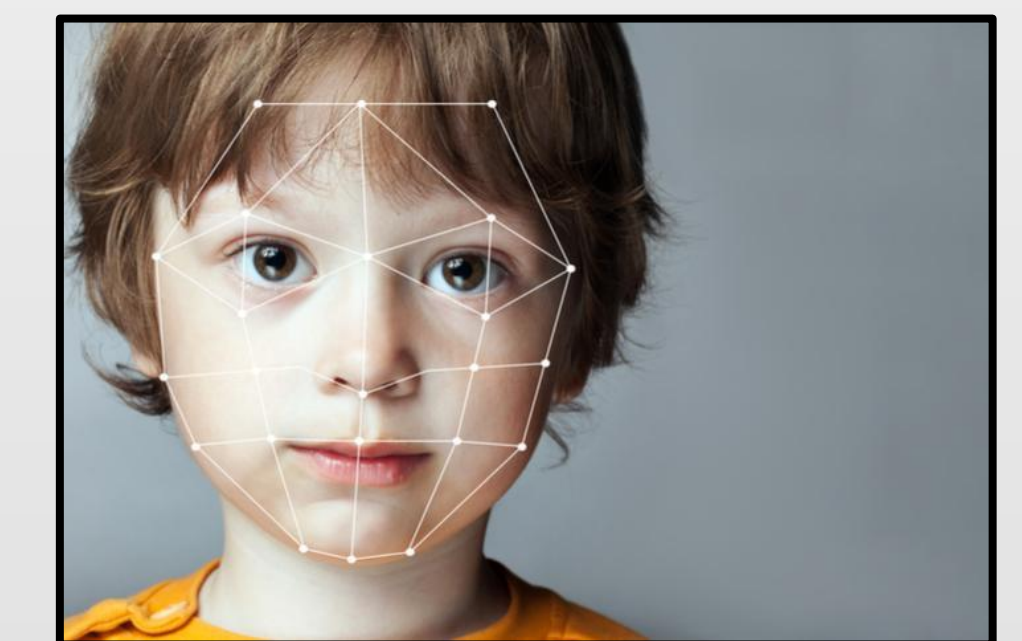
Tricks and Games with Cozmo

Cozmo's pre-installed games teach the user how Cozmo is coded, while demonstrating how the code works with its games. Each mini-game has a button labeled "look inside" which allows the user to view and edit the code to change the game to their liking. Users also get rewards and new tricks, which can motivate students to keep playing and exploring the Cozmo robot. The starting games are more simple but gradually get more complex. Another ability that the Cozmo robot has is nurturing it. This is done by feeding Cozmo regularly which improves his abilities to perform tasks. This can also help children learn responsibility.



Potentials for Education Through Facial Recognition

There are several ways Cozmo can assist K-12 education. In the classroom, Cozmo will be able to collaborate with students one on one, or as a group, by being able to detect different facial expressions using face recognition. Cozmo robot has the ability to recognize faces extremely well, this is because Cozmo was developed by a team of PhD roboticist and game developers. Given a certain circumstance, if the student shows any signs of being unable to comprehend, Cozmo will be able to aid the student through the lesson. Cozmo also features games with code that can be edited so that people can create their own variations or completely new games.



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Future Work

- Exploring Software Developing Kit by learning how to implement more commands in python.
- Learning how to dismiss parameter barrier that Cozmo has, to improve his mobility through the Software Development Kit.

References

<https://www.anki.com/en-us/cozmo>