Controlling Robots Using Image Recognition

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INTRODUCTION

Artificial Intelligence (AI) is a rapidly growing field that's becoming a part of everyday life. Our project aims to elucidate AI by giving students hands-on experience using image recognition to control an MBot robot. Students use hand gestures to direct the robot, learning both how AI works and explore its challenges.

TECHNOLOGY AMBASSADOR PROGRAM

The Technology Ambassador Program allows students from various fields of studies to collaborate and work on IT projects. This allows students to create and harness various technologies that a student may not have access to, allowing them to gain skills and experience in different fields.

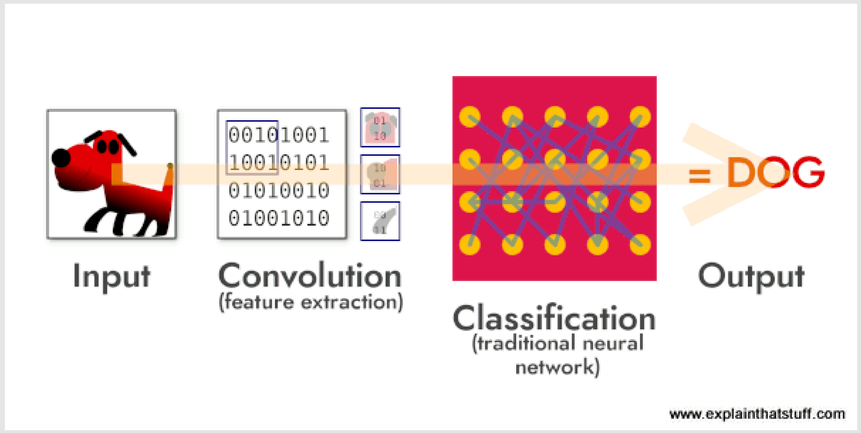
CHALLENGES

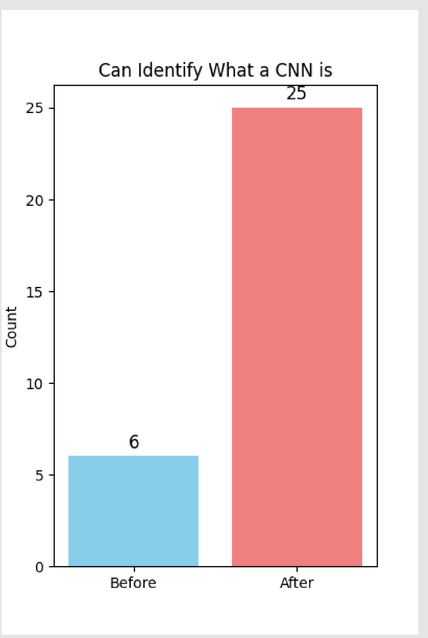
Problems:

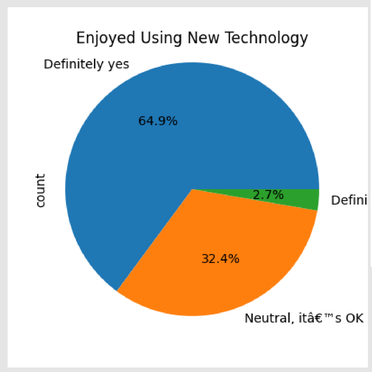
- Training Setup: Helping students create and train their own models.
- Connectivity: Bluetooth and hardware communication issues.
- Model Accuracy: Image recognition struggled with detecting gestures reliably.
  - Environmental factors like lighting can drastically impact the model's performance.
- Accurate Gesture Recognition: Gestures must be unique.
- Applying the model to the Scratch code and controlling the mBot.

EDUCATIONAL VALUE / STUDENT IMPACT

- Introduced students to real-world AI through interactive learning.
- Helped students understand image recognition and classification.
- Exposed students to the imperfections and biases in AI systems.
- Promoted teamwork as students collaborated on training and testing.
- 75.6% of students (28) enjoyed the workshop
- 64.9% of students (24) enjoyed learning the new technology associated with AI
- Saw a significant increase in student knowledge in CNNs (6 vs 25 students answering correctly before and after)
- Only used data where students did both pre- and post-survey.







OUTREACH EVENTS

- We did several events to promote our project
  - TAP Expo
  - Atlanta Science Festival (GGC and Piedmont Park)
  - 3 Classroom Workshops (51 students total)
    - Included Pre-Survey, an introduction of our topic, a walkthrough of our workshop, and a post-survey

ACKNOWLEDGMENTS

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