Teacher Perspectives on How To Train Your Robot: A Middle School AI and Ethics Curriculum

Appendix A: In-Person Course Activities

Fall 2019

Day 1	Day 2	Day 3
Welcome (15 mins) Students are welcomed to the course and the stage is set for the type of activities they will engage in during the week	**Welcome (10 mins)** Students review what they learned yesterday and go over the activities for today.	**Welcome (15 mins)** Students review what they learned yesterday and go over ethical matrices and the activities for the day.
What is AI? (30 mins) Students discuss definitions of technology and artificial and intelligence.	**Pizza Recipe Algorithm (10 mins)** Students create an algorithm to make a pizza.	**Ethical Matrices (30 mins)** Students will learn about stakeholders and use ethical matrices to guide their moral reasoning about an AI technology.
Ethical Dilemmas (60 mins) Students will be introduced to moral reasoning with an ethical decision making example.	**Pizza Delivery App (30 mins)** Students create an algorithm that determines the best type of pizza to create based on data input from several questions.	**Intro to Text Classification (60 Minutes)** Students explore how computers use word embeddings to make sense of language.
Intro to AI Blocks (90 mins) Students will follow tutorials to refresh their knowledge of programming and get to know their robots.	**Intro to Image Classification (60 Minutes)** Students train an image classifier on several data sets of images.	**Command Recognition (90 mins)** Students will use natural language processing to teach their robots to respond to voice commands.
Reflect (30 mins) Students reflect on what they have learned about AI and its role in society today.	**Algorithmic Bias Discussion (30 Minutes)** After watching and reading several sources students discuss the impact of biased algorithms on different groups of people.	**Final Project Research (30 mins)** Students will conduct research and begin idea generation for their own robot projects.
	Animal Recognition (60 mins) Students will use image recognition to have their robots recognize pictures of different animals.	**Reflect (30 mins)** Students set the criteria for the final project and reflect on their brainstorming to begin coming up with concrete ideas about what they will build with their robots.
	Reflect (10 mins) Students reflect on what they have learned today about algorithmic bias in AI systems today.	

Day 4	Day 5	Notes
Welcome (15 mins) Students will create a list of tools to include in the “final project toolbox”.	**Welcome (15 mins)** Students check in with each other about the work they need to do to finish their projects.	
Final Project: Planning (30 mins) Students choose a direction for their final project and begin planning what the major components of the project will be.	**Final Project: Finishing Up (120 mins)** Students put the final touches on their projects for the showcase.	
Final Project: Work Time (105 mins) Students start to build a first version of their final projects based on their plans.	**Final Project: Showcase Preparation (30 mins)** Students prepare to present the work they accomplished this week at the showcase.	
Final Project: Peer Review (30 mins) Students look at each others’ projects to offer feedback	**Final Project: Showcase (60 mins)** Students present their robots to visitors.	
Reflect (15 mins) Students prepare a “final to-do list” for the next day’s work.	**Reflect (15 mins)** Students reflect on the ethical and technical considerations that went into designing their robots, as well as their learning throughout the week.	

Appendix B: Online Course Activities

Summer 2020

Day 1	Day 2	Day 3
Welcome (15 mins) Students are welcomed to the course and the stage is set for the type of activities they will engage in during the week	**Welcome (10 mins)** Students review what they learned yesterday and go over the activities for today.	**Welcome (15 mins)** Students review what they learned yesterday and go over ethical matrices and the activities for the day.
What is AI? (30 mins) Students discuss definitions of technology and artificial and intelligence.	**Pizza Recipe Algorithm (10 mins)** Students create an algorithm to make a pizza.	**Ethical Matrices (30 mins)** Students will learn about stakeholders and use ethical matrices to guide their moral reasoning about an AI technology.
Ethical Dilemmas (60 mins) Students will be introduced to moral reasoning with an ethical decision making example.	**Pizza Delivery App (30 mins)** Students create an algorithm that determines the best type of pizza to create based on data input from several questions.	**Intro to Text Classification (60 Minutes)** Students explore how computers use word embeddings to make sense of language.
Intro to AI Blocks (90 mins) Students will follow tutorials to refresh their knowledge of programming and get to know their robots.	**Intro to Image Classification (60 Minutes)** Students train an image classifier on several data sets of images.	**Command Recognition (90 mins)** Students will use natural language processing to teach their robots to respond to voice commands.
Reflect (30 mins) Students reflect on what they have learned about AI and its role in society today.	**Algorithmic Bias Discussion (30 Minutes)** After watching and reading several sources students discuss the impact of biased algorithms on different groups of people.	**Final Project Research (30 mins)** Students will conduct research and begin idea generation for their own robot projects.
	Animal Recognition (60 mins) Students will use image recognition to have their robots recognize pictures of different animals.	**Reflect (30 mins)** Students set the criteria for the final project and reflect on their brainstorming to begin coming up with concrete ideas about what they will build with their robots.
	Reflect (10 mins) Students reflect on what they have learned today about algorithmic bias in AI systems today.	

Day 4	Day 5	Notes

Welcome (15 mins) Students will create a list of tools to include in the “final project toolbox”.	**Welcome (15 mins)** Students check in with each other about the work they need to do to finish their projects.	
Final Project: Planning (30 mins) Students choose a direction for their final project and begin planning what the major components of the project will be.	**Final Project: Finishing Up (120 mins)** Students put the final touches on their projects for the showcase.	
Final Project: Work Time (105 mins) Students start to build a first version of their final projects based on their plans.	**Final Project: Showcase Preparation (30 mins)** Students prepare to present the work they accomplished this week at the showcase.	
Final Project: Peer Review (30 mins) Students look at each others’ projects to offer feedback	**Final Project: Showcase (60 mins)** Students present their robots to visitors.	
Reflect (15 mins) Students prepare a “final to-do list” for the next day’s work.	**Reflect (15 mins)** Students reflect on the ethical and technical considerations that went into designing their robots, as well as their learning throughout the week.	