

ImageSTEAM Lesson Plan

Hurricanes and AI

Grade/Level: 8th

Time Allotment: 60 minutes

Summary

1. Brief: *Students build their own machine learning model to predict flood damaged areas due to hurricanes using satellite imagery.*
2. Standards alignment:

Arizona State Standard: 8.E1U1.7 Obtain, evaluate, and communicate information about data and historical patterns to predict natural hazards and other geological events.

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into new solutions to better meet the criteria for success.
3. Objective(s):

I can understand how hurricanes are predicted

I can understand parts of a hurricane

I can understand how AI's play a role in hurricane prediction

Materials & Resources

Materials: Notebook or Paper, pencil, powerpoint slides, Computer and internet access

Resources: <https://teachablemachine.withgoogle.com>

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Implementation

Learning Context

What do students need to have learned already in order to complete this lesson?

Students don't necessarily have to have any knowledge. This can be something you do before to build prior knowledge on hurricanes and give basic information to students to comprehend WHY we need to be able to make predictions on natural disasters. Understanding the importance and making real world connections.

Procedure

(not all of these steps need to be included in each lesson, they are here for assistance in the template only)

Slide 1: Have students create a bubble map in their notebooks/Paper with the word hurricane in the center. Have them write everything they already know on the branches. Students then share with a partner and then share with the whole group.

Slide 2: give student's information on how hurricanes are predicted, what technology is used.

Slide 3: Ask students the following question: DO AI'S PLAY A ROLE IN HURRICANE PREDICTION? Student's brainstorm and discuss.

Slide 4: Gives students information on how AI's play a role in helping predict hurricanes.

Slide 5: Give student's information on the parts of a hurricane.

Slide 6: Give student's information on how hurricanes categorized

Slide 7: This slide gives student's the Saffir simpson hurricane scale

Slide 8: Give student's information on how AI's help in hurricane predictions.

Slide 9: Introduces Teachable Machines

Slide 10: Exit ticket (student assessment) How can Teachable machines play a role in connection with hurricanes or other natural disasters?

Lesson Summary

Have students create a bubble map in their notebooks/Paper with the word hurricane in the center. Have them write everything they already know on the branches. Students then share with a partner and then share with the whole group. Student's receive direct instruction by gathering information on parts of a hurricane, how hurricanes are predicted, and how hurricanes are categorized. In the lesson there is also a discussion on how AI's play a role in predicting hurricanes. There is a slide after that gives you the points on how the AI is helpful in hurricane prediction. Students look and discuss the Saffir Simpson hurricane scale. Majority of the lesson is technology free until you get to the Teachable machine activities. Student's looked at a data set of damage vs no damage post hurricane harvey. They got real world experience on how an AI is trained to identify the differences in images and can collect data. Lastly they had an exit ticket. How can Teachable machines play a role in connection with hurricanes or other natural disasters?

Assessment

How will you assess the learning objectives?

1. Observational: walk around when students do their bubble map and have discussions.
2. Exit ticket: How can Teachable machines play a role in connection with hurricanes or other natural disasters?



Teacher Guide:

First slide is Intro Slide for Topic

Engage students in the topic by seeing what their prior knowledge on hurricanes is and having them create a bubble map. Allow students to think on their own first before having them share with a partner. Then have student's share as a whole group.

Give students the following information on how hurricanes are predicted (**Satellites, reconnaissance aircraft, Ships, buoys, radar, and other land-based platforms are all used to track and predict hurricanes. Once a hurricane has formed scientist will mostly use satellites**) and discuss why they think satellites are the most commonly used. Students should say because other technology can be damaged in the storm, the satellite takes pictures from above and gives more range etc...

Engage students in another discussion on if they think AI's play a role in hurricane prediction and if so how. Allow students thinking time and then have students share with a partner and then as a whole group. Students can respond to things such as to collect data, take images on hurricanes, and predict patterns.

Some students may not have prior knowledge on the topic so after the whole group discussion tell students

- AI's do play a role in hurricane predictions in various ways such as :
- looking at past data
- They detect relationships between hurricane behavior and climate factors like heat stored within the ocean, wind speed, and air temperature.

- The AI can predict how intense a storm will be, which path it will take and how strong it will be.

Students need to know the three major parts of a hurricane because it connects to how they are categorized. Go over the following

- Hurricanes have three parts the eye, the eyewall and rain bands
- Eye is the center of the storm
- Eyewall where the strongest winds and rain of the storm are
- And rain bands which gives the hurricane its size

Go into telling students that hurricanes are categorized by wind speed and ask students if they know what the difference between category 1 and 5 is. Allow students to share with a partner and then share with the whole group. Students should say things such as a category 1 is less MPH and a category 5 is more MPH, The amount of damage it will cause etc....

On the slide with the scale talk about damage and why is knowing the amount of damage important for us to know. Allow students time to discuss with a partner and then as a whole group.

Tell students a type of machine learning is used in the topic of hurricanes, researchers feed information to algorithms, they then detect relationships between hurricane behavior and climate factors like the heat stored within the ocean, the wind speed, and air temperature.

Do activity on teachable machines. Students will train a machine to identify photos on hurricane Harvey of areas that were damaged vs not damaged. All materials for this activity are on the following website including Teachable machine demo

<https://www.imagesteam.org/home>.

After the activity students have an exit ticket to assess what they learned.

Exit ticket question: How can Teachable machines play a role in connection with hurricanes or other natural disasters?

How could looking at this data of the damaged vs not damaged areas in Texas hurricane Harvey help for the future?

