

Research Experience for Teachers: Mitigating Natural Disasters



NDSU

NORTH DAKOTA STATE UNIVERSITY

Get a Move on: Do Autonomous Vehicles improve Traffic Flow?

Summary

Students will learn to analyze univariate data gathered from traffic simulation software. They will consider the shape, center, and variability of the data. Students will learn the characteristics of the Normal distribution as well as how standardizing the Normal distribution allows them to calculate the probability of certain events occurring.

Grade level

9 – 12

Time required

2 weeks

Resources

TI graphing calculator

Keywords

univariate data analysis, probability distribution, Normal distribution, Standard Normal distribution

Subject area

Mathematics

Education Standard

National Council of Teachers of Mathematics Principles and Standards

Data Analysis and Probability

Select and use appropriate statistical methods to analyze data

- Find, use, and interpret measures of center and spread, including mean and interquartile range.
- For univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics.
- Recognize how linear transformations of univariate data affect shape, center, and spread.

Pacing Guide

Lesson 1: Day 1 – Lesson #1: The Shape of Data and Expected Value

Day 2 – Video: *An Introduction to Autonomous Vehicles*

<https://www.youtube.com/watch?v=HgF7E5q9sU4>

Video: *Waymo 360° Experience: A Fully Autonomous Driving Journey*

<https://www.youtube.com/watch?v=B8R148hFxPw>

Introduction to data collected by VISSIM traffic simulation.

Exercise #1: The Shape of Data

Lesson 2: Day 3 – Lesson #2: Analyzing Single Variable Data

Day 4 – Exercise #2: Analyzing Single Variable Data

Lesson 3: Day 5 - The Mean and Standard Deviation

Day 6 - Activity 3:

Lesson 4: Day 7 - The Normal Distribution

Lesson 5: Day 8 - The Standard Normal Distribution

Day 9 -Activity 4:

Connection to Civil Engineering

Data comes from everywhere: our phones, our homes, and our cars. All this data is useless without a means to mine the information buried in it. Civil engineers gather, organize, and interpret data. They use the information from this data analysis to make smarter decisions, avoid pitfalls and make their designs effective, functional and environmentally viable.

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Acknowledgements:

This curriculum was developed under the National Science Foundation RET grant #1953102. However, these contents do not necessarily represent the policies of the National Science Foundation, and you should not assume endorsement by the federal government.