**Agenda**

Autonomous cars are becoming reality in the next few years, with most auto makers rolling out a version of a car by 2020. The lesson introduces the differences of “autonomous” and “self-driving” vehicles, what technology each style uses. In the process of the technology, Machine Learning & Deep learning will be explored.

**Class Design:**
- Input data and output data
- Classes: Program Design
- Methodology: Object-oriented program design
  - Abstraction: How languages are implemented
  - Refraction: 3D
  - Control: Algorithms, libraries, methods
  - Structure: Codebases, methods, classes
- Object-oriented design
- Direct Instruction
- Guided Practice
- Independent Practice
- Materials and Equipment
- Assessment and Follow-Up

**Deep Learning**

- “Deep learning” is a subset of machine learning in which the data is processed through multiple layers of abstraction.
- In the context of autonomous driving, deep learning is used to analyze various sensor data (e.g., cameras, LiDAR) and make decisions about vehicle control.

**Objectives and Goals**

- Students will learn to solve real-world problems using machine learning.
- Students will understand the basics of neural networks and how they are used in autonomous driving.
- Students will develop an understanding of deep learning frameworks and their applications in autonomous vehicles.

**Sample Lesson Plans**

<table>
<thead>
<tr>
<th>Bell ringer</th>
<th>Autonomous car block (110 min) 1st semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students write a code to perform a Gaussian Blur on an image.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Long Project block (110 min) 2nd semester</th>
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<tbody>
<tr>
<td>Students will work through a practice project on your phone?</td>
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</table>

**Sample Lesson Plans**

<table>
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<tr>
<th>Guided Practice</th>
<th>Workshop comparing “Auto-pilot” &amp; “self-driving”</th>
</tr>
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<tbody>
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<td>Students will work through a practice project with given prompts.</td>
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</table>

**Independent Practice**

<table>
<thead>
<tr>
<th>Assignment: Write a simple code with…</th>
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<tbody>
<tr>
<td>Students will use a code to perform the given tasks.</td>
</tr>
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</table>

**ASSESSMENT AND FOLLOW-UP**

- Online quiz about concepts & similarities to other languages.
- Students will use a code to perform the given tasks.

**List of Figures**

- Figure 1: Screenshot from PowerPoint
- Figure 2: Screenshot from PowerPoint
- Figure 3: https://www.quora.com/Why-do-autonomous-cars-need-LIDAR-radar-and-many-other-sensors-when-people-drive-cars-with-only-their-2-eyes-and-ears
- Figure 4: https://commons.wikimedia.org/wiki/File:Machine_Learning_Technical_JPG
- Figure 5: https://3l3mnts3l3y enduring.co experiments/2016/09/to/g3.png
- Figure 6: Screenshot from PowerPoint
- Figure 7: Screenshot from PowerPoint
- Figure 8: Screenshot from PowerPoint
- Figure 9: A Gaussian Blur before edge detection aims to reduce the level of noise in the image, which improves the result of the following edge-detection algorithm.
- Figure 10: Screenshot from PowerPoint

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