Module 1 Notes For AIM 100

What is AI

A computer system doing things that normally would require human intelligence.

Types of AI

1. **Artificial Narrow Intelligence**
   - AI that simulates human intelligence at one thing
   - **Example:** When your camera can recognize you're in the camera frame and blur the background.
2. **Artificial General Intelligence**
   - AI that simulates human intelligence at everything
   - *Much less developed. Think Terminator and human-robots.*

General Notes

- Syllabus
- AI Lecture Slideshow
- Goal-setting Article

Wolf Example

```
wolf_classifier() {
   // Does it have two ears?
   // Does it have wiskers?
   // Does it have four legs?
   // Does it have a grey pelt?
}
```

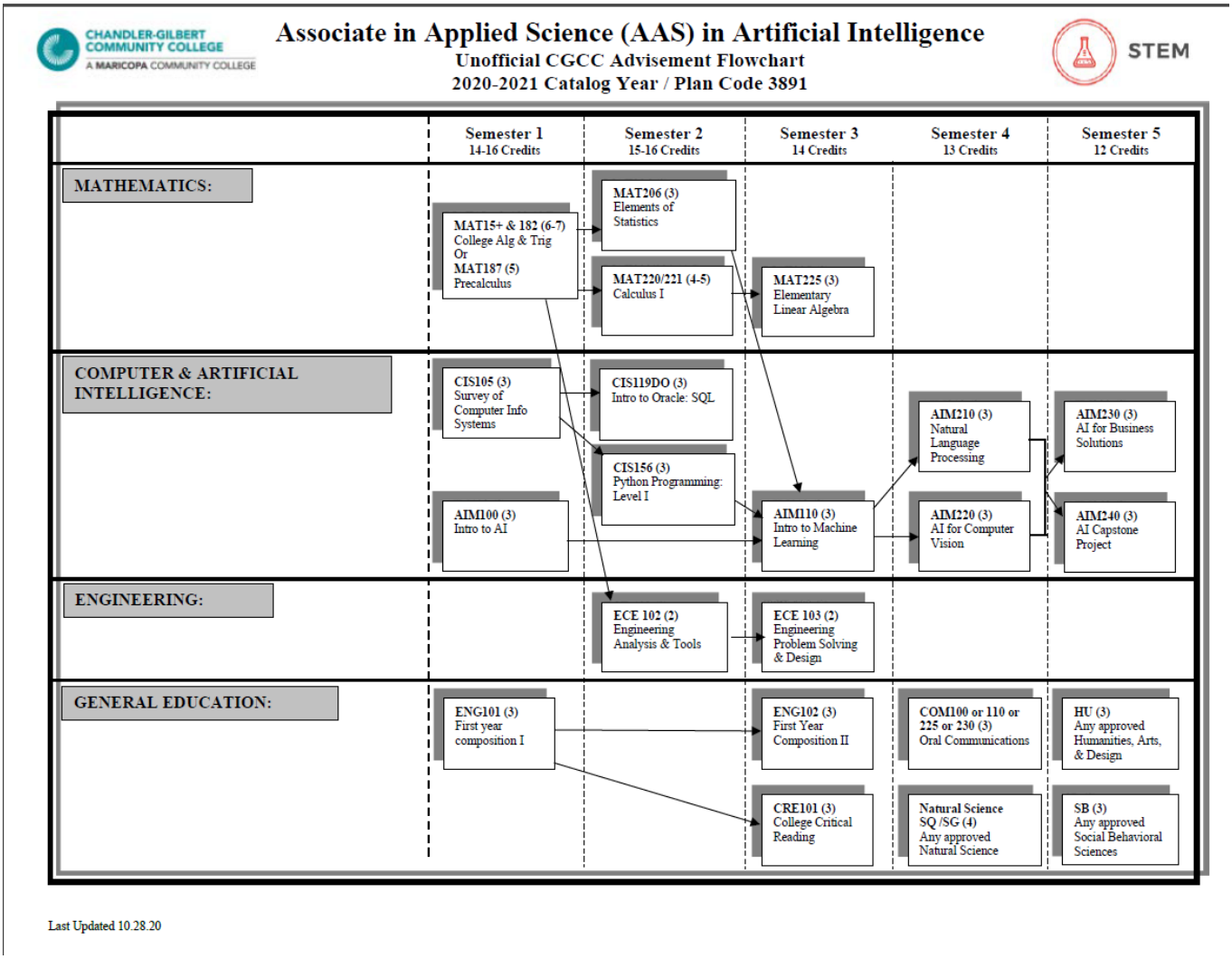
- Classifier depicts one thing from another.
- If all the values are true, it's classified as a "wolf".

The issue with this classifier is that it will not be able to differentiate between a wolf and a dog that looks like a wolf.

- The way to get around this is **Supervised Learning**.

Academic Pathway

- CGC AI Page
- Academic Flowchart
- CGC Degree



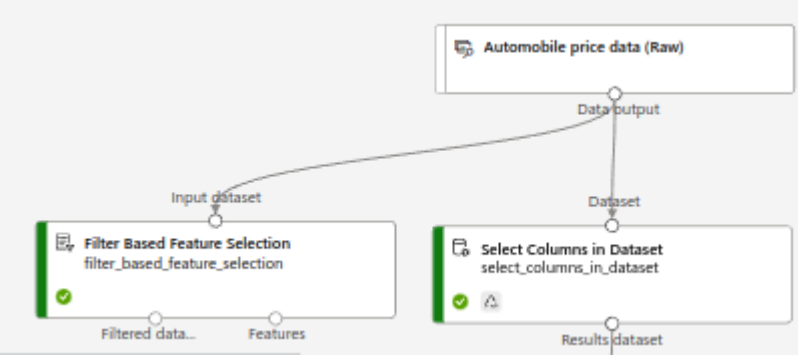
- AI involves a lot of math.

AI Libraries

- OpenVINO
  - Documentation
- Pandas
- OpenCV
- Scikit-Learn
- Numpy
- PyTorch
- Keras
- Natural Language Toolkit
- Hugging Face

Labs

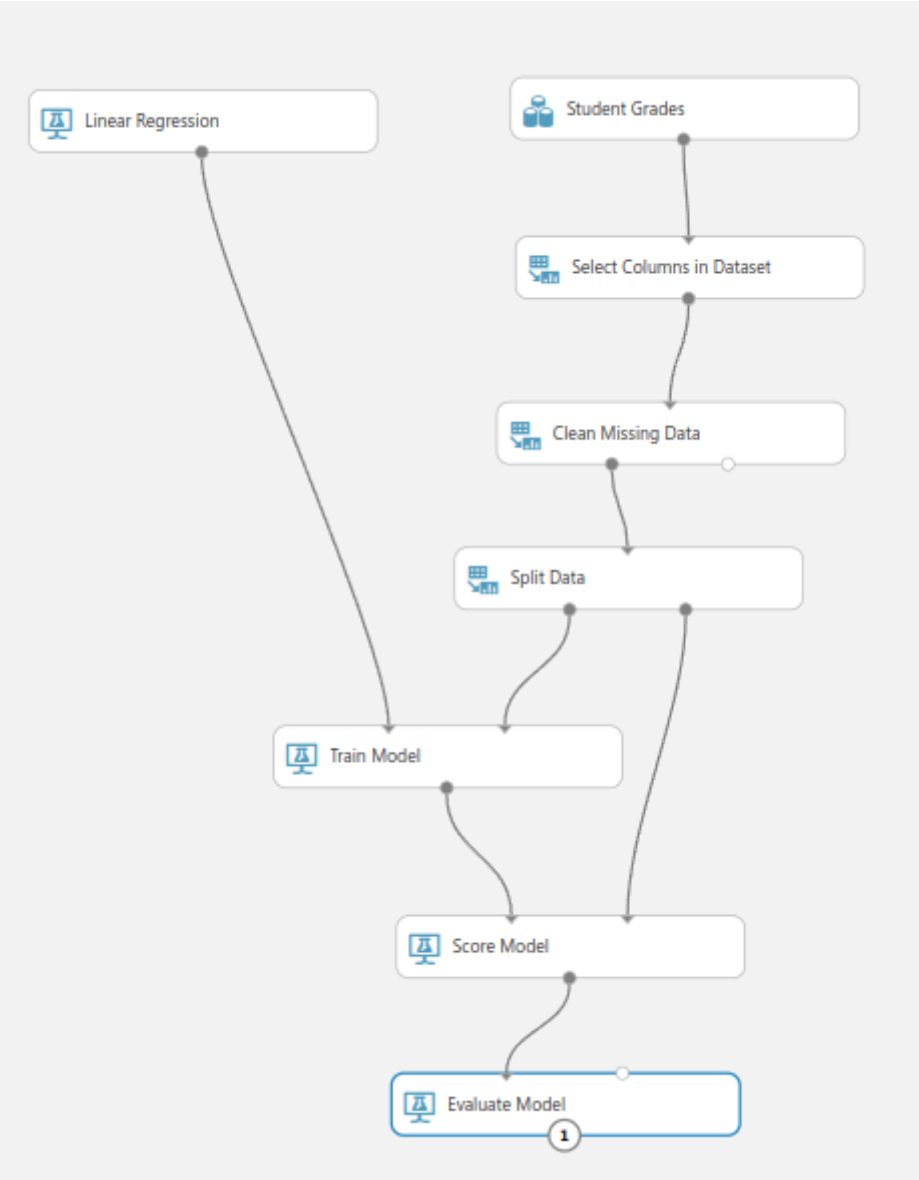
- Lab Link
  - What is Machine Learning
  - Creating a No-Code Regression Model
- Azure Studio Classic



- For the automotive lab, you will need to use the **Filter Based Feature Selection** node with the Raw data from the first node as its input in order to see the feature weights.
  - After it's done: `Right click > Preview Data > Features`

Model Example

- Student Grades



When working with models, first create a dataset to train your model, and another dataset for testing real world data to determine accuracy.

- This can be done by splitting your dataset if you only have the one.
  - A 70/30 split is a good base.

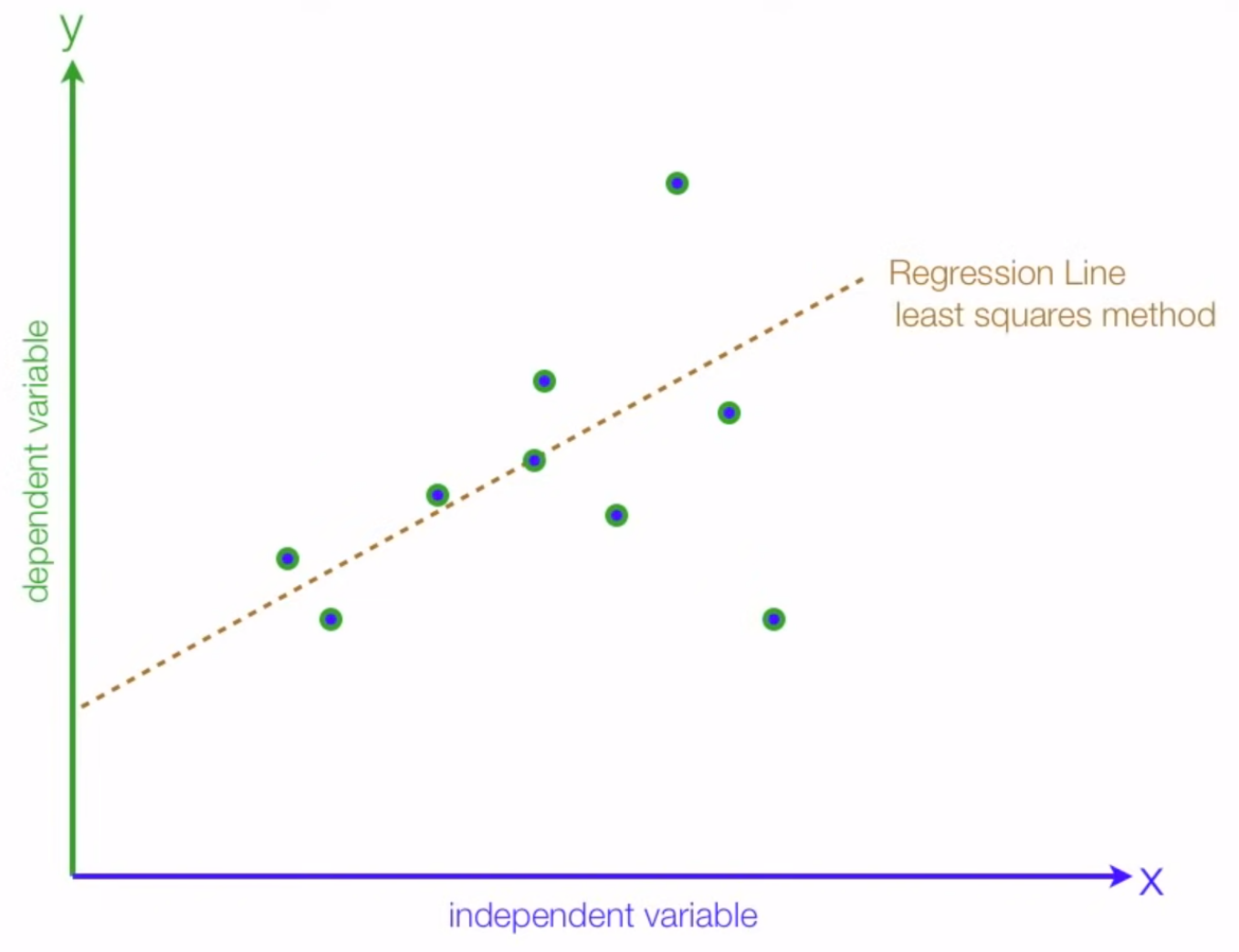
Useful Terms

- **Mean Absolute Error (MAE):** The average of absolute errors. An error is the difference between the predicted value and the actual value.
- **Root Mean Squared Error (RMSE):** The square root of the average of squared errors of predictions made on the test dataset.
- **Relative Absolute Error:** The average of absolute errors relative to the absolute difference between actual values and the average of all actual values.

- **Relative Squared Error:** The average of squared errors relative to the squared difference between the actual values and the average of all actual values.
- **Coefficient of Determination:** Also known as the R squared value, this statistical metric indicates how well a model fits the data.

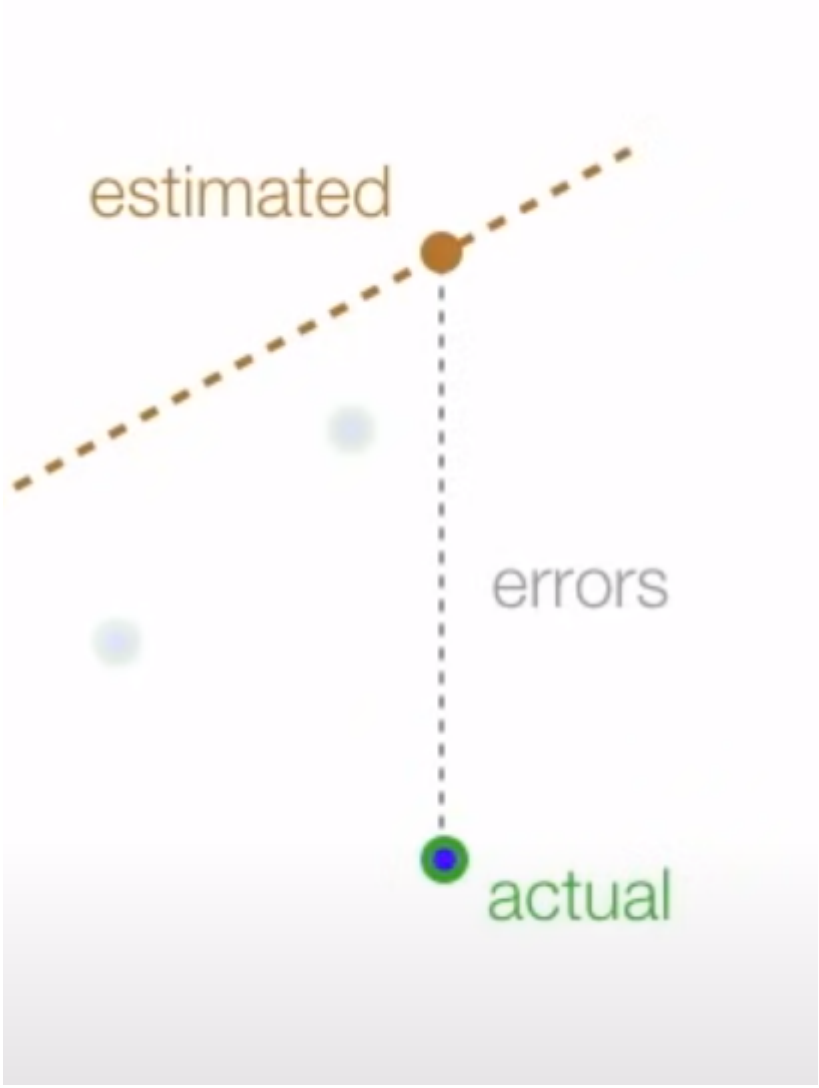
Linear Regression

Linear regression uses a straight line:

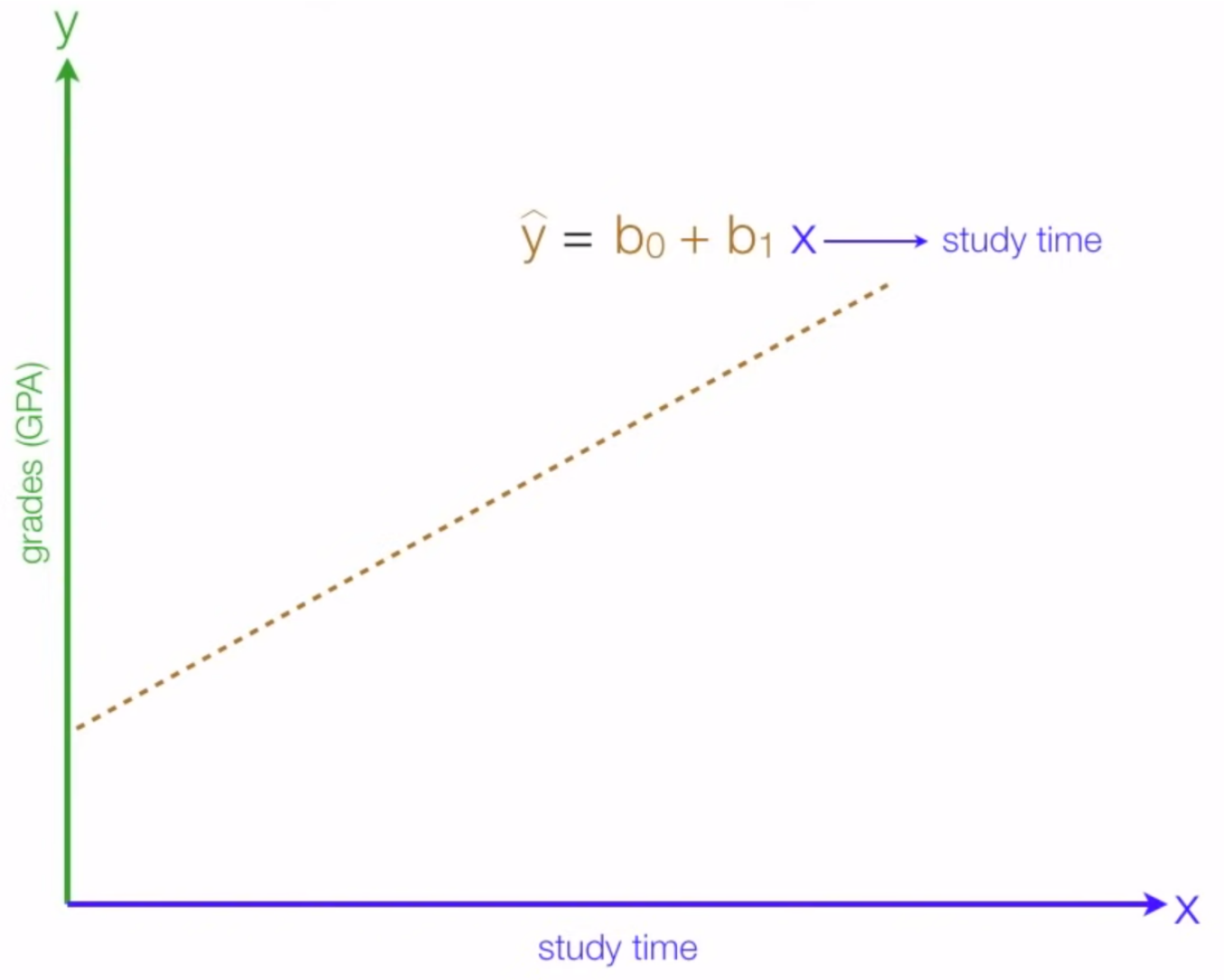


- The plotted points are **observations**.
- The regression line is based on the least squares method.

The goal is to minimize the errors between the estimated value and the actual value:

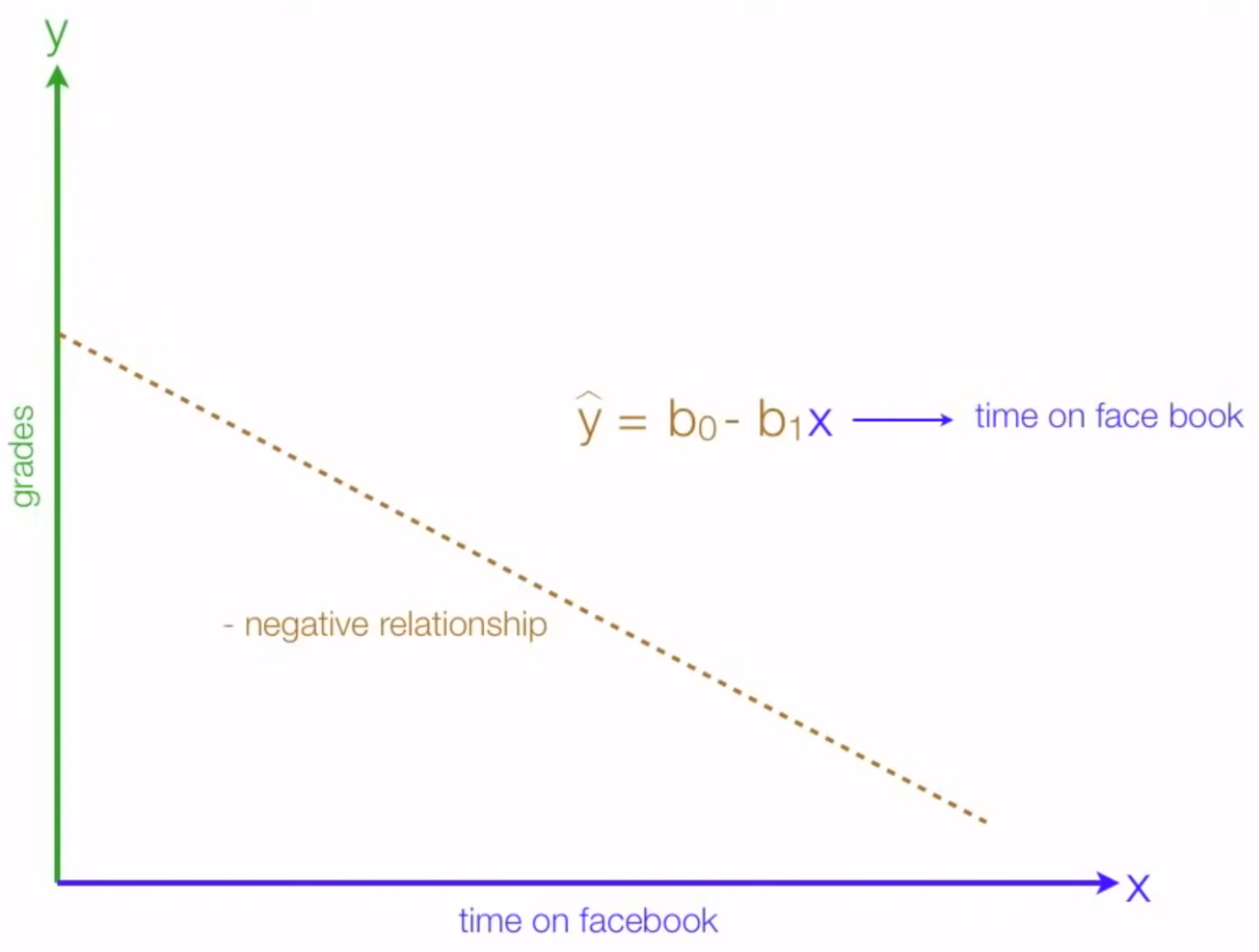

estimated
errors
actual

Positive Relationship



- b_0 is the **Y-Intercept** and b_1 is the slope.
- **Y** is the **Dependent Variable**
  - The outcome
- **X** is the **Independent Variable** and is what we:
  - control
  - change
  - manipulate

Negative Relationship



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