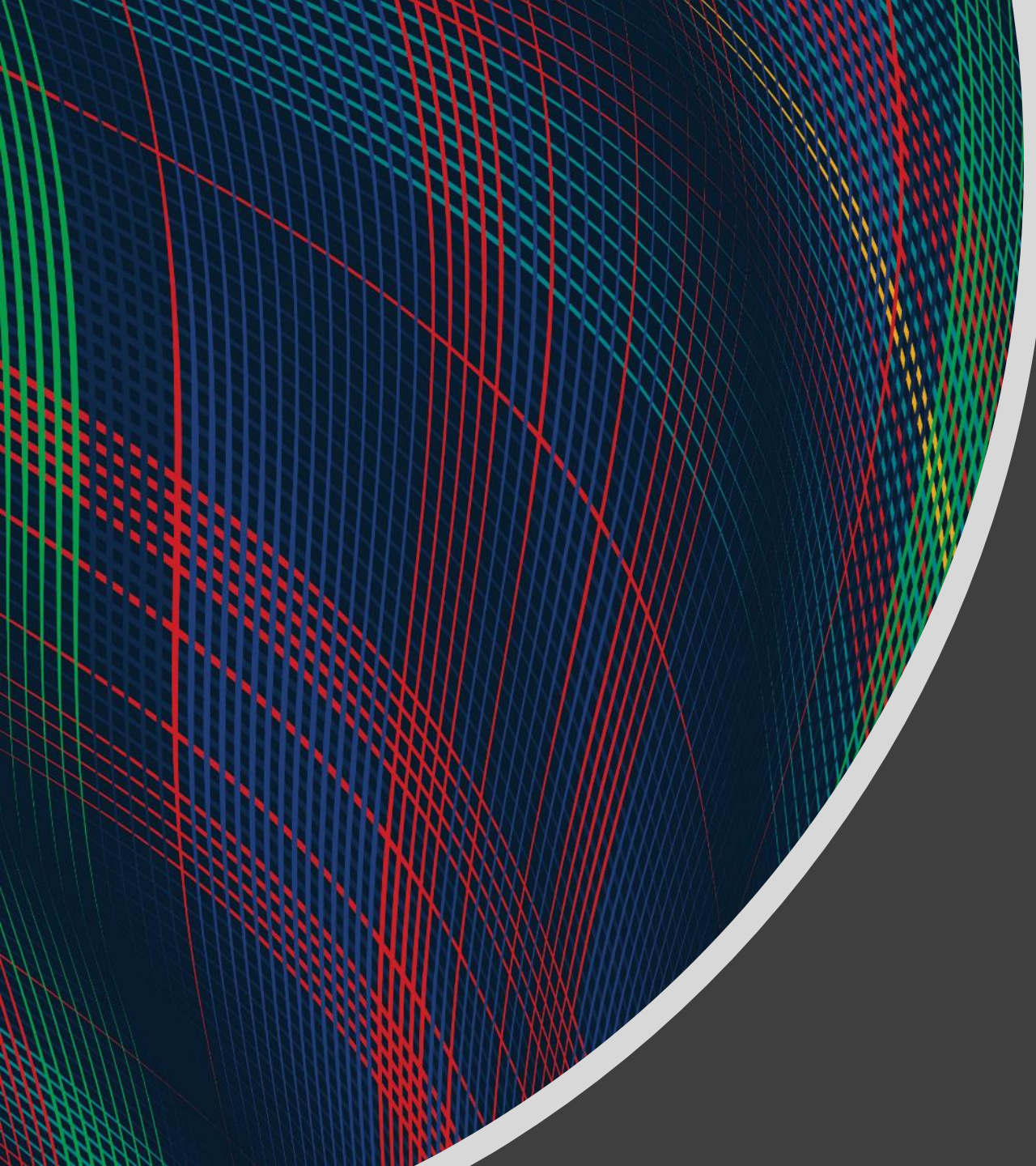


An abstract graphic on the left side of the slide, featuring a sphere-like shape composed of a dense grid of intersecting red, green, and blue lines. The lines are curved and create a sense of depth and movement.

Demystifying AI

Data and ML Models

Instructor: Pat Virtue

Exercise 1: Input Output Prediction

Learn from training data input and output to predict test output

- Fill in Predicted Output for each test data input

Exercise 2: Input Output Prediction

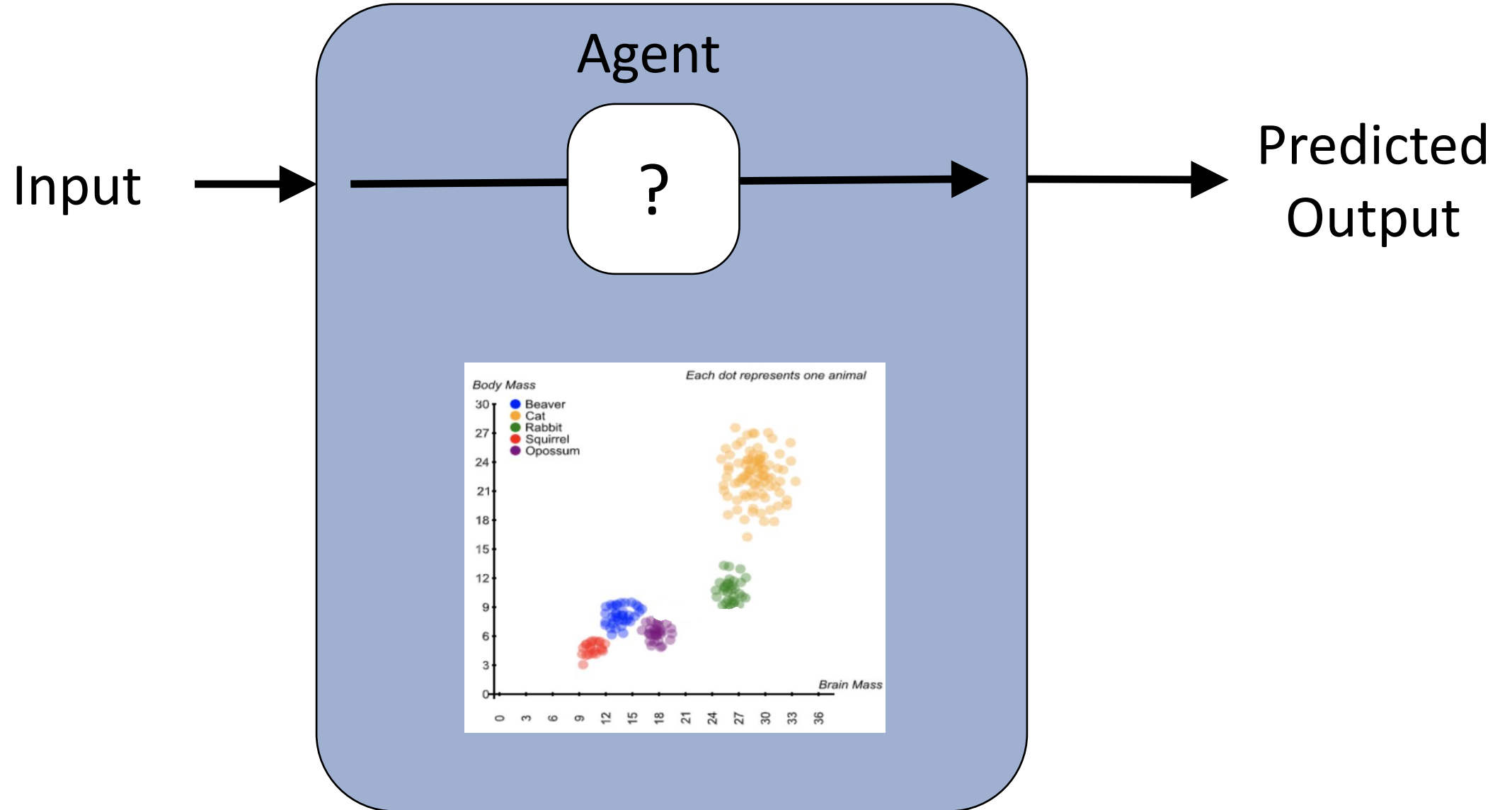
Learn from training data input and output to predict test output

- Fill in Predicted Output for each test data input

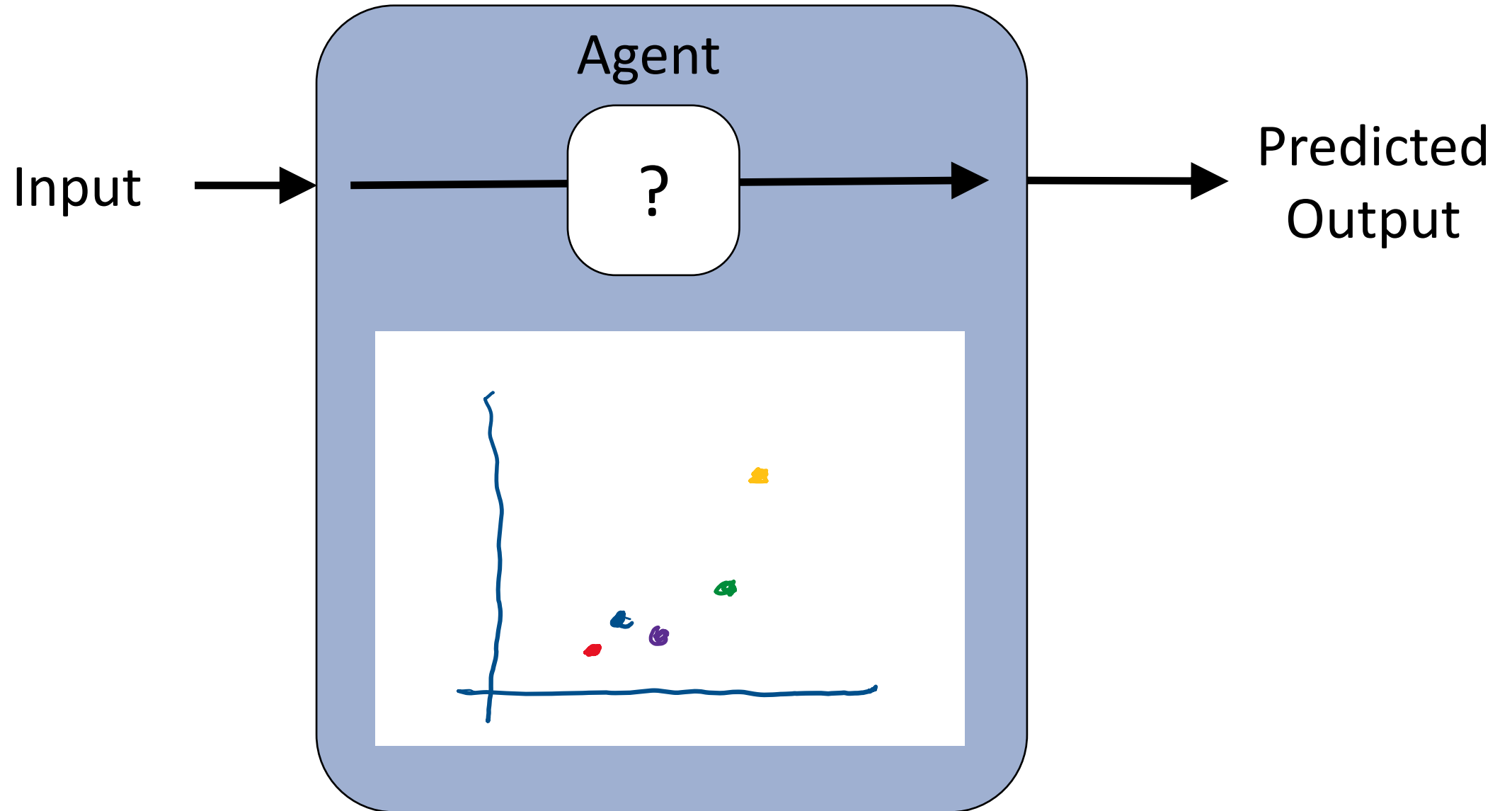
Using the same method that you used to predict the test data output

- Fill in Predicted Output for each train data input

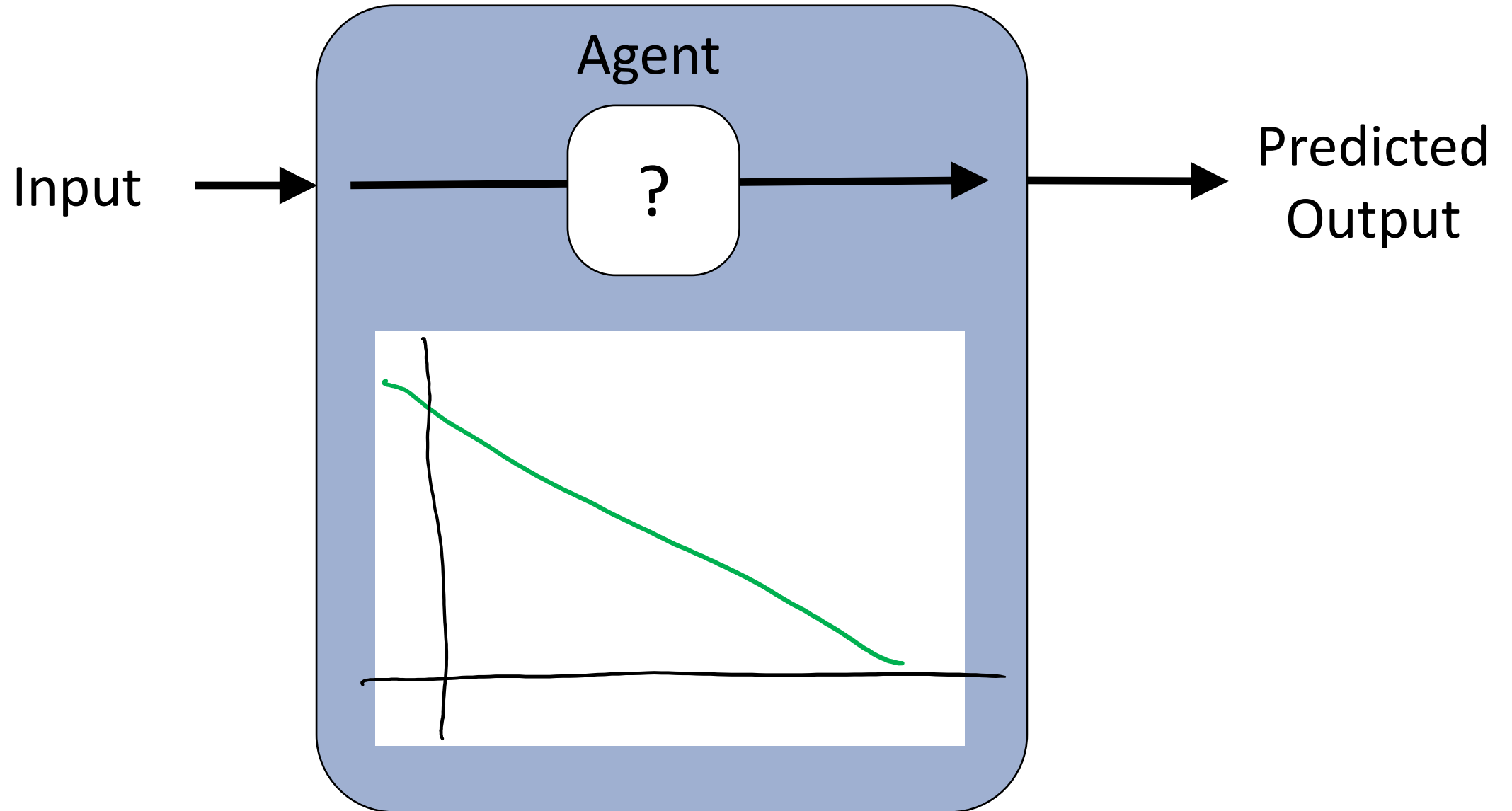
Agent Uses Data to Make Decisions



Agent Uses Data to Make Decisions

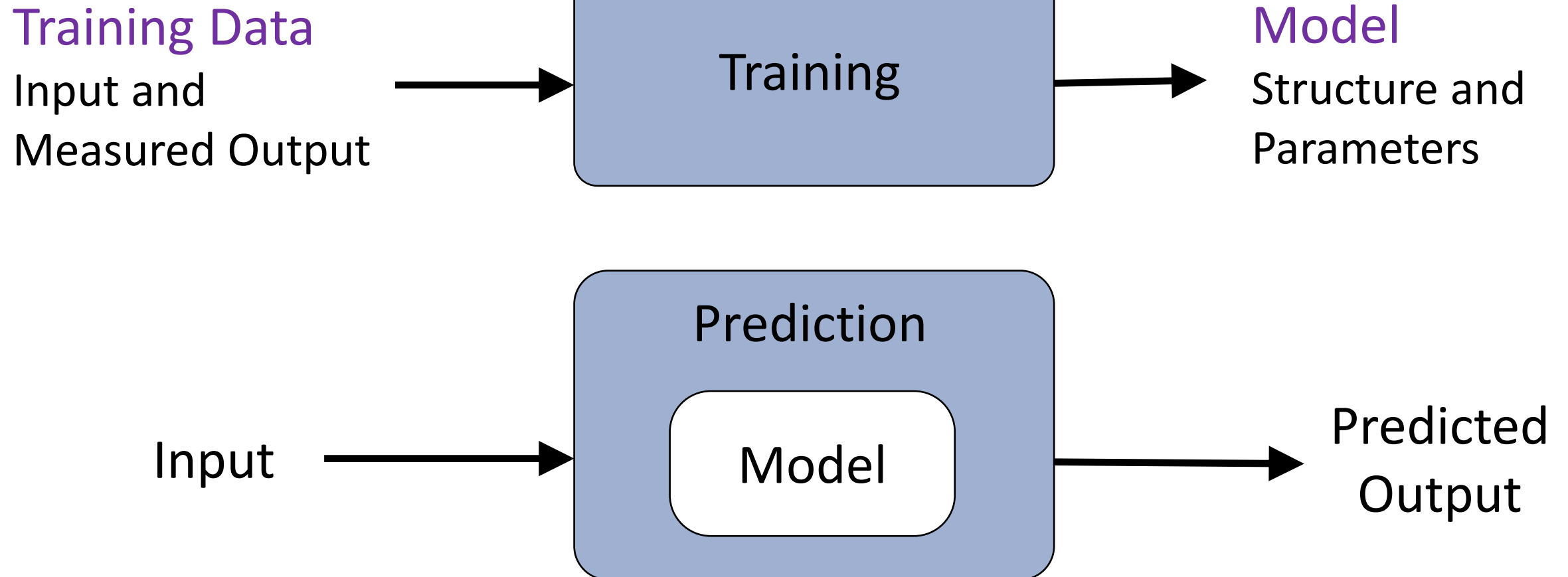


Agent Uses Data to Make Decisions



Machine Learning

Using (training) data to learn a model that we'll later use for prediction



Machine Learning

Using (training) data to learn a model that we'll later use for prediction

Training Data

Input: ~~x~~ mileage ✓

Output: price ✓
y

Training

Model

Structure:

line: $y = mx + b$

Parameters:

$m = -5/32$

$b = 25,000$

Input

Prediction

$y = mx + b$
 $m = -5/32$
 $b = 25,000$

Predicted
Output

Vocab

Data: Numerical Values

More input measurements

Label	Width	Height	Length	Weight	Brain	Life expectancy
3	3.95	12.79	10.45	0.899	4.89	8.25
2	4.21	12.71	10.83	11.66	9.09	5.92
2	3	13.88	11.41	10.21	14.78	5.42
3	4.79	12.71	10.76	0.885	8.73	10.72
3	5.09	15.4	7.68	1.143	13.95	8.54
3	4.92	8.96	8.91	1.1	11.25	9.13
0	9.85	12.78	4.04	11.1	10.71	11.19
4	5.48	8.81	10.09	9.22	6.18	4.88
⋮	⋮	⋮	⋮	⋮	⋮	⋮

Data: Numerical Values

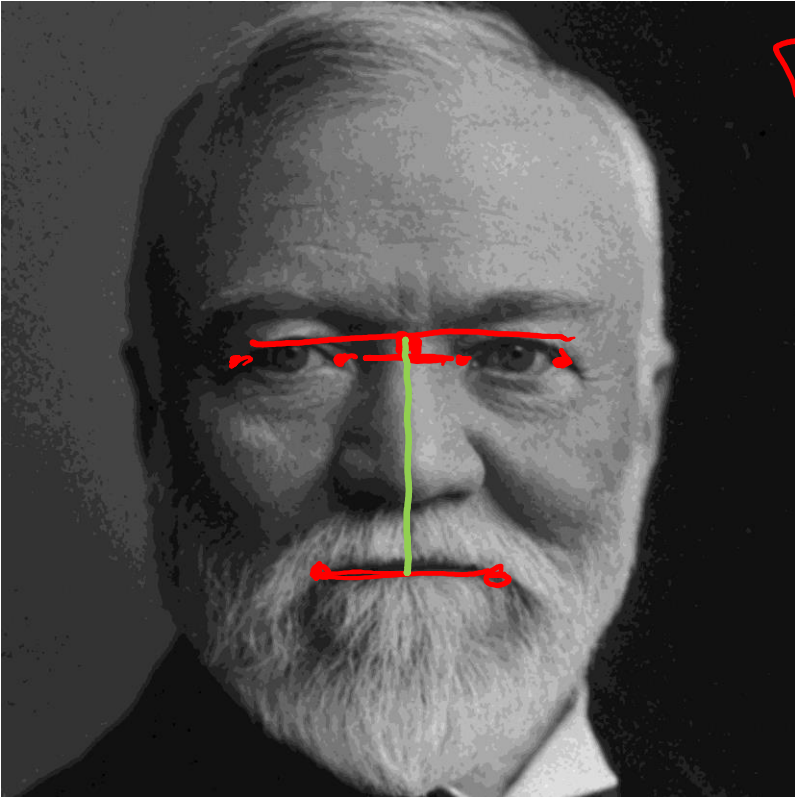
Converting more complex data into a table of numerical values

- Images (and video)
- Language (words, sentences, books)
- Audio signals (music, speech)

Data: Numerical Values

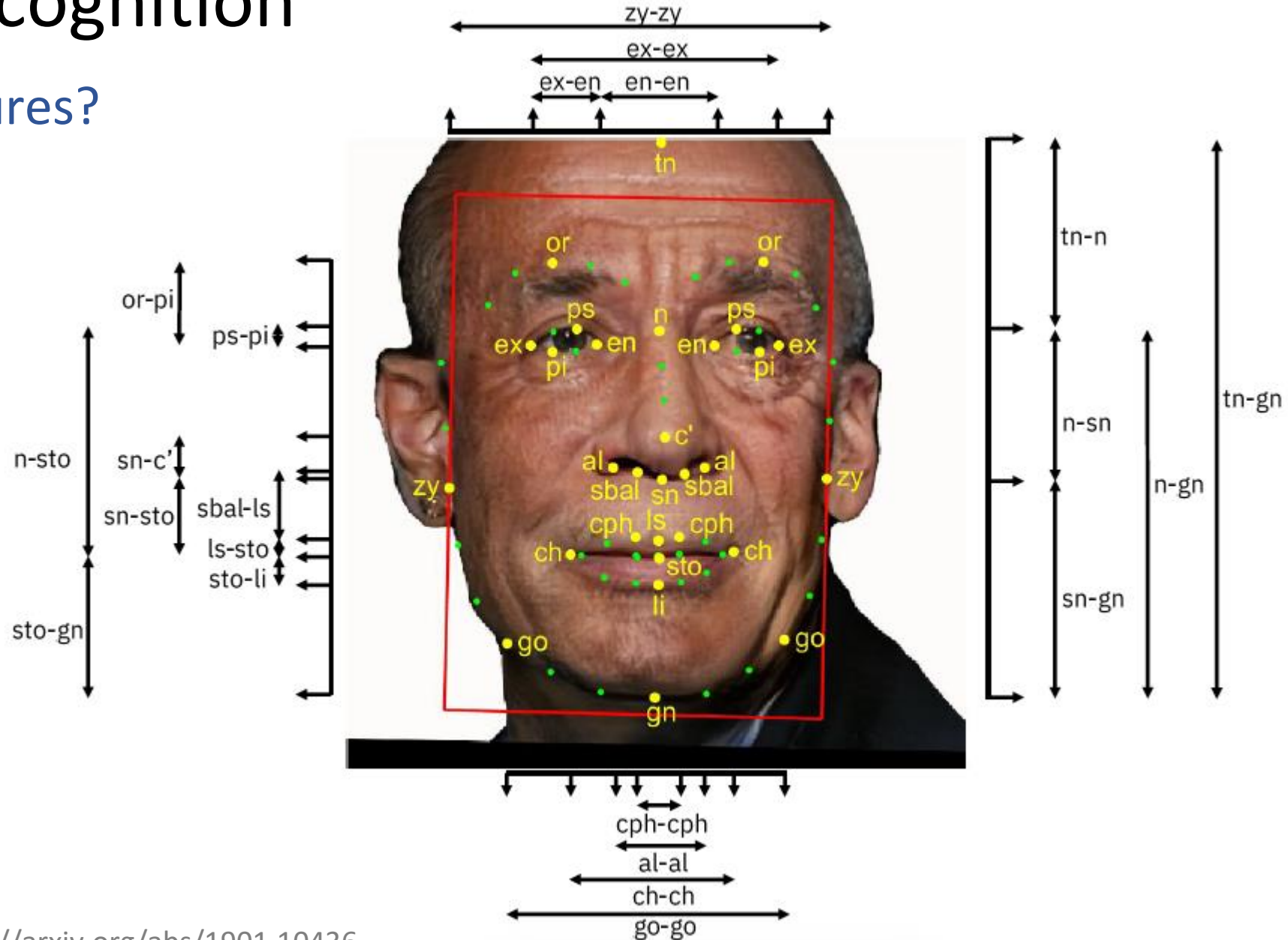
Converting more complex data into a table of numerical values

Task: Face recognition from image

[illegible]

Face Recognition

Input Features?



Face Recognition

Input Features?



Face Recognition

Input Features?



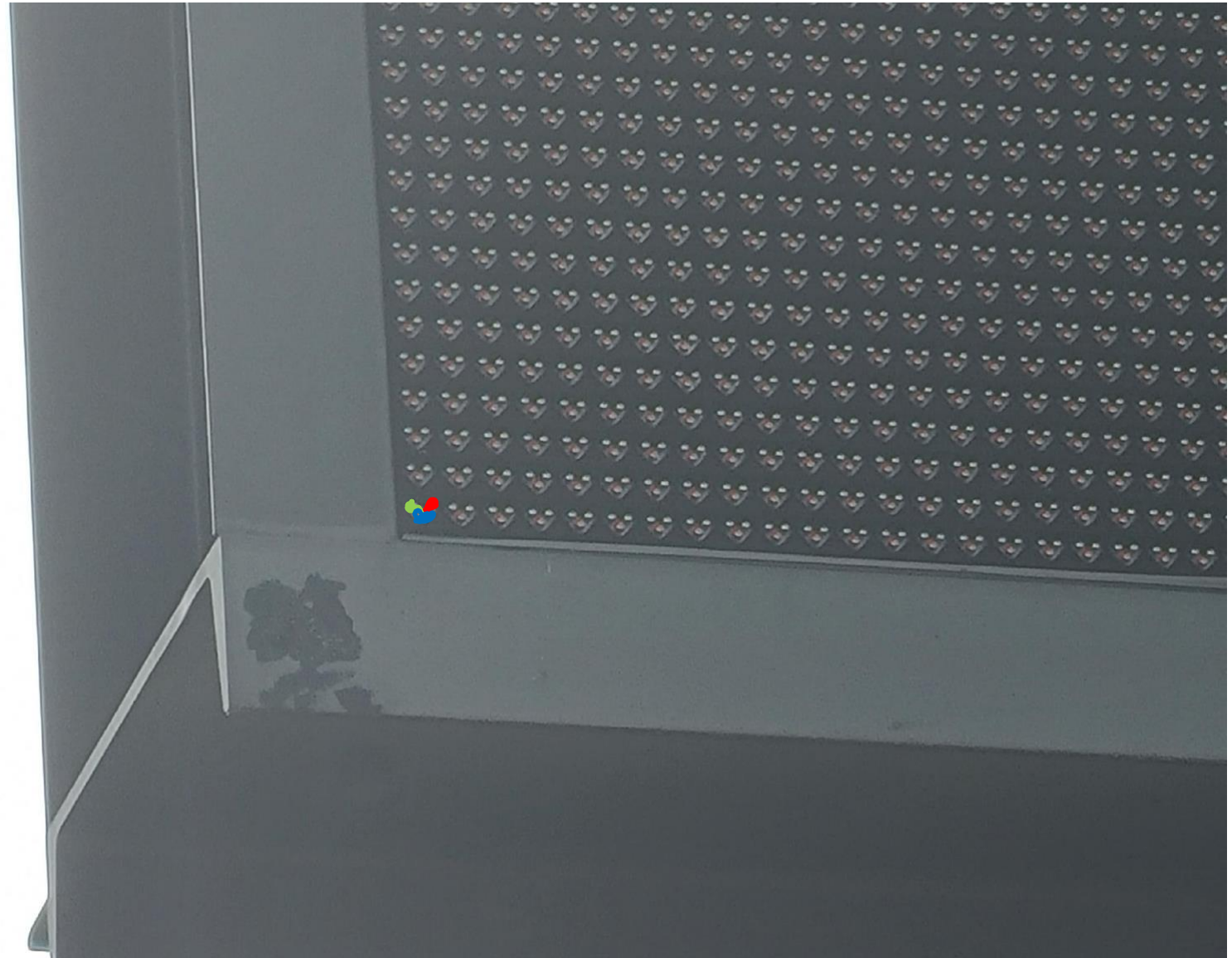
Face Recognition

Input Features?



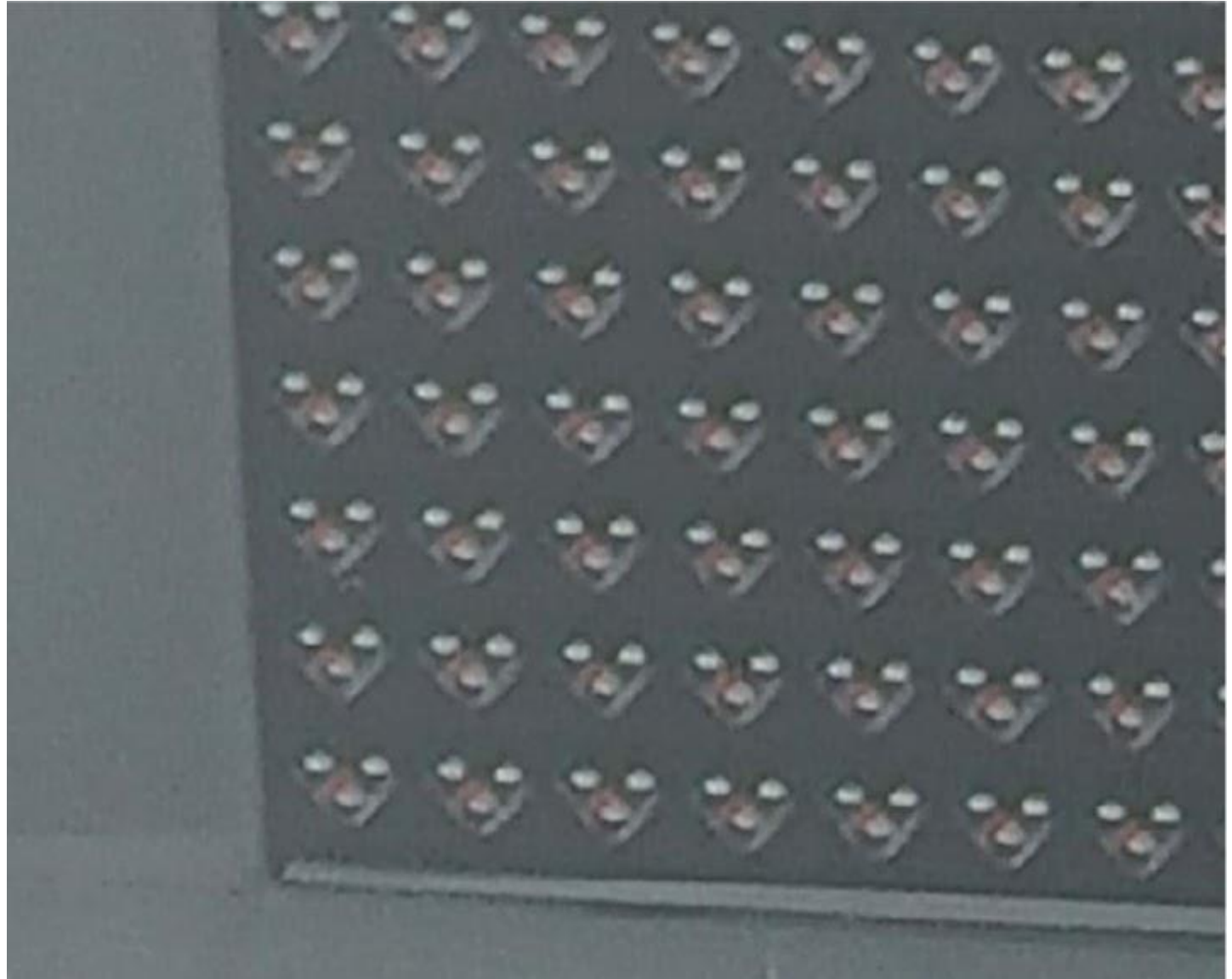
Face Recognition

Input Features?



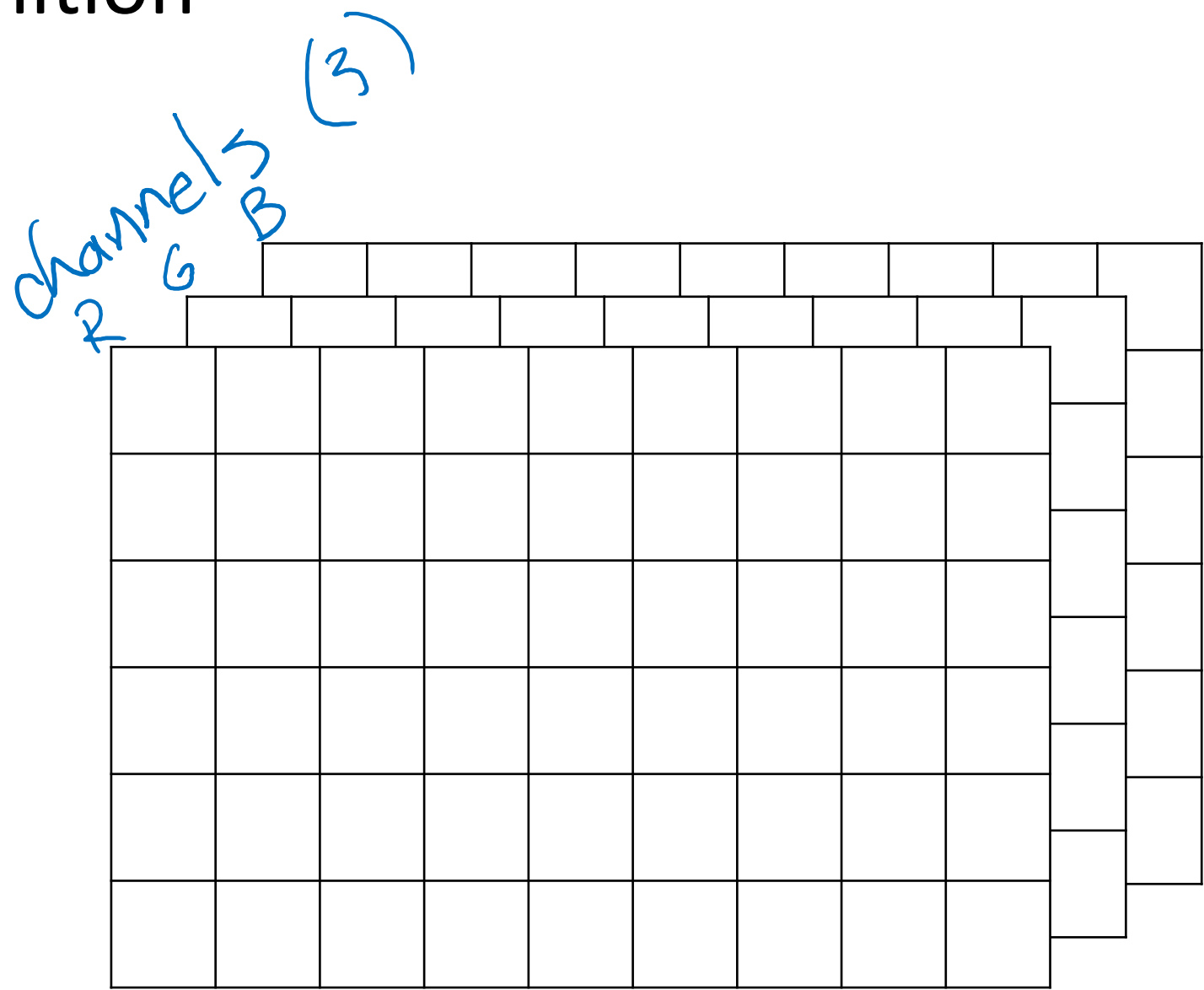
Face Recognition

Input Features?



Face Recognition

Input Features?



Data: Numerical Values

Converting more complex data into a table of numerical values

Task: SPAM classification from email (body) text

<u>Output</u> SPAM=1	<u>num</u> \$	<u>num</u> spelling errors	<u>known</u> SPAM sent.	<u>num</u> ext link/attach	<u>num</u> words in CAPS
0	0				
1	2				
0	10				
1	8				
1	0				
test → ?	0				

Data: Numerical Values

Converting more complex data into a table of numerical values

Task: SPAM classification from email (body) text

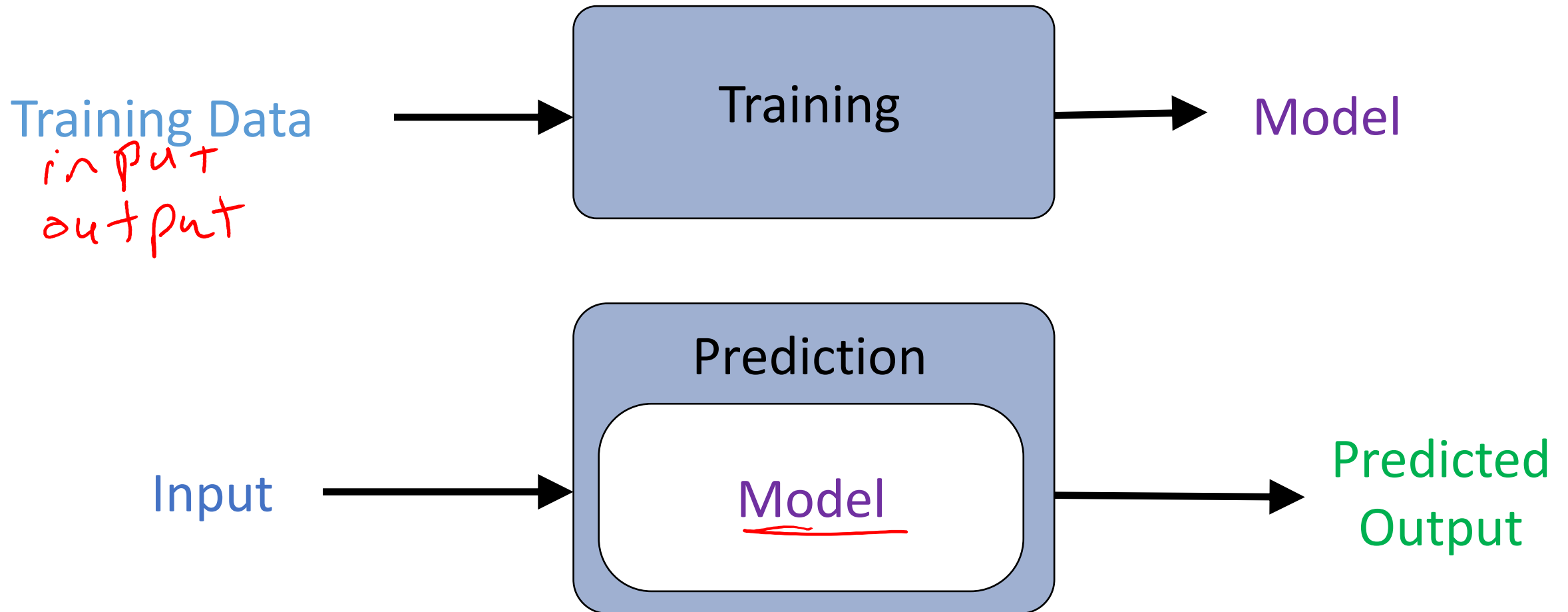
- ASCII
char/
symbol
- | | |
|---|----|
| A | 65 |
| B | 66 |
| C | 67 |

C	A	B			
67	65	66	1	1	1

- Word:
index in a
dictionary

Reminder: Machine Learning

Using (training) data to learn a model that we'll later use for prediction



Training

Training Input
Training Output

Training

Model

Training Error

Training Input

Prediction

Model

Training Output
Predicted

Training Output
(Measured)

Testing

Testing Input

Prediction

Model

Testing Output
Predicted

Testing Output
(Measured)

Testing Error

