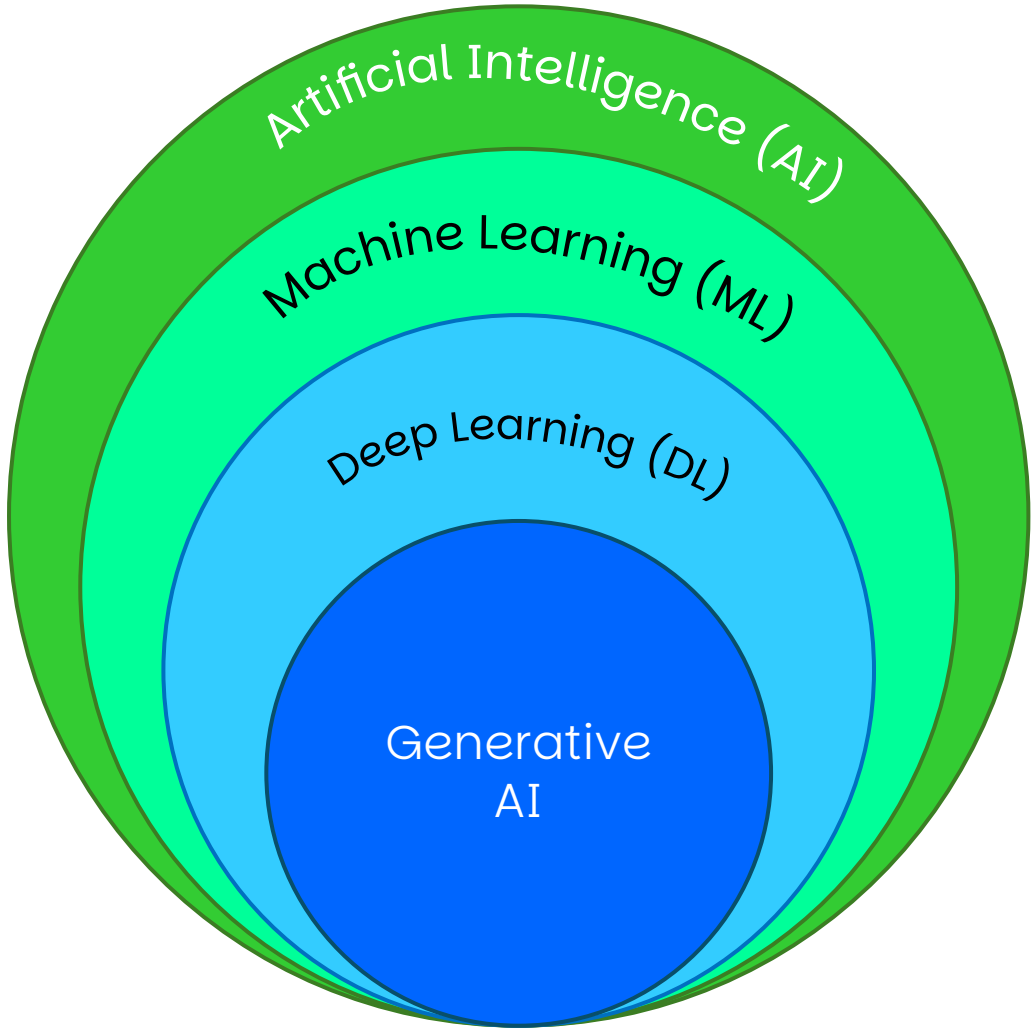
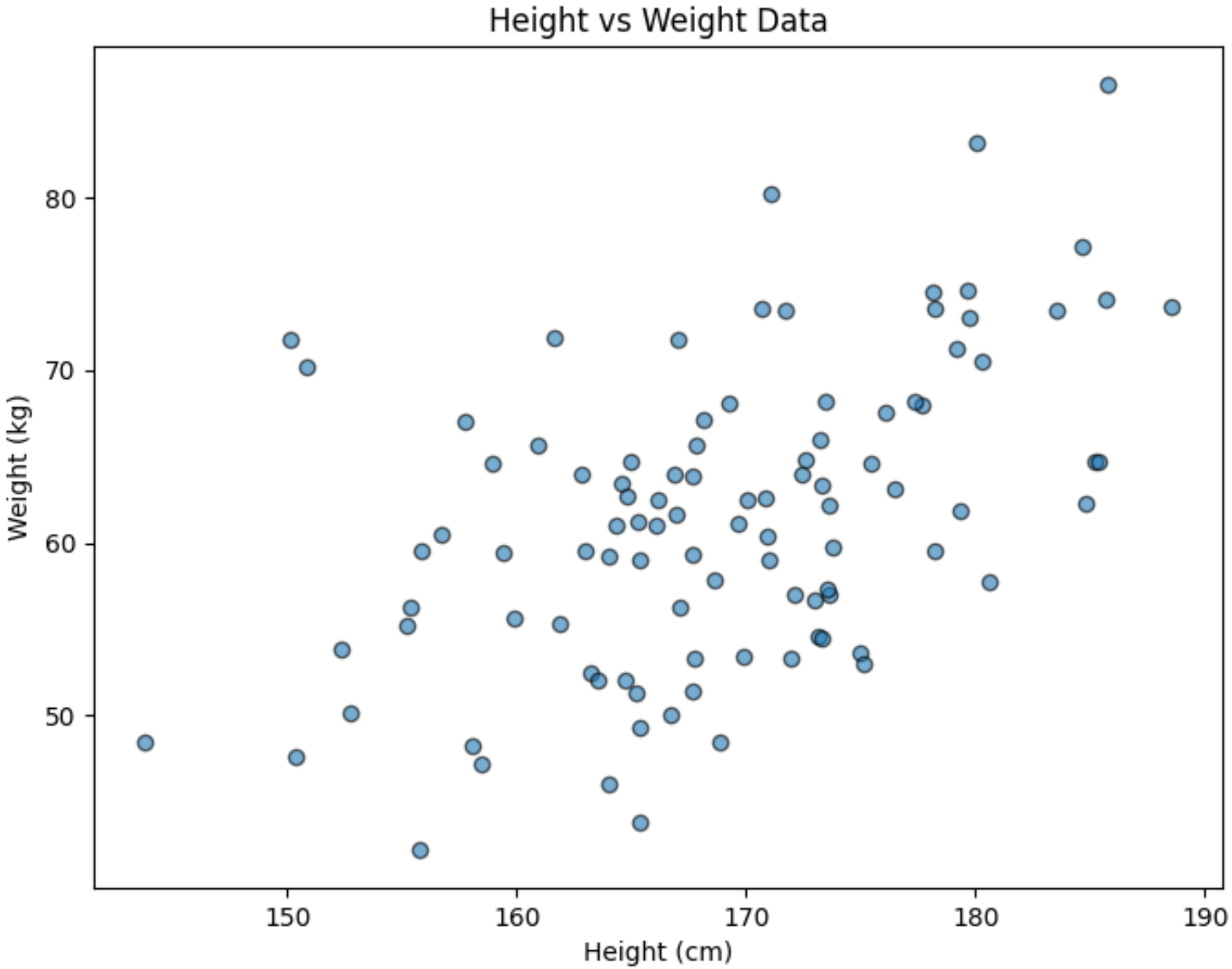
ML Basics

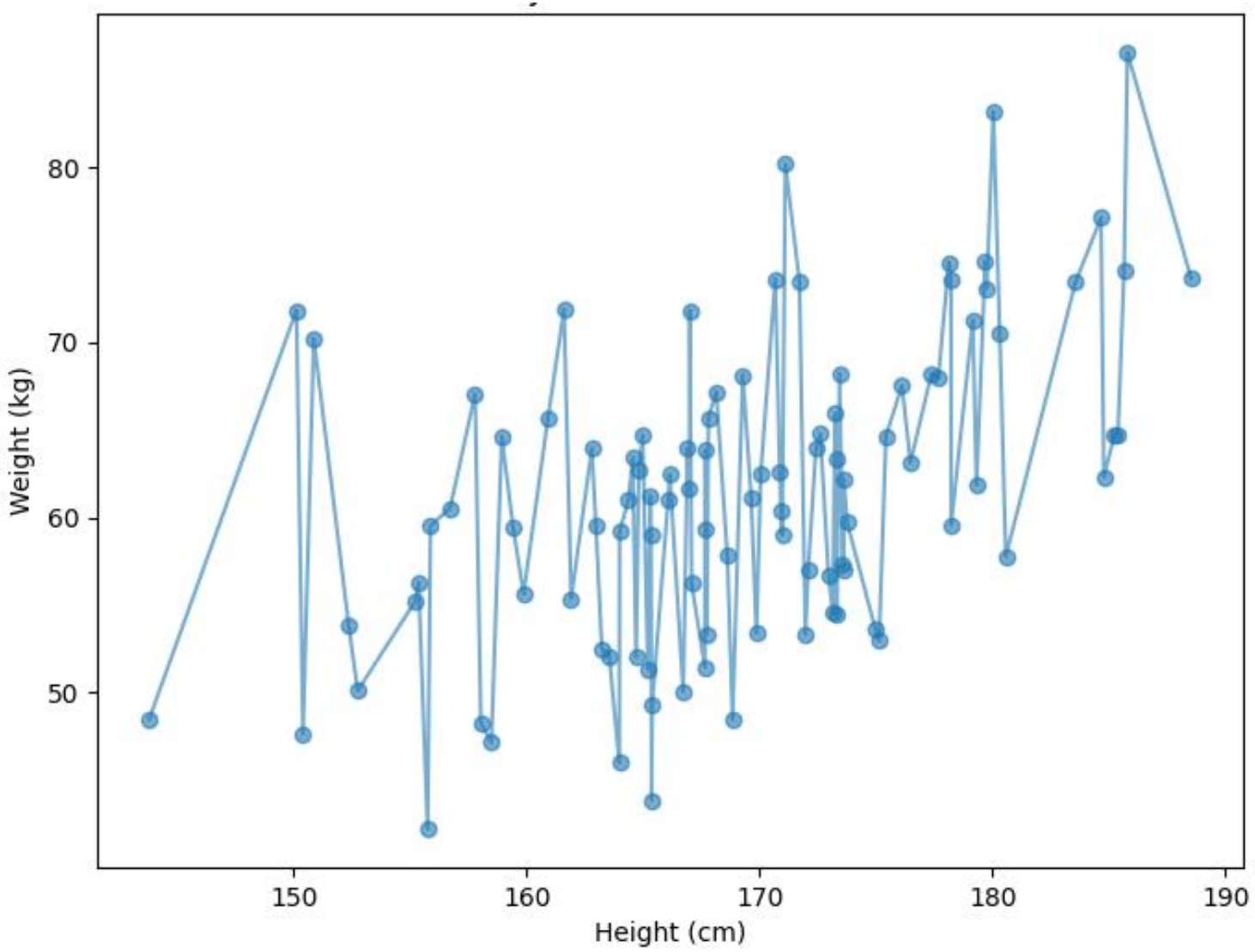
Regression and Classification


Artificial Intelligence (AI)
Machine Learning (ML)
Deep Learning (DL)
Generative AI

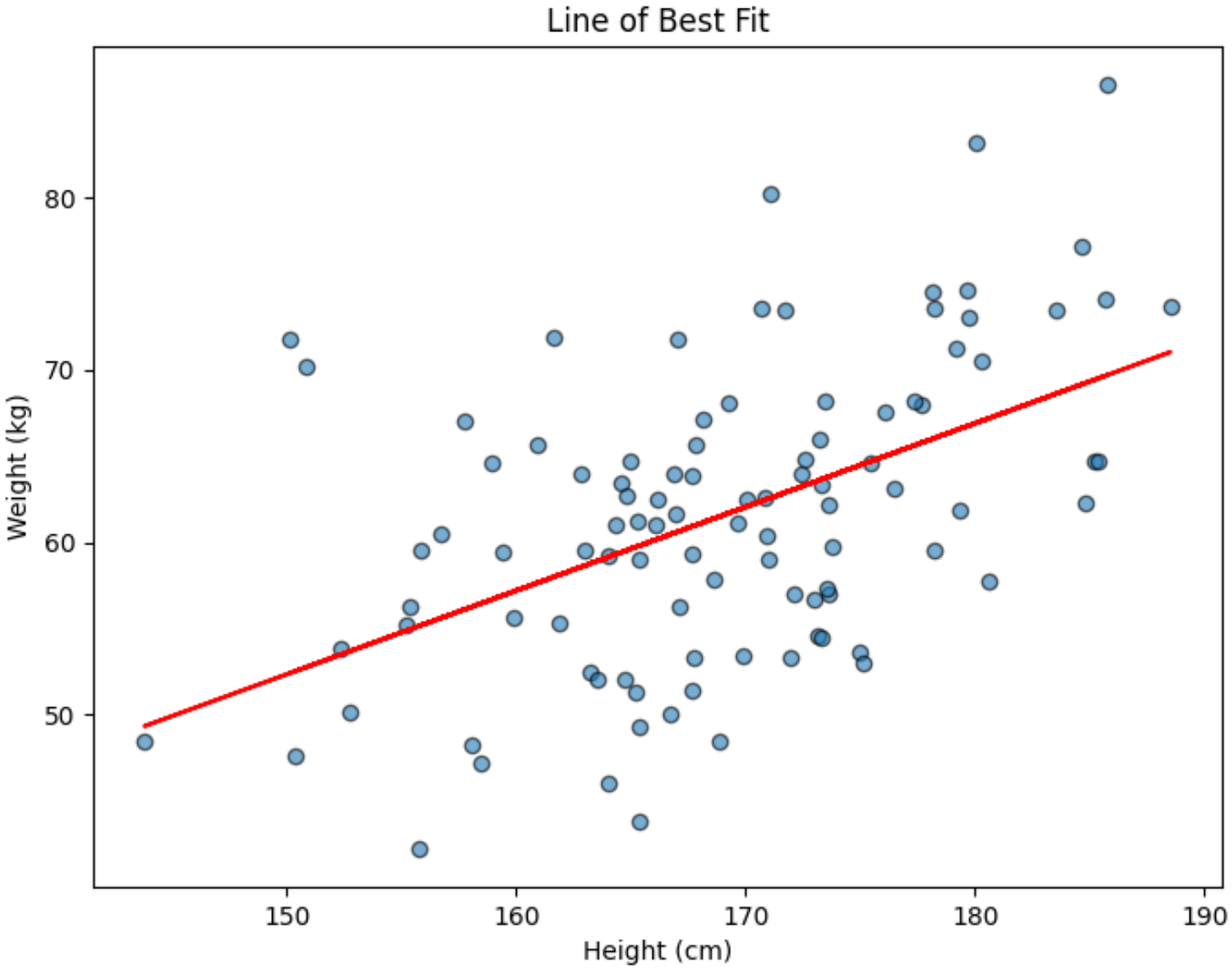
ML finds patterns to make inferences.

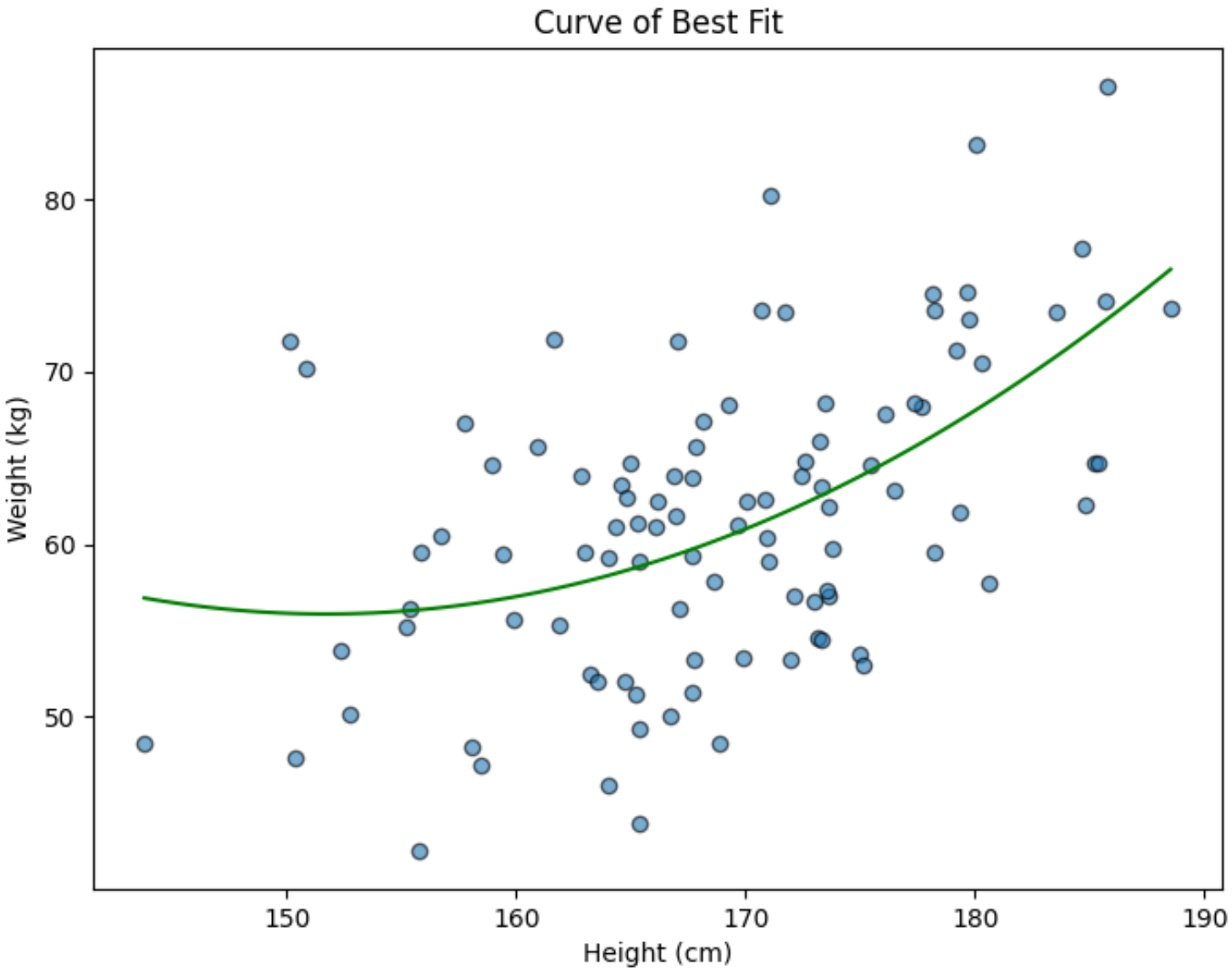
	A	B
1	Height (cm)	Weight (kg)
2	174.9671415	53.65731898
3	168.617357	57.80525161
4	176.4768854	63.1444151
5	185.2302986	64.71996098
6	167.6584663	59.30479406
7	167.6586304	63.82758511
8	185.7921282	86.5647641
9	177.6743473	68.00123088
10	165.3052561	61.24355681
11	175.4256004	64.65979294
12	165.3658231	43.86932412
13	165.3427025	58.99351047

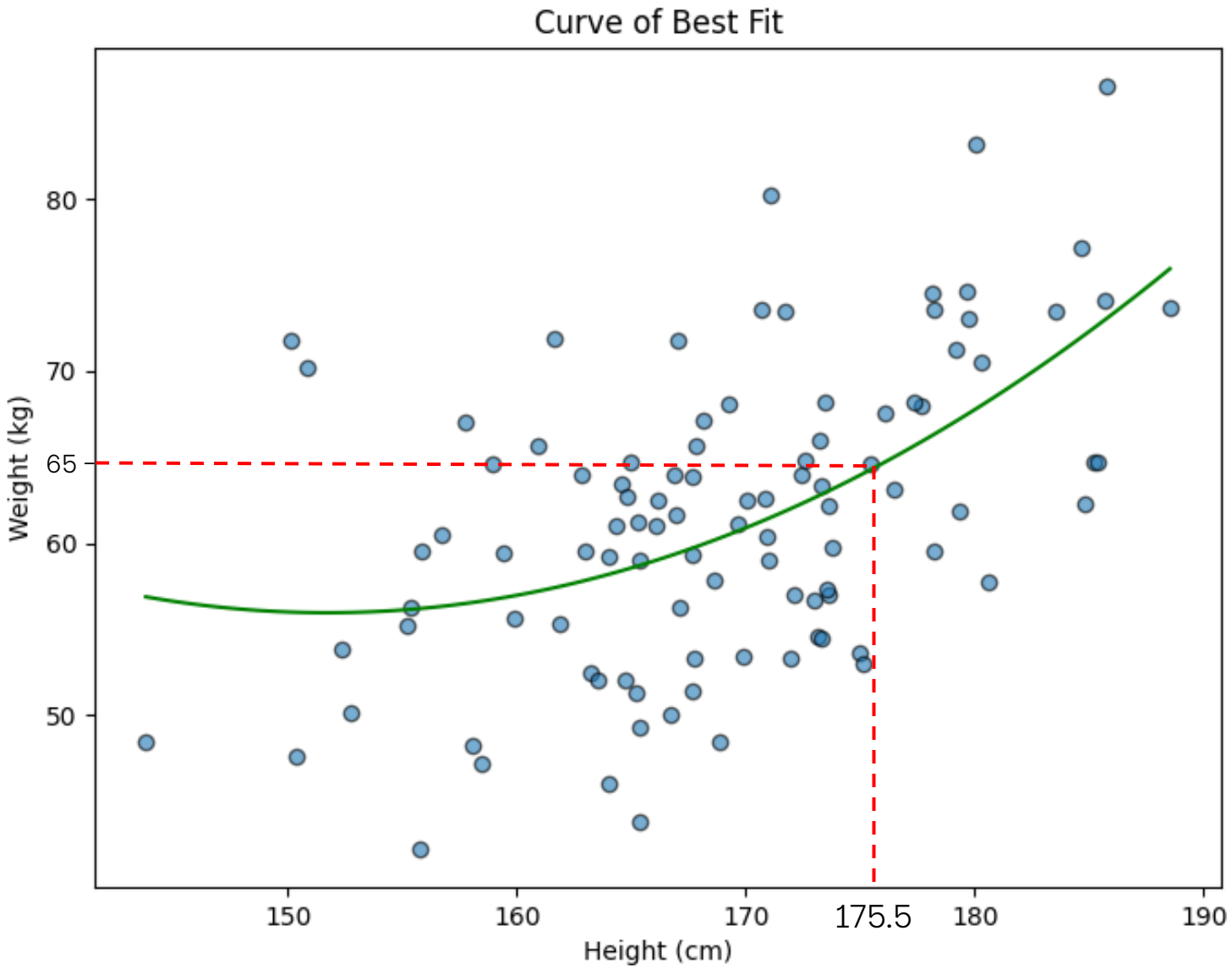




Line of Best Fit







If someone weighed 65 kg, how tall will they be?

175.5 cm

Regression Algorithms

- Two features (generally)
- Line or curve
- Represents the general trend of the data.

	A	B
1	Height (cm)	Weight (kg)
2	174.9671415	53.65731898
3	168.617357	57.80525161
4	176.4768854	63.1444151
5	185.2302986	64.71996098
6	167.6584663	59.30479406
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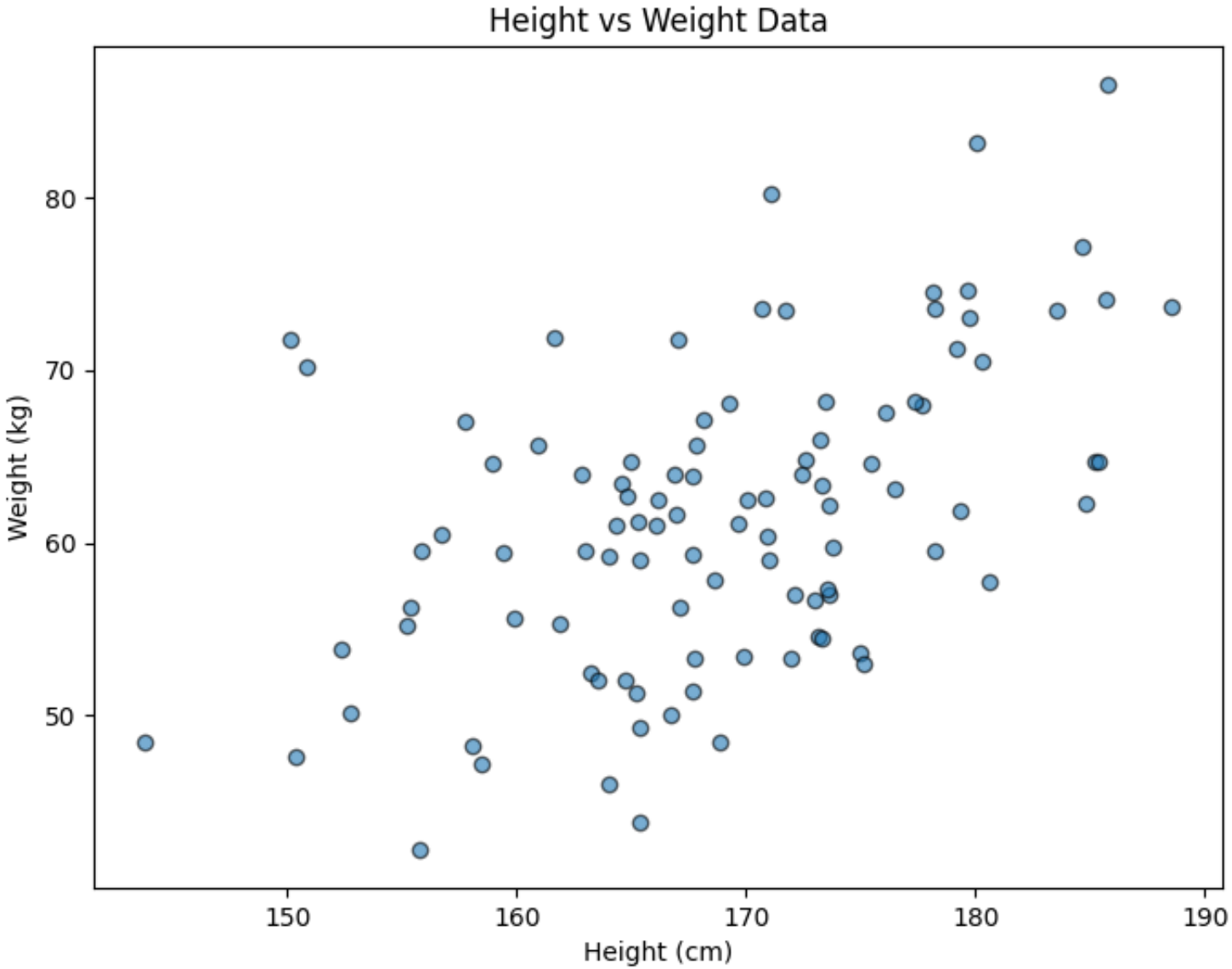
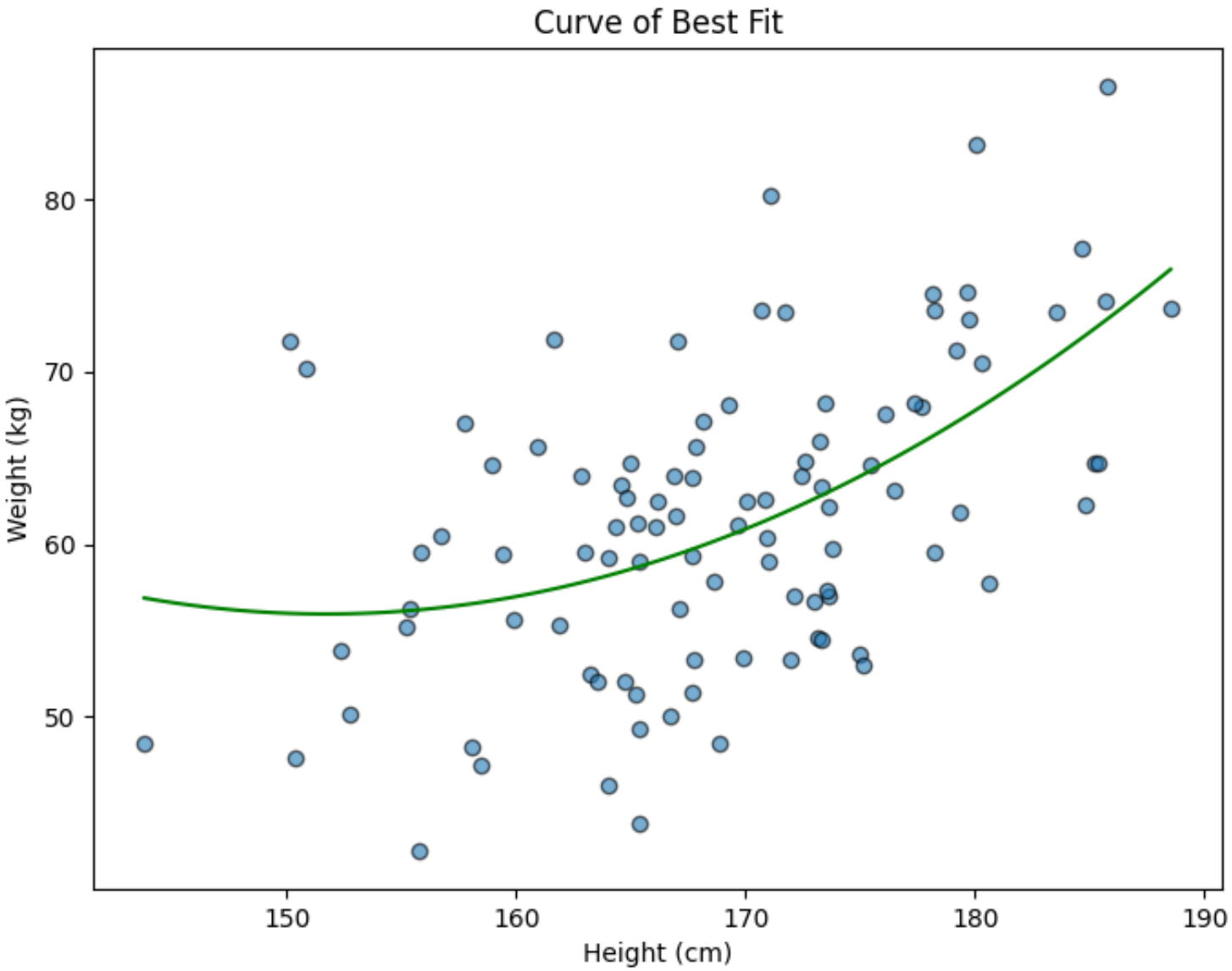
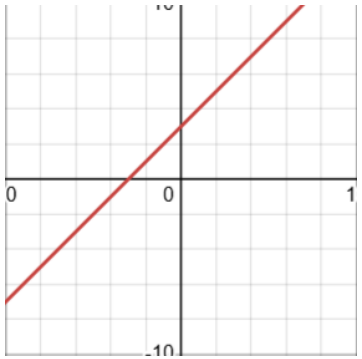




Types of Regression Algorithms

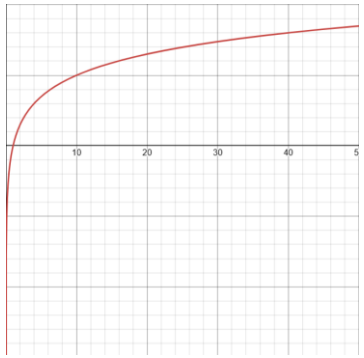
Regression algorithms are usually named after the type of line/curve used.



Linear Regression

A straight line with no curves.
Represents data that grows/decays at a steady rate.

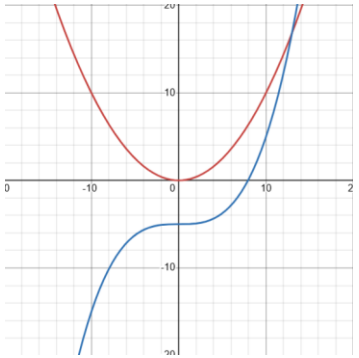
$$y = mx + c$$



Logarithmic Regression

A curve with initially rapid growth/decay that levels off.
Represents data that has rapid initial change that flattens/plateaus.

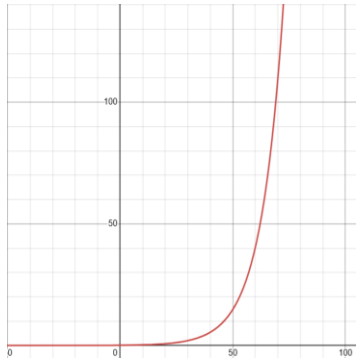
$$y = a + b(log(x))$$



Polynomial Regression

A curve. Represents data that grows/decays at a varied rate.

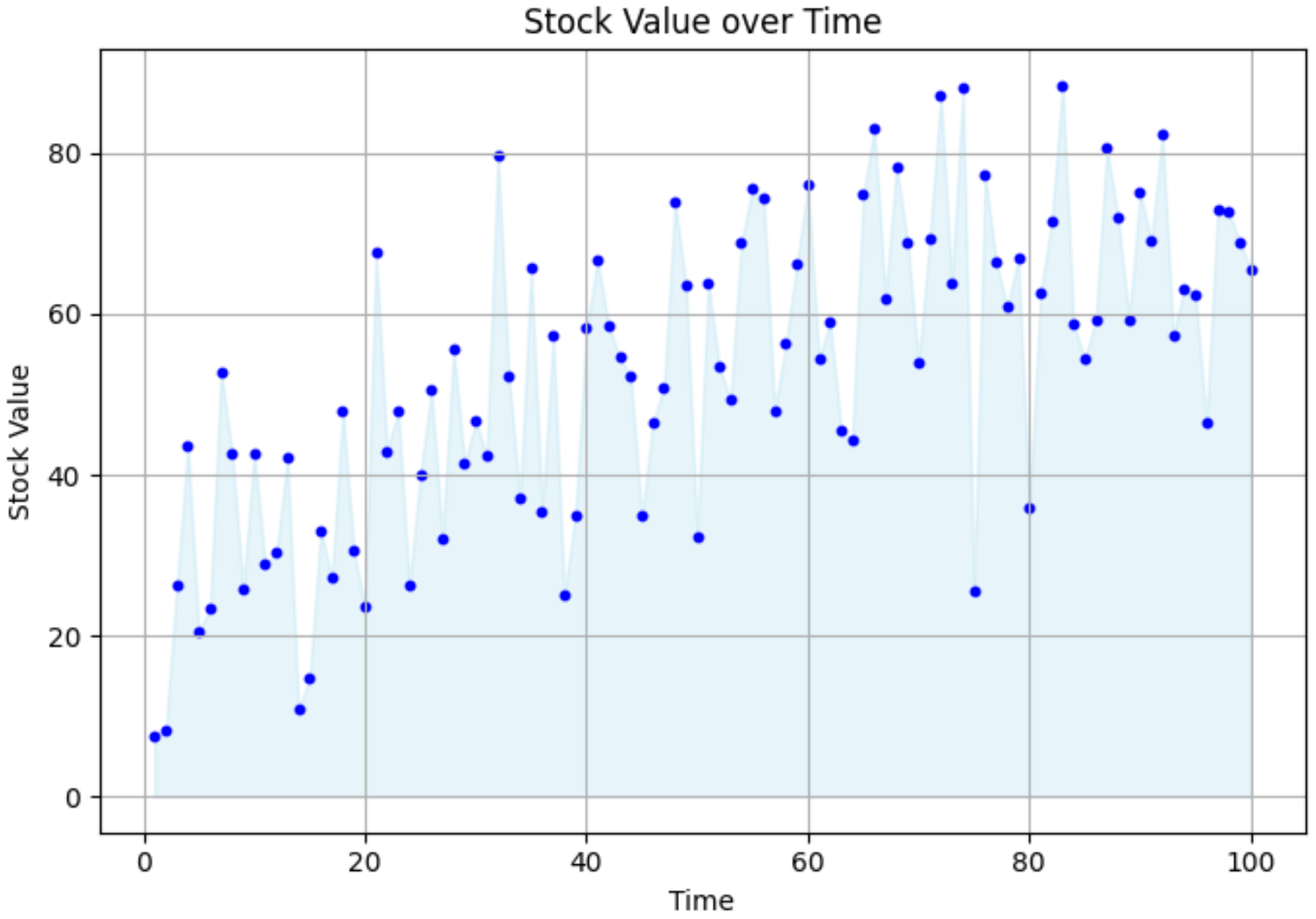
$$y = a + bx + cx^2 + dx^3 + \cdots$$

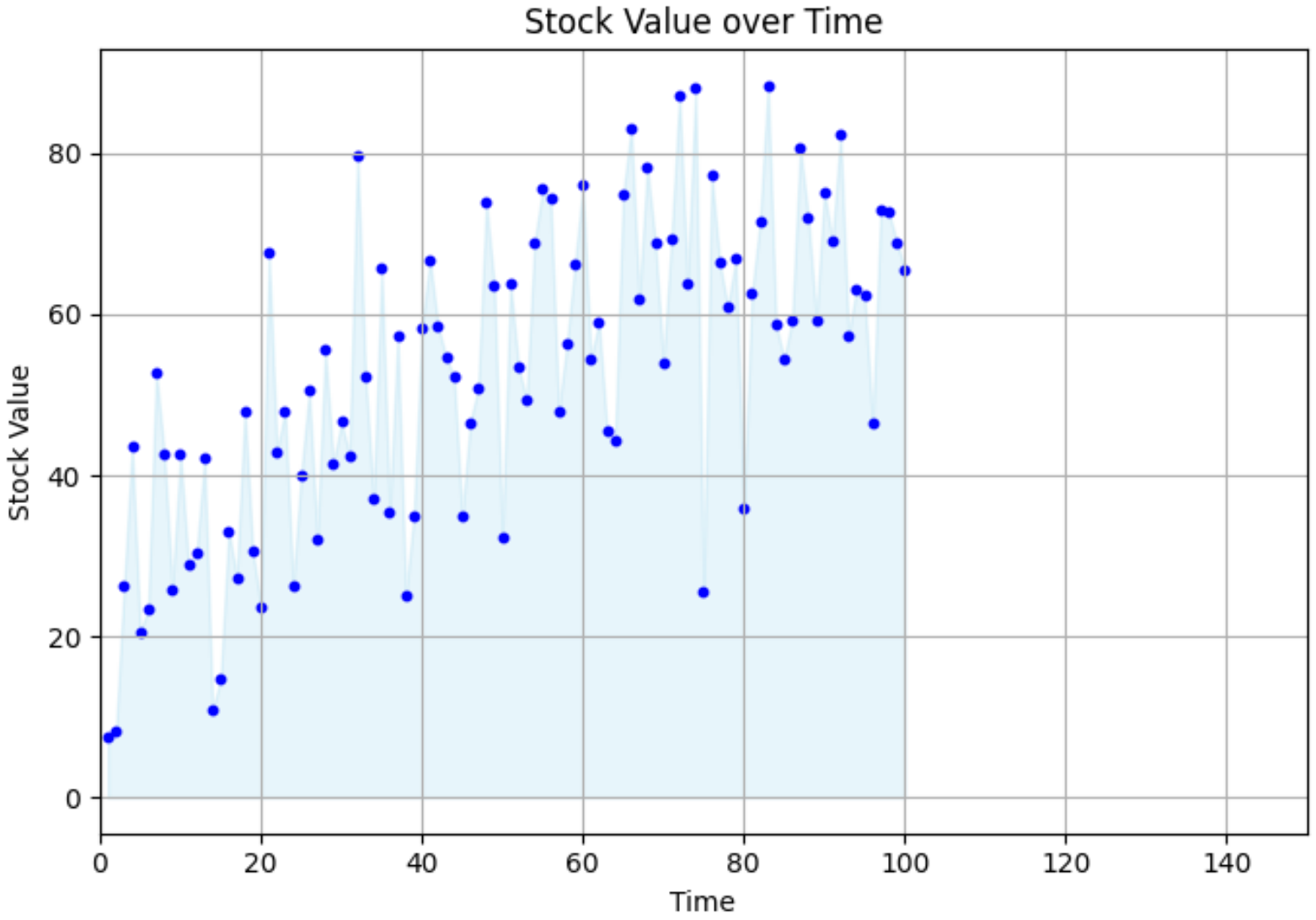


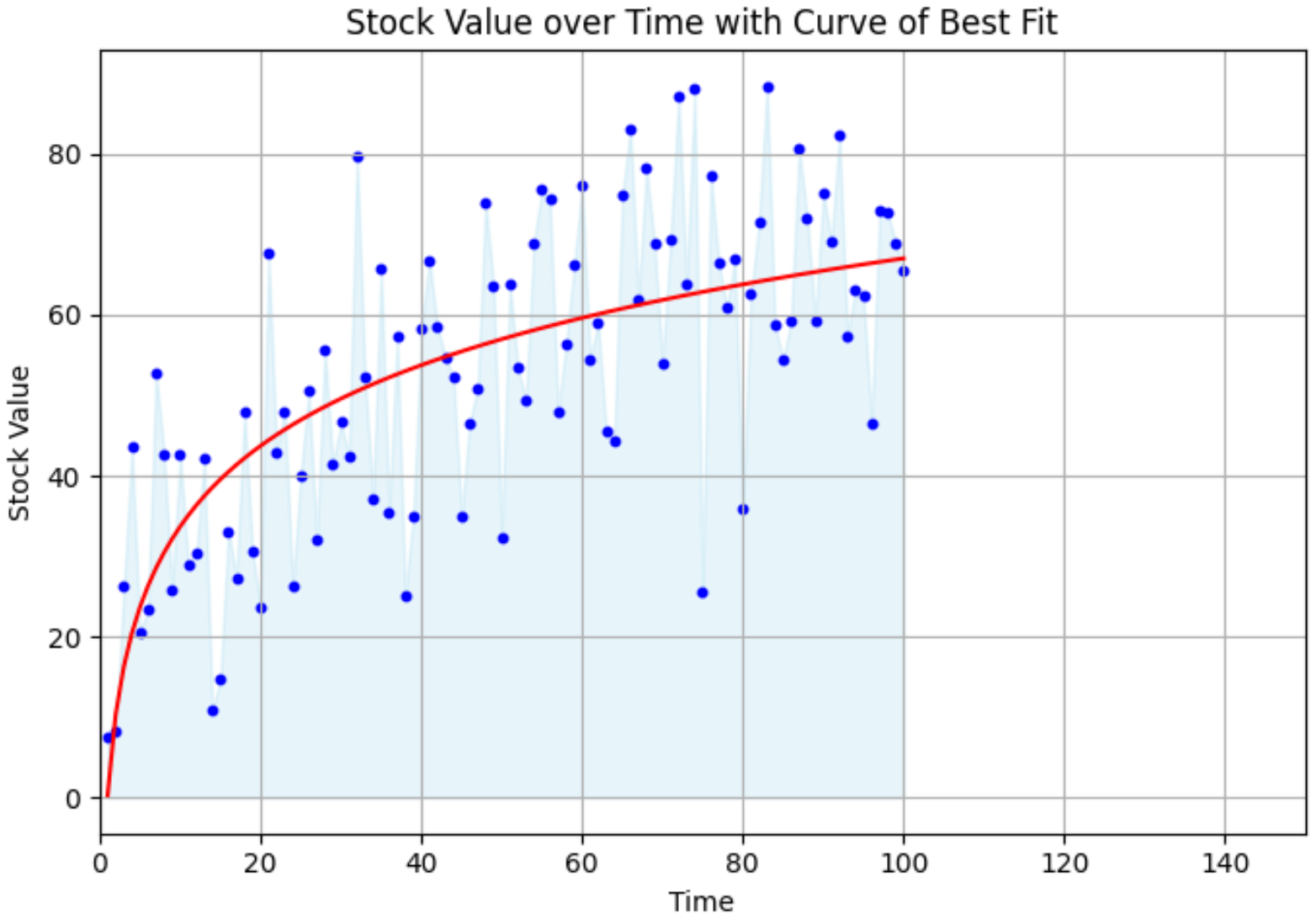
Exponential Regression

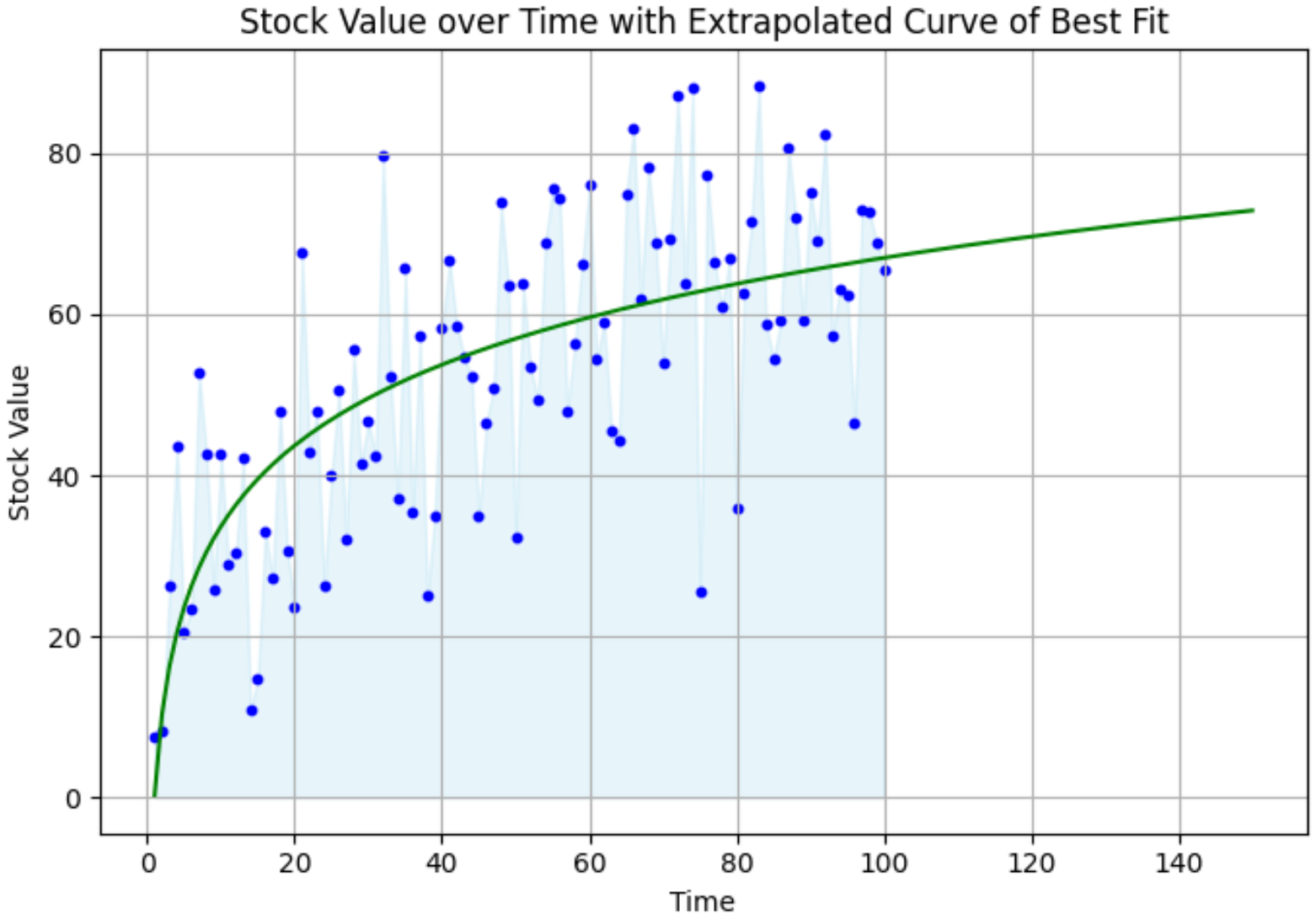
A curve with initially slow growth/decay that speeds up rapidly.
Represents compounding growth/decay.

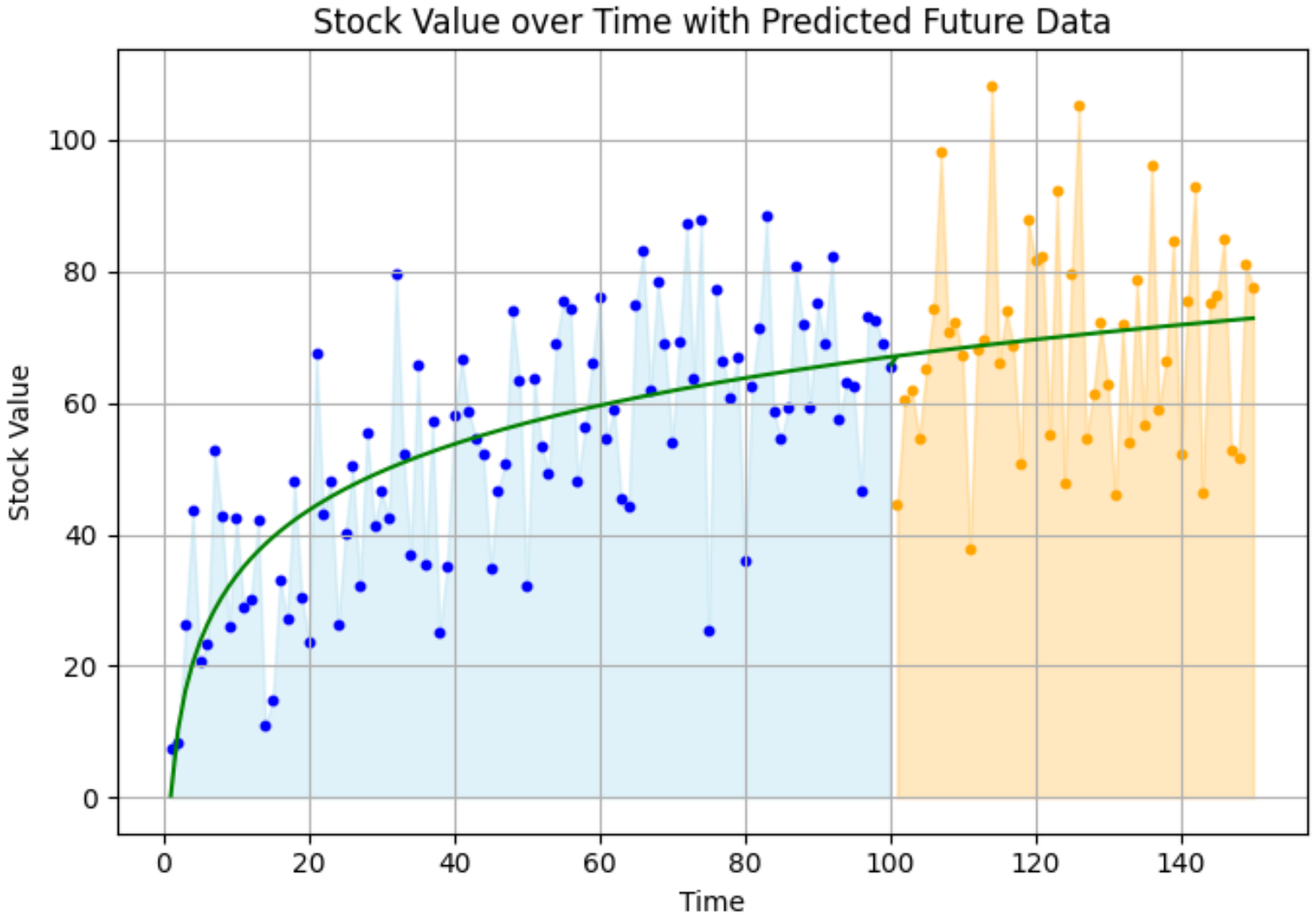
$$y = ae^{bx}$$



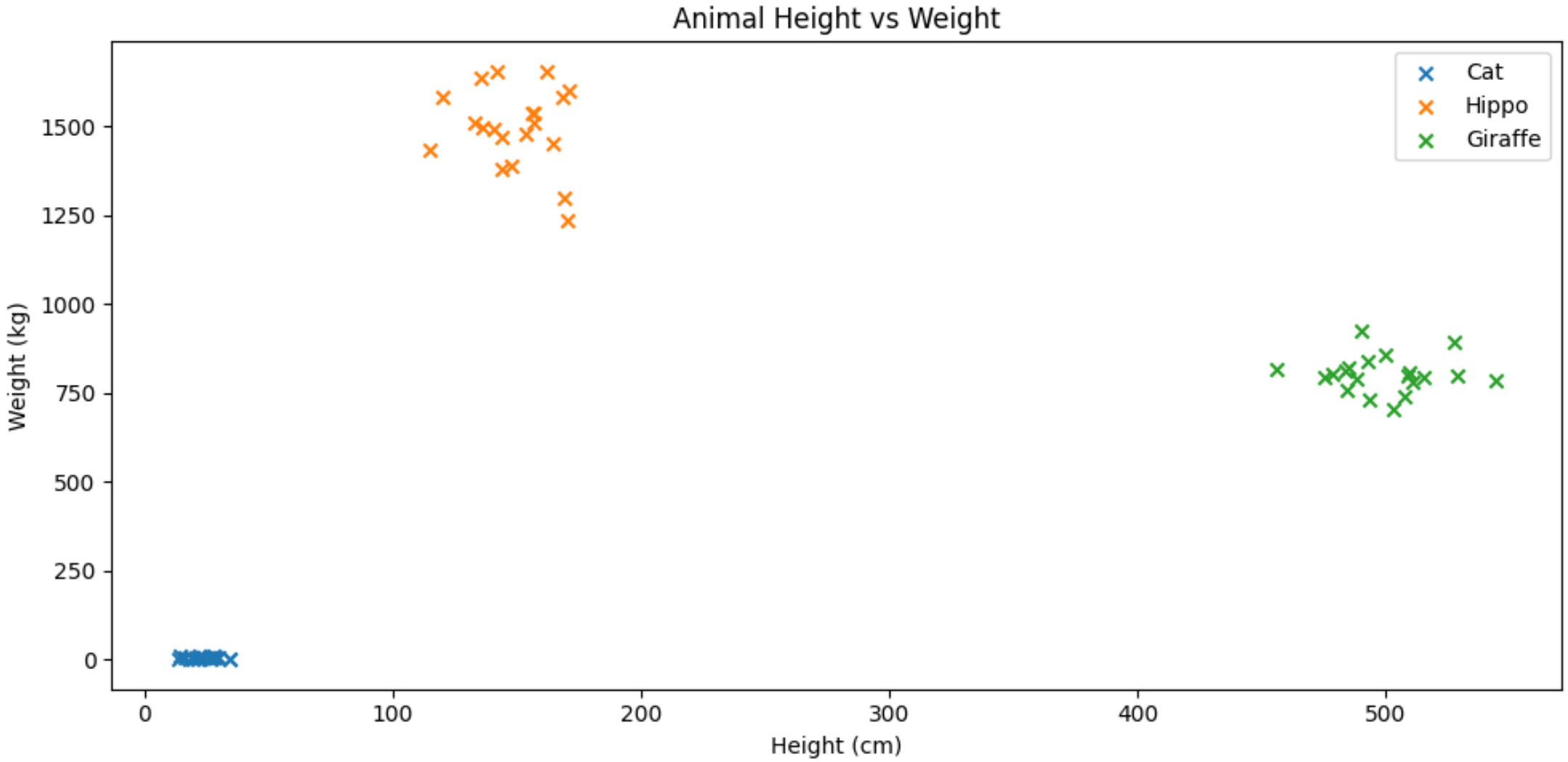


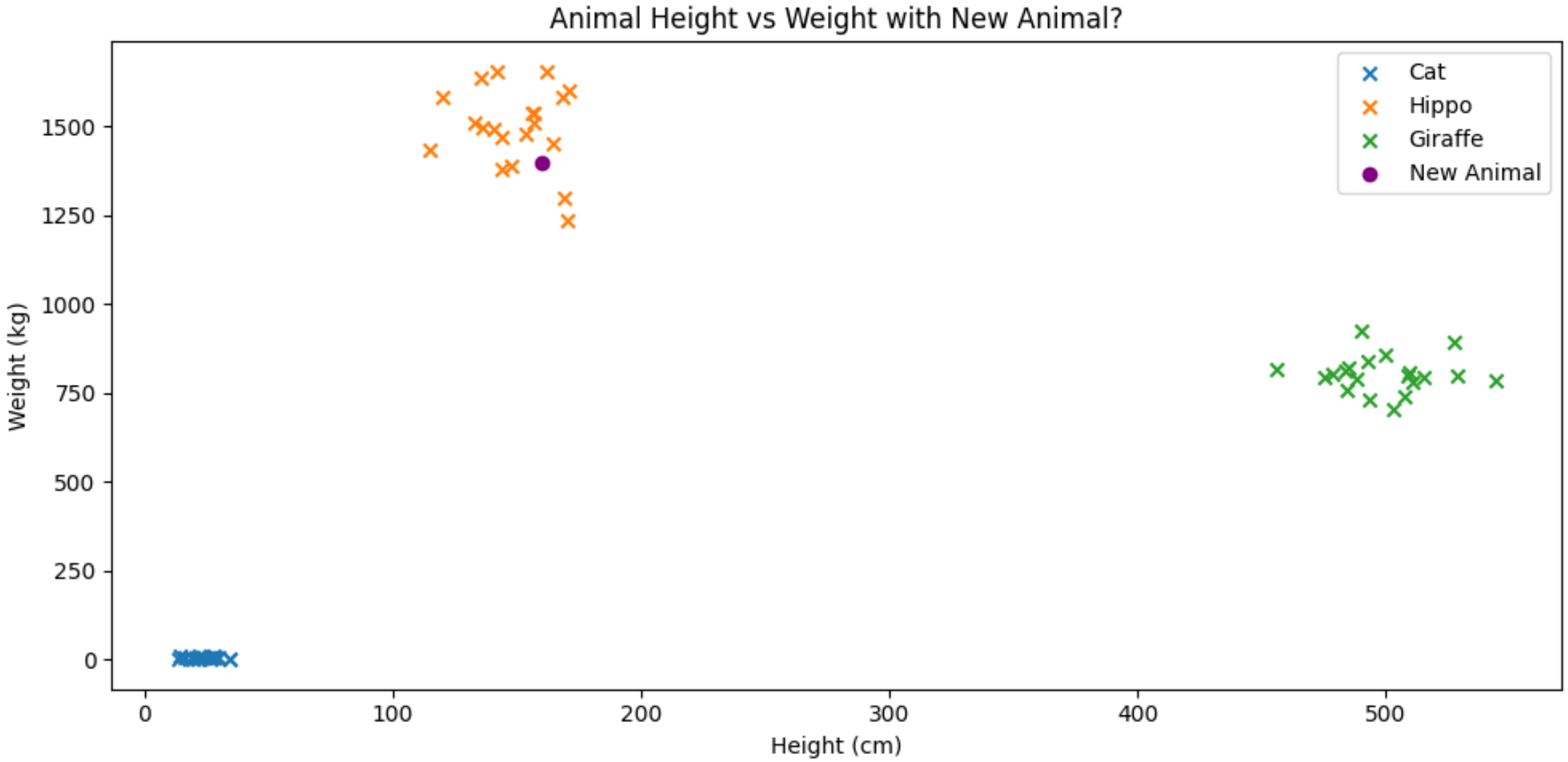


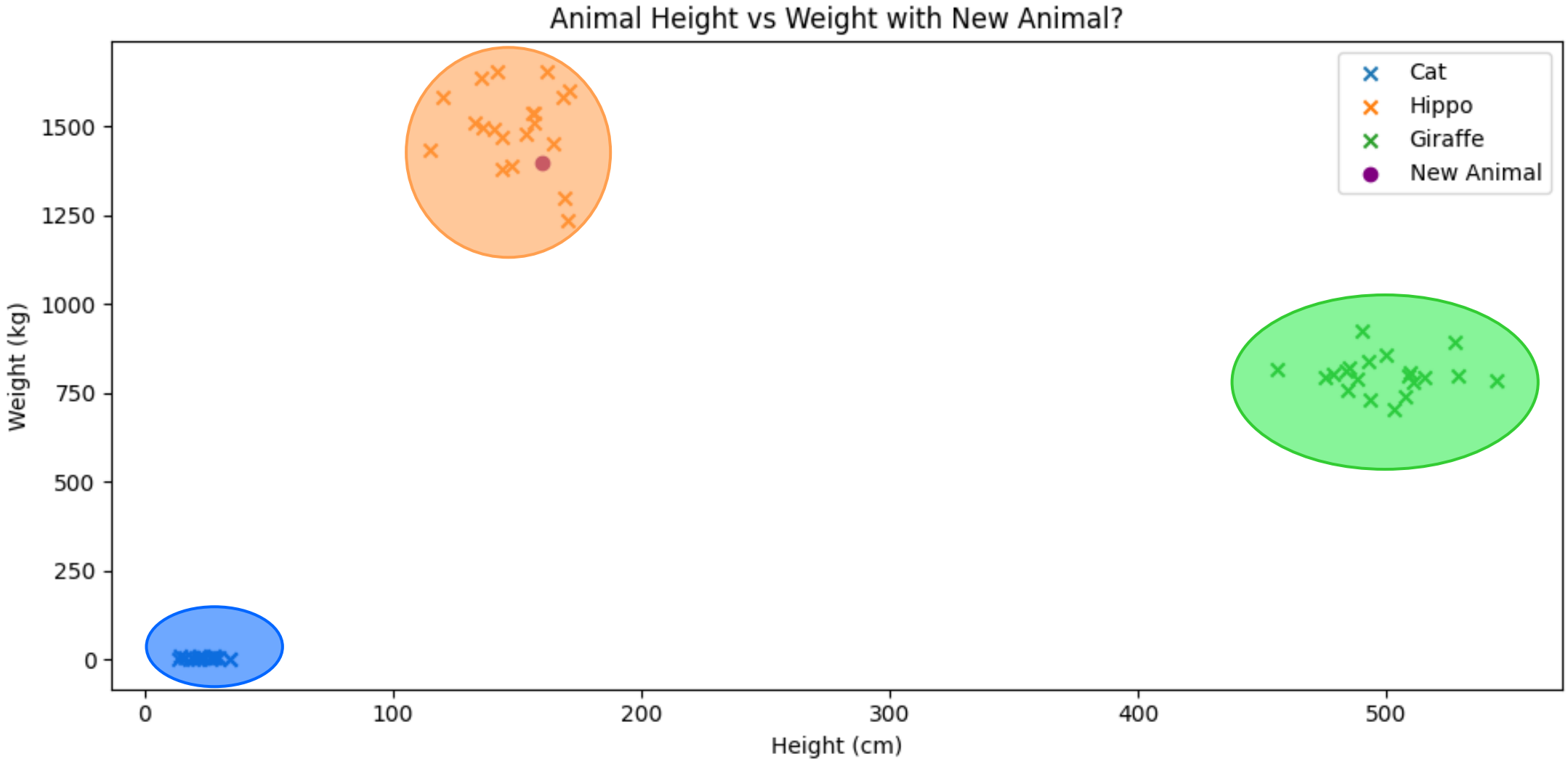




Height (cm)	Weight (kg)	Animal
26.45177363	4.959508326	Cat
500.1534037	857.1411407	Giraffe
169.5109025	1301.243109	Hippo
29.60460837	6.127094055	Cat
170.6199904	1238.02549	Hippo
147.6870344	1389.366503	Hippo
484.9472887	820.2025428	Giraffe
515.398023	796.2777042	Giraffe
153.4273656	1481.434102	Hippo
143.9779261	1380.379338	Hippo
23.59507975	3.366851826	Cat
488.2367554	790.3819518	Giraffe
493.4098434	729.2314629	Giraffe
456.0945516	815.0773671	Giraffe
510.7133771	778.9677339	Giraffe
22.21949384	3.194880163	Cat
484.1071939	812.8775195	Giraffe
143.8157525	1470.099265	Hippo
475.7451919	791.9357144	Giraffe
22.18315368	3.19808393	Cat
22.20562148	10.55683455	Cat
120.4295602	1581.252582	Hippo



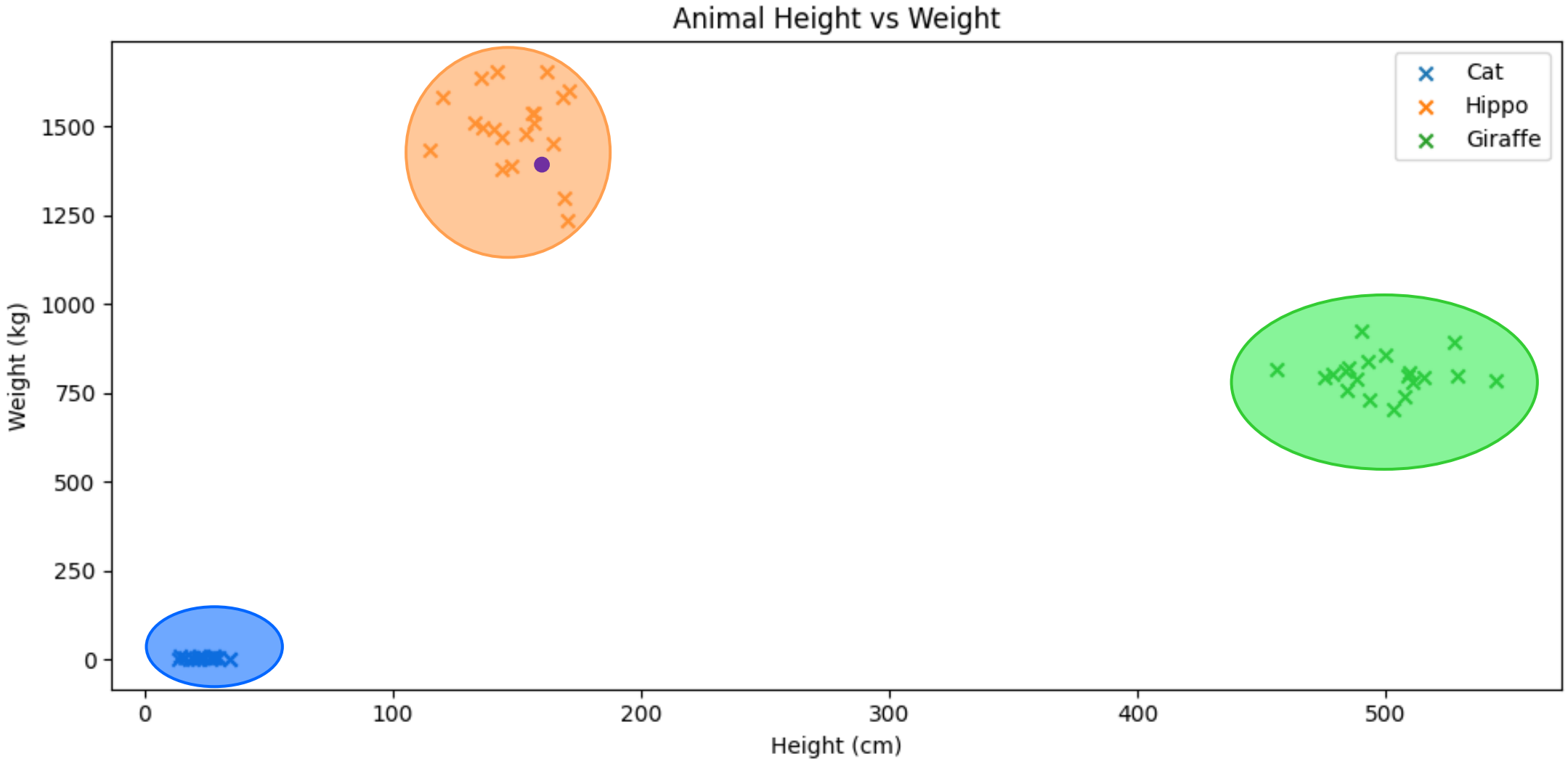


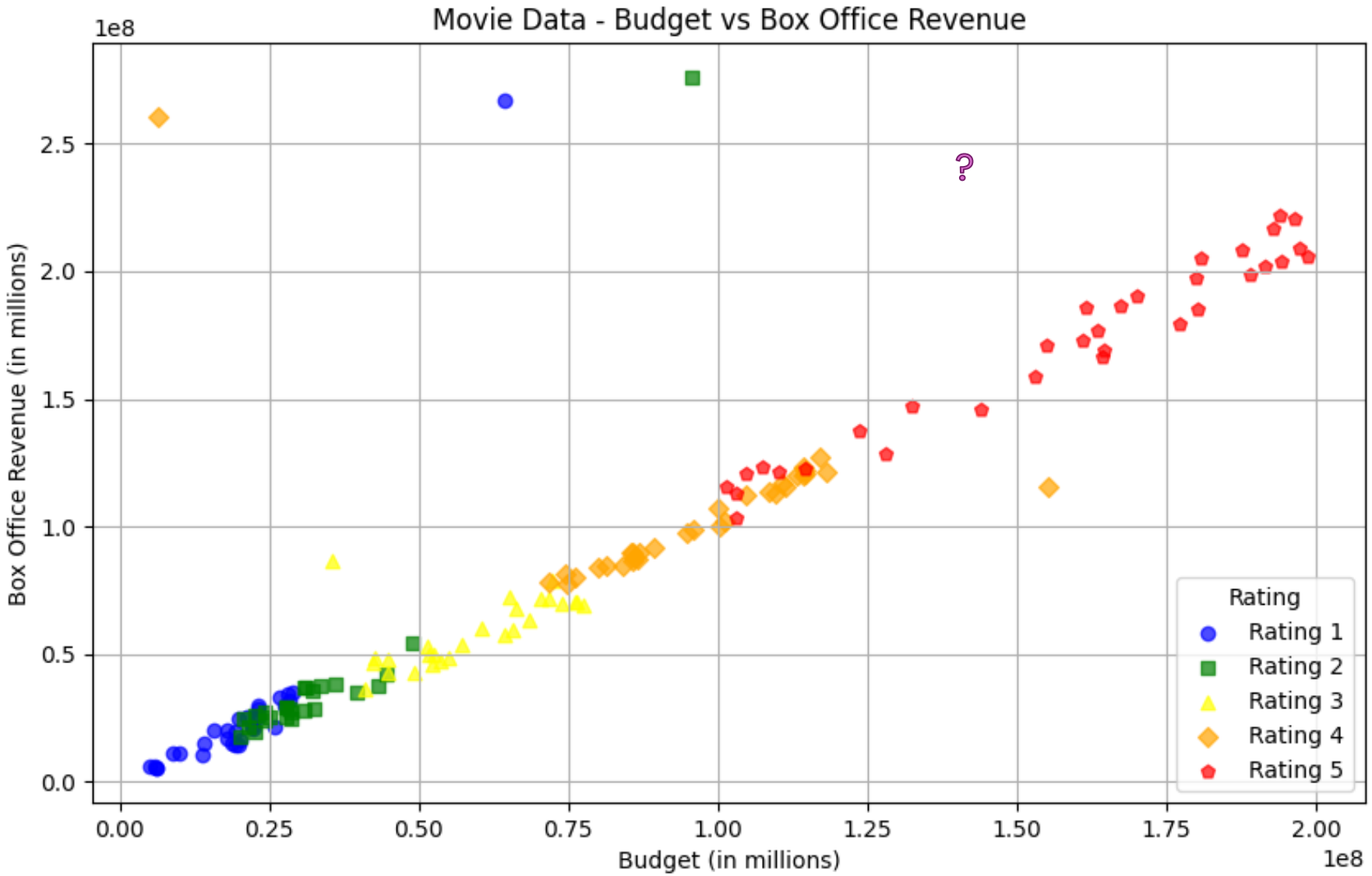


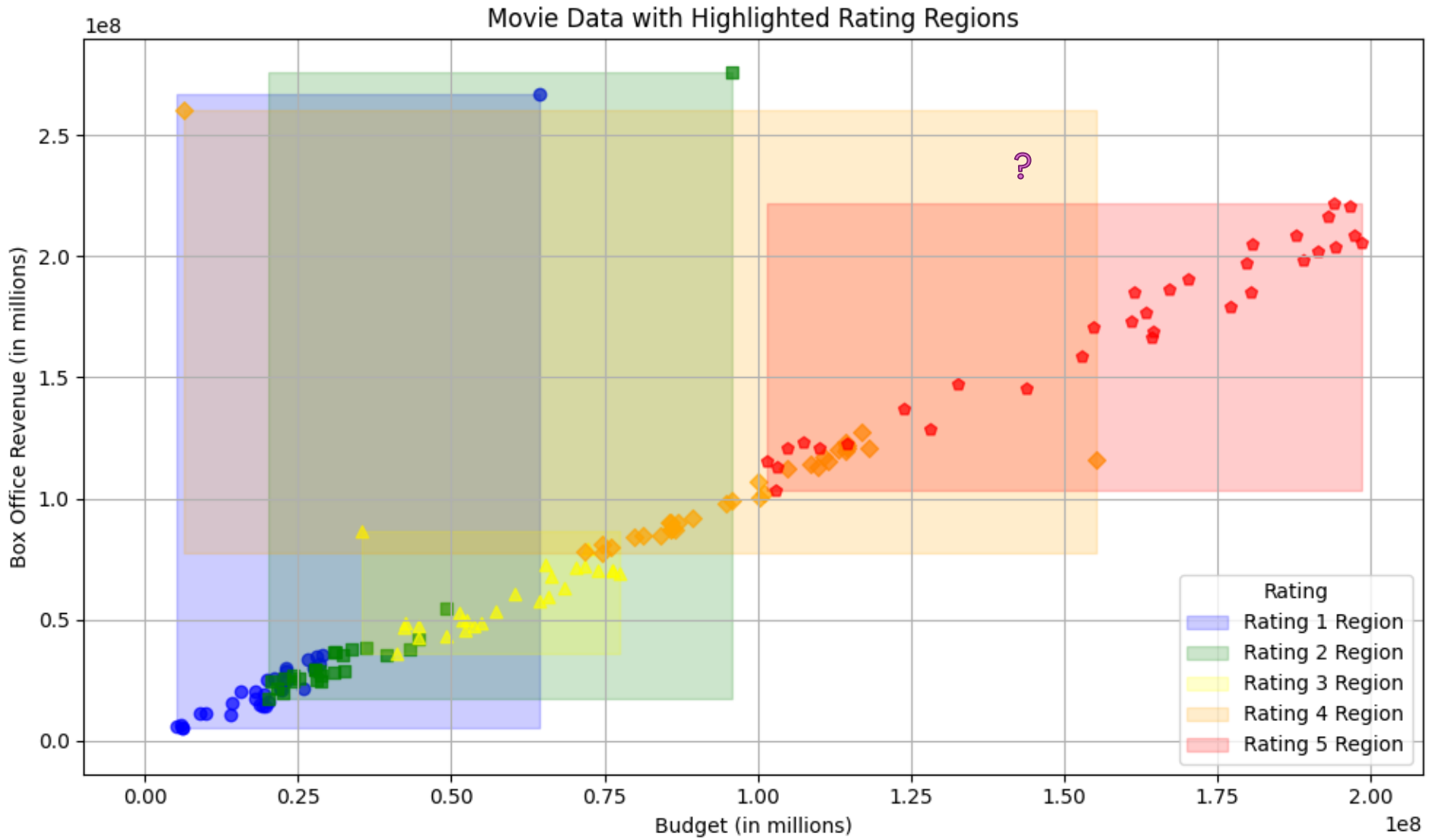
Classification Algorithms

- Multiple features
- One label

- Identifies common attributes among given categories to predict the category when the attributes take unseen values.







Machine Learning (ML) finds patterns to make inferences.

Regression predicts continuous numerical data by finding trends.

Classification predicts discrete classes by finding patterns among common data points.

@hamdivazim

Thanks for reading!

Check out the video at https://youtube.com/@hamdivazim!

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