

The background is a gradient from deep red at the top to dark blue at the bottom, speckled with white dots resembling stars. Overlaid on this are several faint, white circular patterns. Some are solid lines, while others are dashed. Some circles have arrows indicating a clockwise direction. One large circle on the left has a scale with numbers from 140 to 260 in increments of 10, arranged in a semi-circle. Other smaller circles are scattered across the frame, some with partial arcs or arrows.

# IN DEPTH MACHINE LEARNING

WITH PYTHON

# AIM OF THE CLASS

- 1.A quick revision
- 2.Newton's Method
- 3.Binary classification
- 4.Likelihood
- 5.Multinomial Classification
- 6.Softmax Multivariable Classification
- 7.Weight Decay

# TERMINOLOGY:

- 1. Training Set:  $\mathcal{D} = \{(x_i, y_i)\}_{i=1}^n$
- 2. Fitting Parameter :  $\theta$
- 3. Hypothesis function :  $h_{\theta}(x)$
- 4. Cost Function :  $J(\theta)$
- 5. Learning Rate :  $\alpha$

# A QUICK REVISION

- 1.Linear Regression(Theory)
- 2.Optimising Techniques :
  - a. Batch Gradient Decent(Theory)
  - b. Stochastic Gradient Decent(Theory)
  - c. Normal Equation(Theory)
- 3. Locally Weighted Regression(Theory)
- 4. Feature Engineering



# NEWTONS METHOD

- A faster way to converge.....

# BINARY CLASSIFICATION

- WHERE?
- HOW?
- Linear Classification
- Non-Linear Classification(We will see later in the slide)

# LIKELIHOOD

- Going into probability.....
- Against the cost

# USING LINEAR AND NON LINEAR MODELS

- Feature Engineering



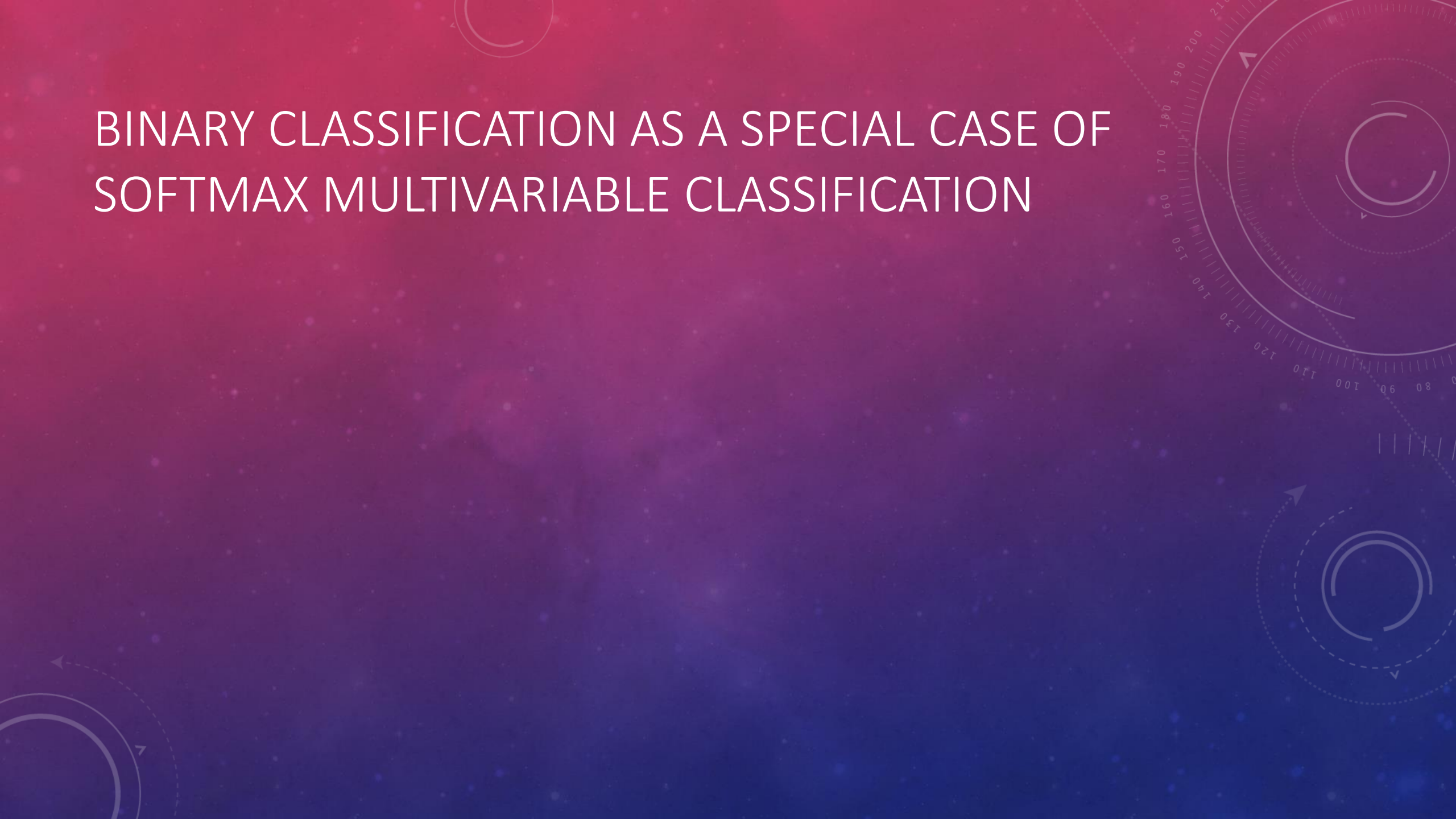
# MULTINOMIAL CLASSIFIER

- Use k different Classifier for k Class Output
- When to use???
- Do I really need k classifier???

# SOFTMAX CLASSIFICATION

- A better classification technique than K different Classifier if the data is explicit.
- Properties of Softmax Classifier

# BINARY CLASSIFICATION AS A SPECIAL CASE OF SOFTMAX MULTIVARIABLE CLASSIFICATION



# WEIGHT DECAY

- To avoid overfitting.....



CODES

