Neural Networks

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What is a Deep Neural Network

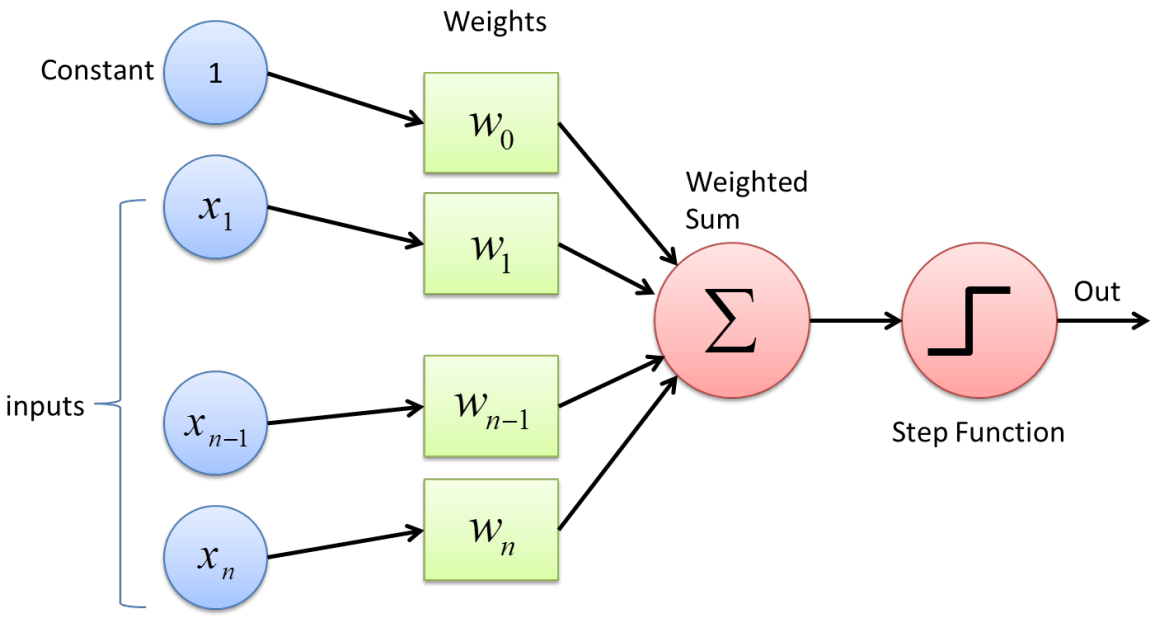
- Computers learn to process data in a way that mimics the human brain.
- Neural networks are made of layered neurons
- Can work with a large volume of data

Examples of the Use of Neural Networks

- Computer Vision
  - Facial Recognition
  - Object Detection
- Speech Recognition
  - Amazon Alexa
  - Voice Transcription
- Natural Language Processing

How Do Neural Networks Work

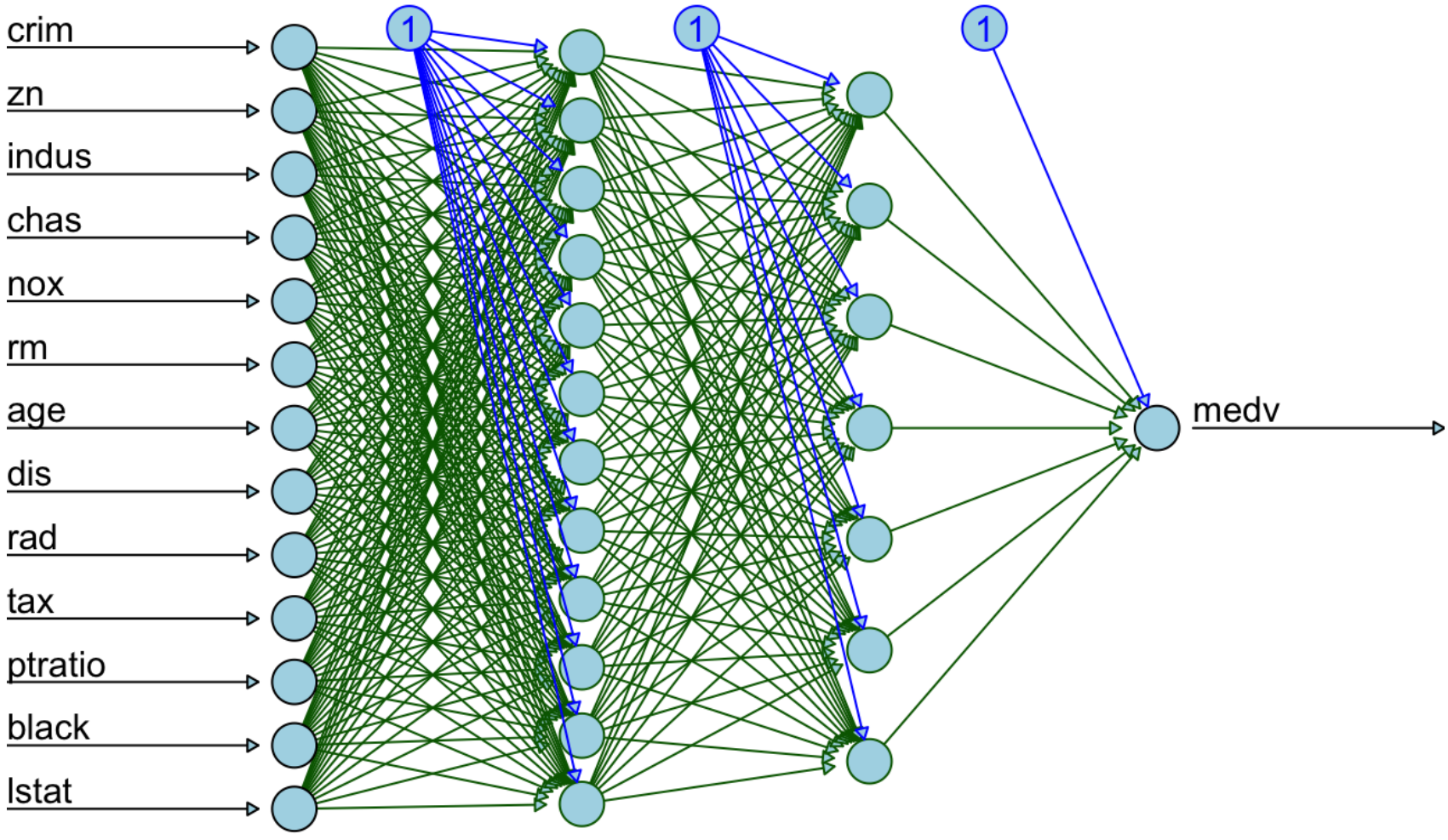
1. Input
2. Hidden Layers
3. Output Layer



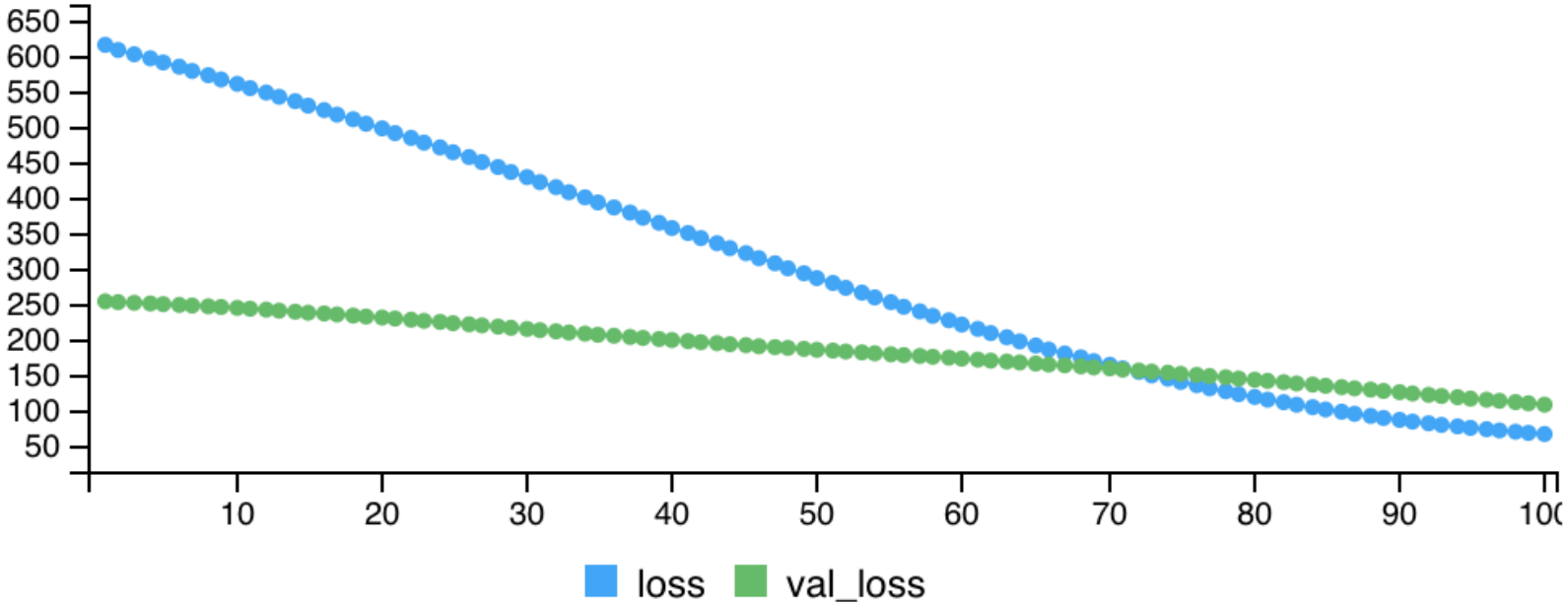
Boston: Predicting Median Value of Owner Occupied Homes

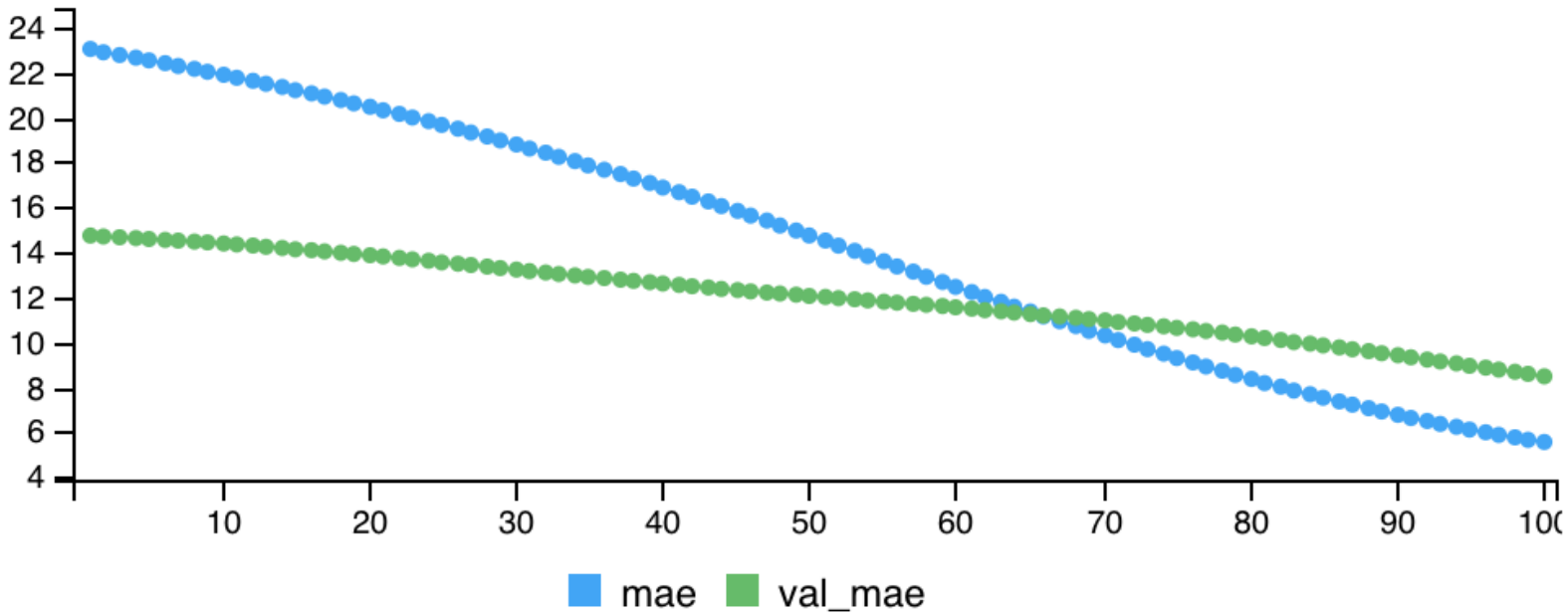
- 14 Features, including the outcome variable
- 506 Rows
- keras_model_sequential
- Mean Squared Error loss function
- Training for 100 epochs

Visual of Neural Network on the Boston Dataset



Training a Neural Network





Calculated Results on the Test Set

```
model %>% evaluate(test, testtarget)
```

```
##      loss       mae
## 232.7746  13.0197
```

```
pred <- model %>% predict(test)
paste("Mean Squared Error: ", mean((testtarget-pred)^2))
```

```
## [1] "Mean Squared Error:  232.774568775009"
```

Predicted Value vs Actual Value