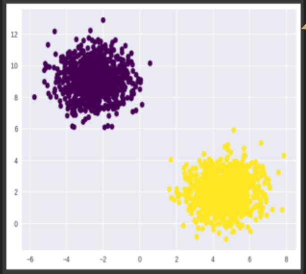
```
X,y =make_blobs(n_samples=2000,n_features=2,centers=2,random_state=42)
```

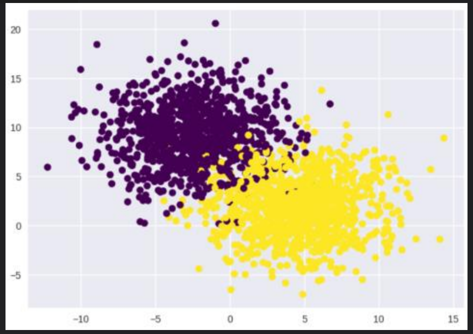
or



```
def visualise(X,y):
  plt.scatter(X[:,0],X[:,1],c=y,cmap="viridis")
  plt.show()
```

```
visualise(X,y)
```

or




```
X,y =make_blobs(n_samples=2000,n_features=2,cluster_std=3,centers=2,random_state=42)
```

D
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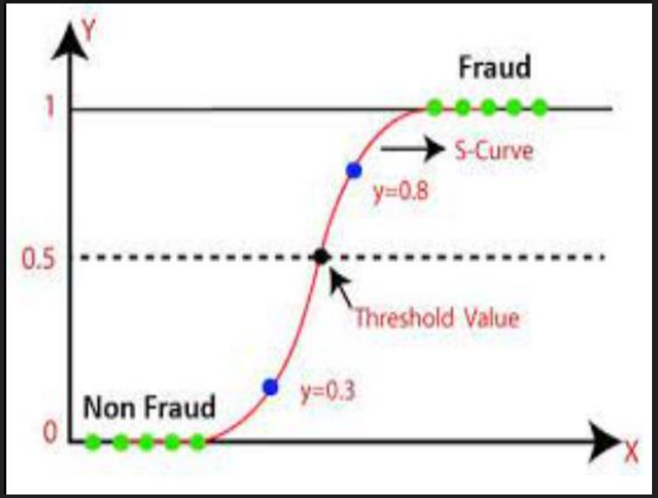
```
#model
def sigmoid(x):
  return 1/(1+np.exp(-x))


x=np.linspace(-10,10,20)
print(x)

plt.plot(x,sigmoid(x))
plt.show()
```



METHODOLOGY

We'll solve this problem using Logistic regression

If z represents the output of the linear layer of a model trained with logistic regression, then $sigmoid(z)$ will yield a value (a probability) between 0 and 1. In mathematical terms:

$$y' = \frac{1}{1+e^{-z}}$$

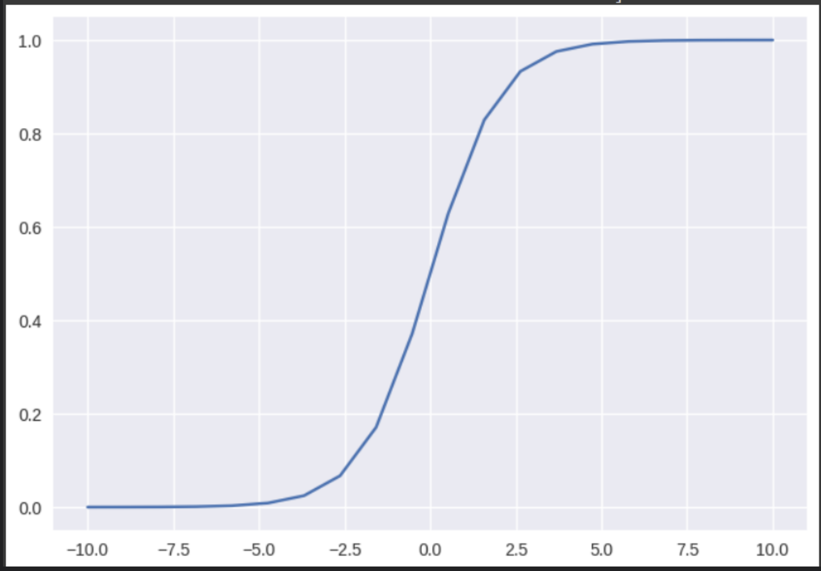
where:

- y' is the output of the logistic regression model for a particular example.
- $z = b + w_1x_1 + w_2x_2 + \ldots + w_Nx_N$
  - The w values are the model's learned weights, and b is the bias.
  - The x values are the feature values for a particular example.

Note that z is also referred to as the *log-odds* because the inverse of the sigmoid states that z can be defined as the log of the probability of the 1 label (e.g., "dog barks") divided by the probability of the 0 label (e.g., "dog doesn't bark"):

$$z = \log\left(\frac{y}{1-y}\right)$$

```
[-10.         -8.94736842  -7.89473684  -6.84210526  -5.78947368
  -4.73684211  -3.68421053  -2.63157895  -1.57894737  -0.52631579
   0.52631579   1.57894737   2.63157895   3.68421053   4.73684211
   5.78947368   6.84210526   7.89473684   8.94736842  10.        ]
```



SOCIETAL IMPACT/ NOVELTY

1. **Deterrence and Prevention:** Fraud detection systems act as a deterrent to potential fraudsters. Knowing that their activities are being monitored and swiftly detected, individuals with malicious intent are less likely to engage in fraudulent behavior. This helps maintain the integrity of financial systems and markets.
2. **Efficient Resource Allocation:** Fraud detection systems streamline the process of identifying and investigating fraudulent activities, enabling efficient allocation of resources to genuine transactions and legitimate activities. By reducing the time and effort required for manual fraud investigations, these systems free up resources that can be utilized for societal development, such as improving public services, infrastructure, healthcare, or education.

FUTURE SCOPE

1. **ENHANCED TRUST AND CONFIDENCE:** Fraud can erode trust and confidence in financial institutions, e-commerce platforms, and other systems that involve transactions. Organizations can demonstrate their commitment to security and protect their customers' interests by implementing effective fraud detection systems. This, in turn, fosters trust and confidence in society, encouraging individuals and businesses to participate in economic activities without the fear of falling victim to fraud.

2. **REDUCED FINANCIAL LOSSES:** Fraud detection systems have a significant societal impact by mitigating financial losses for individuals, businesses, and governments. By minimizing financial losses, fraud detection systems help protect individuals' savings, safeguard businesses' assets, and reduce the burden on government resources.

THANK YOU