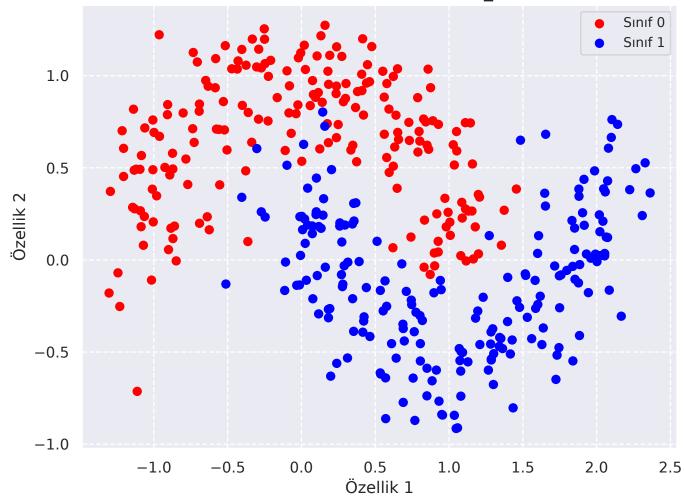
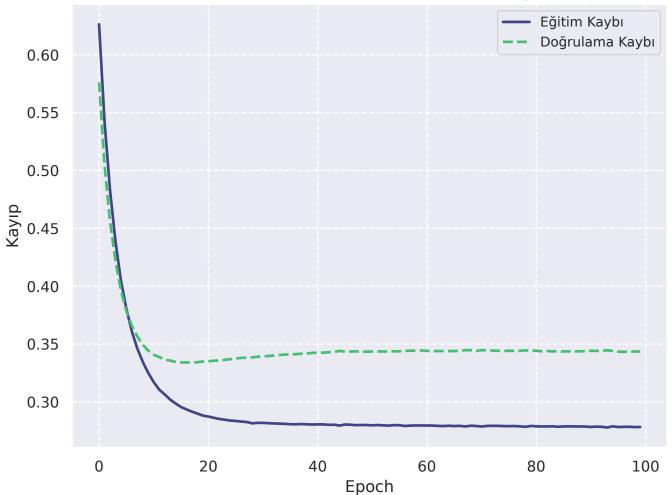
## 1. Veri Kümesi Oluşturma ve Görselleştirme



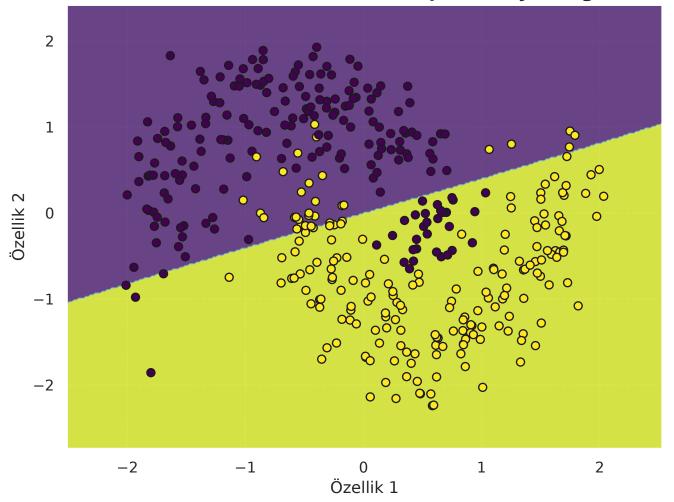


# 2. Yapay Sinir Ağı (YSA) Modelleri

YSA - Gizli katmanlar: [10], Optimizasyon: sgd



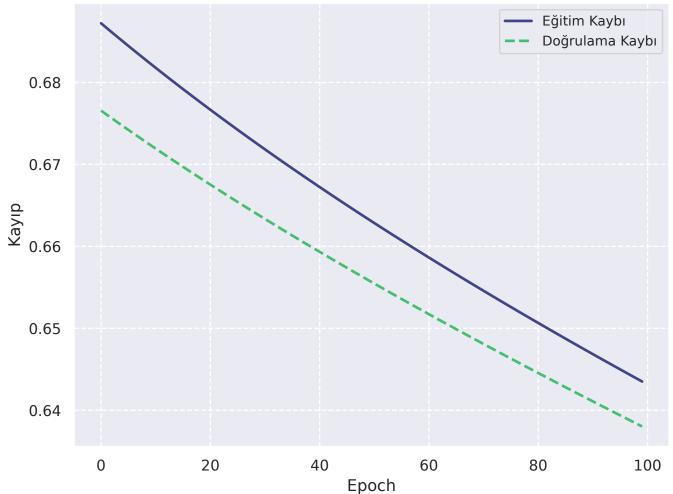
YSA - Gizli katmanlar: [10], Optimizasyon: sgd



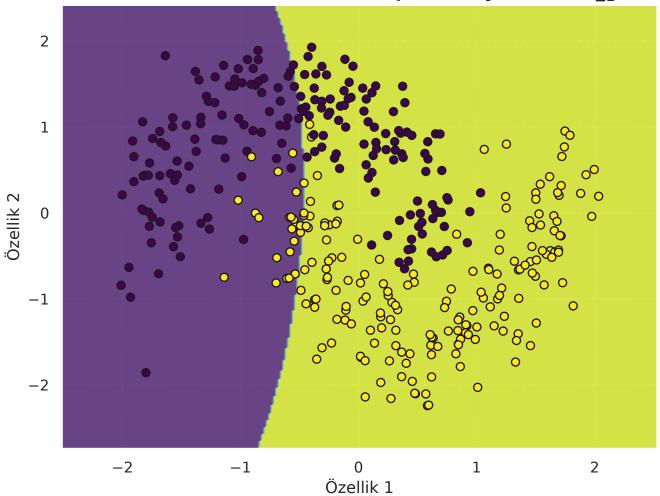
	YS <i>A</i>	A - Gizli katmanlar: [10], Optimizasyon: sgd -		
—— [0m	[1m0s [0m 70ms/step		[1m8/8 [0m	[32m-
[0m	[1m0s [0m 36ms/step	Eğitim Seti Confusion Matrix:  [[101 19]  [ 16 104]]  Eğitim Seti Accuracy: 0.8542  Eğitim Seti Precision: 0.8455  Eğitim Seti Recall: 0.8667  Eğitim Seti F1-Score: 0.8560	[1m3/3 [0m	[32m-
— <u> </u>	Timos form soms/steb		[1110] 5/51111	
[0	[1m000 [0mm ]Fmon/ets-	Doğrulama Seti Confusion Matrix: [[30 7] [ 7 36]] Doğrulama Seti Accuracy: 0.8250 Doğrulama Seti Precision: 0.8372 Doğrulama Seti Recall: 0.8372 Doğrulama Seti F1-Score: 0.8372	[1m2/2 [0m-	[22]
[UM	[1m0s [0m 25ms/step		[1m3/3 [0m	[32m-
		Test Seti Confusion Matrix: [[35 8] [ 8 29]] Test Seti Accuracy: 0.8000 Test Seti Precision: 0.7838 Test Seti Recall: 0.7838		

Test Seti F1-Score: 0.7838

YSA - Gizli katmanlar: [10], Optimizasyon: batch\_gd

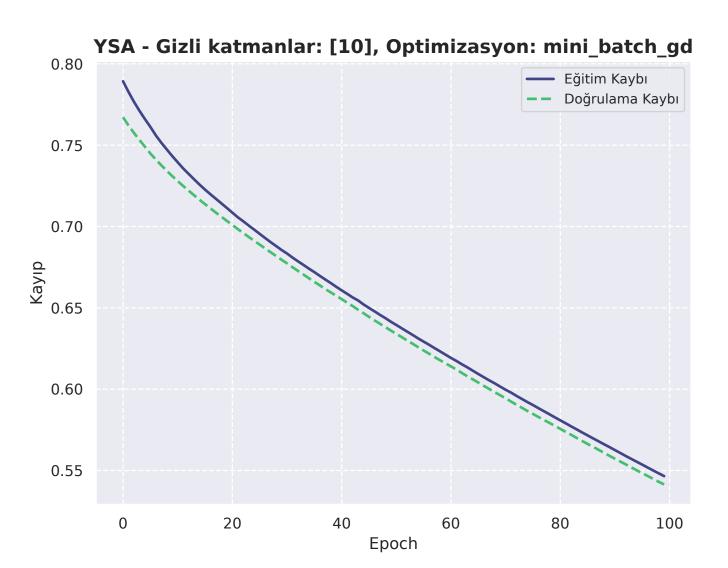


YSA - Gizli katmanlar: [10], Optimizasyon: batch\_gd

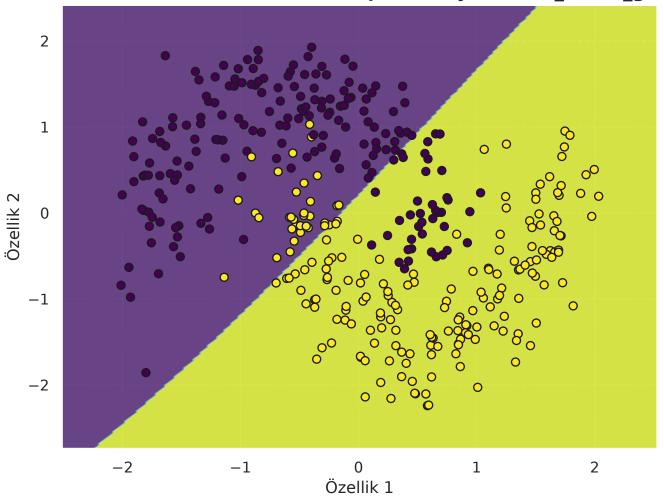


10		Gizli katmanlar: [10], Optimizasyon: batch		122
[0m	[1m0s [0m 34ms/step		[1m8/8 [0m	[32m-
[0m	[1m0s [0m 20ms/stan	Eğitim Seti Confusion Matrix: [[ 58 62] [ 13 107]] Eğitim Seti Accuracy: 0.6875 Eğitim Seti Precision: 0.6331 Eğitim Seti Recall: 0.8917 Eğitim Seti F1-Score: 0.7405	[1m2/2 [0m	[22m_
[0m	[1m0s [0m 30ms/step		[1m3/3 [0m	[32m-
[0m	[1m0s [0m 32ms/stan	Doğrulama Seti Confusion Matrix:  [[16 21]	[1m3/3 [0m	[32m
[0111	[1m0s [0m 32ms/step		[1110] 5/61111]	[32111
		Test Seti Confusion Matrix: [[23 20] [ 6 31]] Test Seti Accuracy: 0.6750 Test Seti Precision: 0.6078		

Test Seti Recall: 0.8378 Test Seti F1-Score: 0.7045



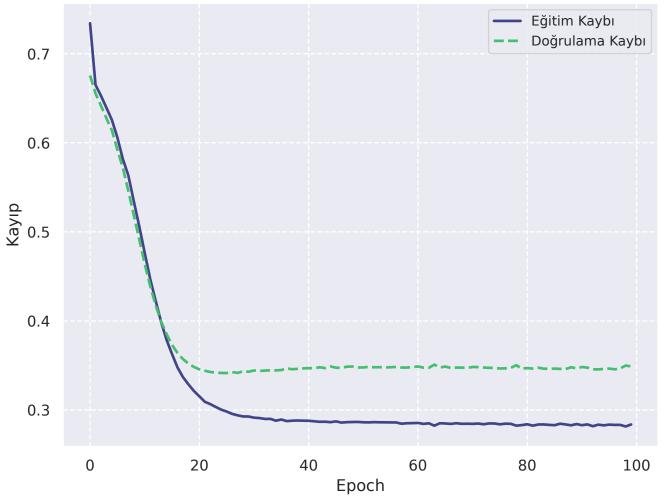
YSA - Gizli katmanlar: [10], Optimizasyon: mini\_batch\_gd



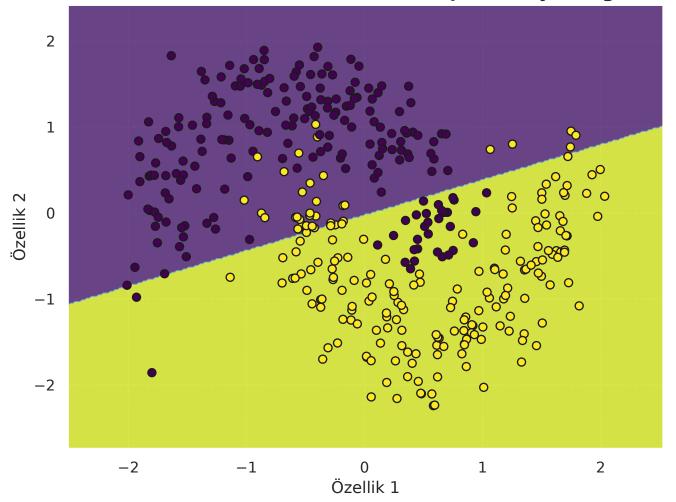
[0m	[1m0c		li katmanlar: [10], Optimizasyon: mini_batc		m01	[22m_
	LTIIIOS	[0m 30ms/step		[1m8/8	נוווטן	
	[1,000	IOm 22ms/ster	Eğitim Seti Confusion Matrix: [[ 96 24] [ 19 101]] Eğitim Seti Accuracy: 0.8208 Eğitim Seti Precision: 0.8080 Eğitim Seti Recall: 0.8417 Eğitim Seti F1-Score: 0.8245	[1m2/2	[0,00	[22m
[0m	[ImUs	[0m 32ms/step		[1m3/3	Įθm	[32m
[0m	[1m0s	[Om 3/ms/sten	Doğrulama Seti Confusion Matrix: [[30 7] [ 6 37]] Doğrulama Seti Accuracy: 0.8375 Doğrulama Seti Precision: 0.8409 Doğrulama Seti Recall: 0.8605 Doğrulama Seti F1-Score: 0.8506	[1m3/3	[Om	[32m
[UM	LTMUS	[0m 34ms/step		[1m3/3	ſnm	[3211]
			Test Seti Confusion Matrix: [[33 10] [ 8 29]] Test Seti Accuracy: 0.7750 Test Seti Precision: 0.7436			

Test Seti Recall: 0.7838 Test Seti F1-Score: 0.7632

YSA - Gizli katmanlar: [10, 10], Optimizasyon: sgd

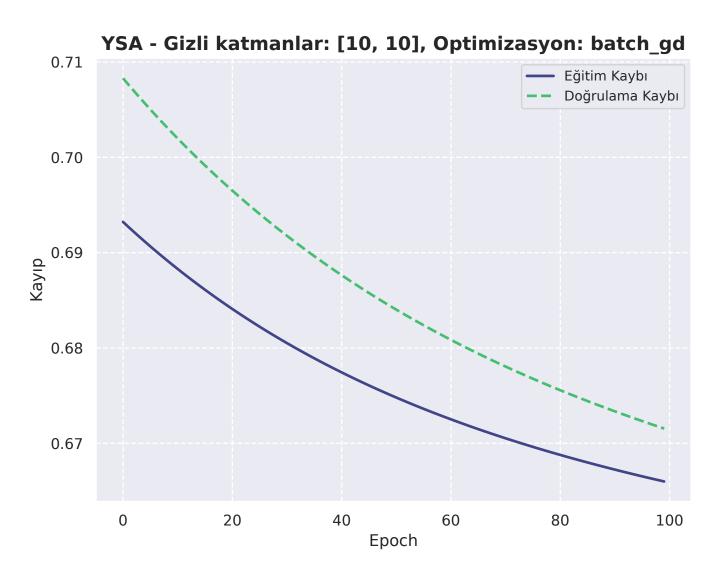


YSA - Gizli katmanlar: [10, 10], Optimizasyon: sgd

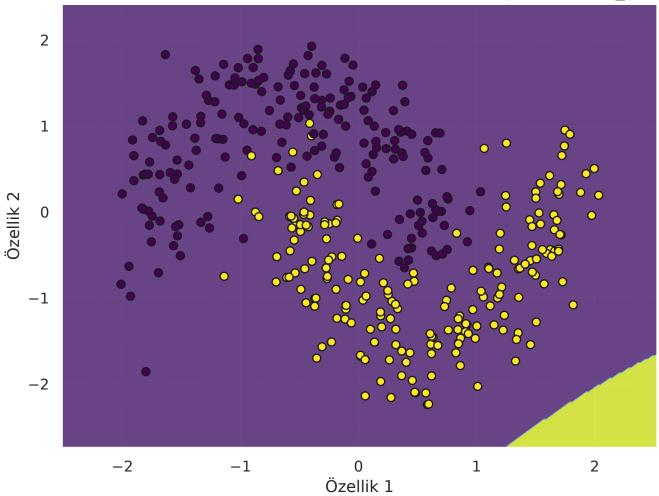


[0m	YSA - [1m0s [0m 21ms/step	Gizli katmanlar: [10, 10], Optimizasyon: sg	d [1m8/8	[0m	[32m
[0111	[111103 [0111 211113/3406]		[11110/0 ]		[32111
[0m	[1m0s [0m 21ms/ston	Eğitim Seti Confusion Matrix:  [[103 17]  [ 17 103]]  Eğitim Seti Accuracy: 0.8583  Eğitim Seti Precision: 0.8583  Eğitim Seti Recall: 0.8583  Eğitim Seti F1-Score: 0.8583	[1m2/2]	[0m	[22m
—— [UM	[1m0s [0m 21ms/step		[1m3/3	Um	[32M-
[0m	[1m0s [0m 19ms/step	Doğrulama Seti Confusion Matrix: [[30 7] [ 7 36]] Doğrulama Seti Accuracy: 0.8250 Doğrulama Seti Precision: 0.8372 Doğrulama Seti Recall: 0.8372 Doğrulama Seti F1-Score: 0.8372	[1m3/3	[Om	[32m
	[IIII02 [0III I3III5/Steb		[11112/2	LOIII	
		Test Seti Confusion Matrix: [[35 8] [ 8 29]] Test Seti Accuracy: 0.8000 Test Seti Precision: 0.7838			

Test Seti Recall: 0.7838 Test Seti F1-Score: 0.7838

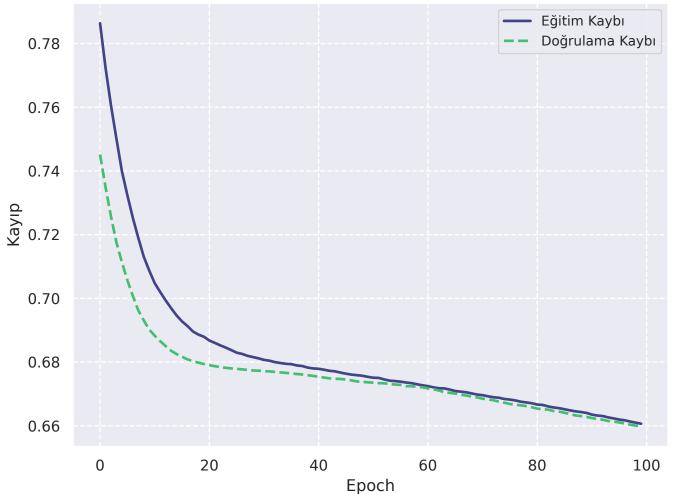


YSA - Gizli katmanlar: [10, 10], Optimizasyon: batch\_gd

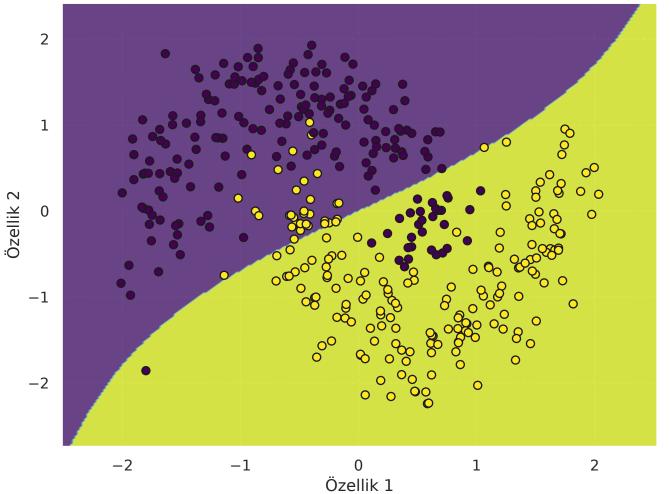


[0m	[1m0s	YSA - Giz [0m 20ms/step	li katmanlar: [10, 10], Optimizasyon: batch	_gd [1m8/8	[0m	[32m-
LOIII	LTINOS	[0111 201113/3tcp		[11110/0	[0111	[JZIII
[0	[] 0	[0m, 21m, /atam	Eğitim Seti Confusion Matrix:  [[120 0]  [120 0]]  Eğitim Seti Accuracy: 0.5000  Eğitim Seti Precision: 0.0000  Eğitim Seti Recall: 0.0000  Eğitim Seti F1-Score: 0.0000	[12/2	[0	[22]
[0m	[Imus	[0m 21ms/step		[1m3/3	[0m	[32m
[0m	[1m0c	[0m 20ms/ston	Doğrulama Seti Confusion Matrix:  [[37 0]  [43 0]]  Doğrulama Seti Accuracy: 0.4625  Doğrulama Seti Precision: 0.0000  Doğrulama Seti Recall: 0.0000  Doğrulama Seti F1-Score: 0.0000	[1m2/2	[Om	[22m-
	[IIIIUS	[0m 20ms/step		[1m3/3	[UIII	[32111
			Test Seti Confusion Matrix:  [[43 0]  [37 0]]  Test Seti Accuracy: 0.5375  Test Seti Precision: 0.0000  Test Seti Recall: 0.0000  Test Seti F1-Score: 0.0000			

YSA - Gizli katmanlar: [10, 10], Optimizasyon: mini\_batch\_gd



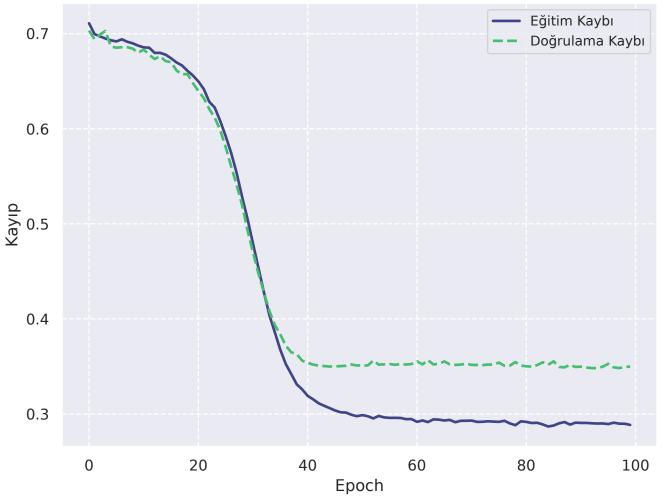
YSA - Gizli katmanlar: [10, 10], Optimizasyon: mini\_batch\_gd



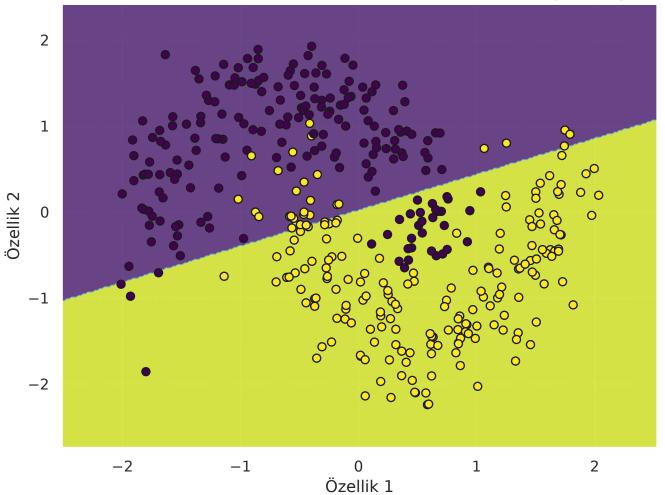
		katmanlar: [10, 10], Optimizasyon: mini_ba		
—— [0m	[1m0s [0m 34ms/step		[1m8/8 [0m	[32m———
		Eğitim Seti Confusion Matrix:  [[104 16]  [ 21 99]]  Eğitim Seti Accuracy: 0.8458  Eğitim Seti Precision: 0.8609  Eğitim Seti Recall: 0.8250  Eğitim Seti F1-Score: 0.8426		
—— [0m	[1m0s [0m 35ms/step		[1m3/3 [0m	[32m
[0m	[1m0s [0m 30ms/step	Doğrulama Seti Confusion Matrix: [[30 7] [ 5 38]] Doğrulama Seti Accuracy: 0.8500 Doğrulama Seti Precision: 0.8444 Doğrulama Seti Recall: 0.8837 Doğrulama Seti F1-Score: 0.8636	[1m3/3 [0m	[32m
Į OIII	[11103 [0111 301113/3tep	Test Seti Confusion Matrix: [[35 8] [ 7 30]] Test Seti Accuracy: 0.8125 Test Seti Precision: 0.7895	[1113/3 [0111	[32.11]

Test Seti Recall: 0.8108 Test Seti F1-Score: 0.8000

YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: sgd



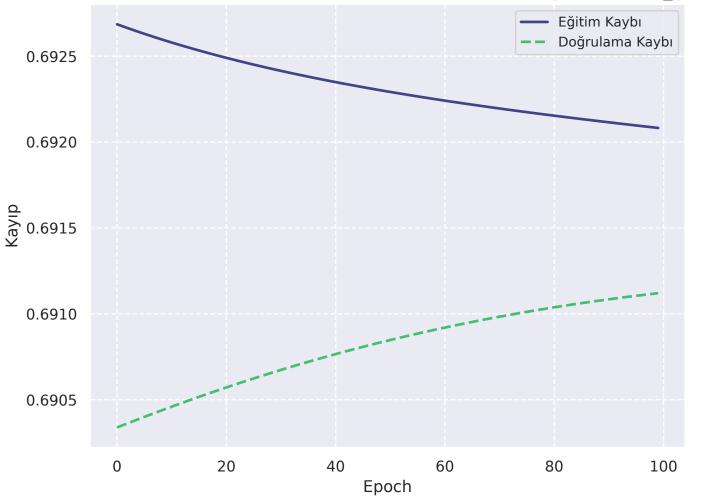
YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: sgd



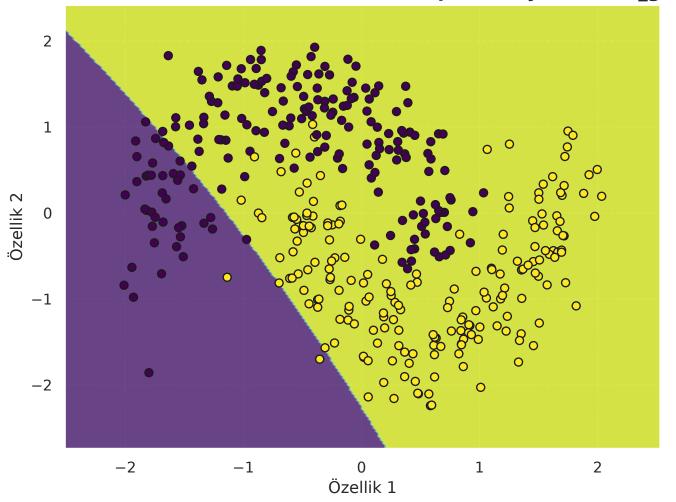
[0m	YSA - G [1m0s [0m 19ms/step	Gizli katmanlar: [10, 10, 10], Optimizasyon:	sgd [1m8/8 [0m	[32m—
[0111	[111103 [0111 131113/310]		[1110/0 [0111	[32111
[0m	[1m0c [0m 10mc/cton	Eğitim Seti Confusion Matrix:  [[101 19]  [ 14 106]]  Eğitim Seti Accuracy: 0.8625  Eğitim Seti Precision: 0.8480  Eğitim Seti Recall: 0.8833  Eğitim Seti F1-Score: 0.8653	[1m2/2 [0m	[32m_
[UIII	[1m0s [0m 19ms/step		[1m3/3 [0m	[3211]
[0m	[1m0s [0m 21ms/step	Doğrulama Seti Confusion Matrix: [[30 7] [ 7 36]]  Doğrulama Seti Accuracy: 0.8250  Doğrulama Seti Precision: 0.8372  Doğrulama Seti Recall: 0.8372  Doğrulama Seti F1-Score: 0.8372	[1m3/3 [0m	[32m-
[UIII	[Imos [um 21ms/step		[11113/3 [0111]	[32111
		Test Seti Confusion Matrix: [[35 8] [ 8 29]] Test Seti Accuracy: 0.8000 Test Seti Precision: 0.7838		

Test Seti Recall: 0.7838 Test Seti F1-Score: 0.7838

YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: batch\_gd

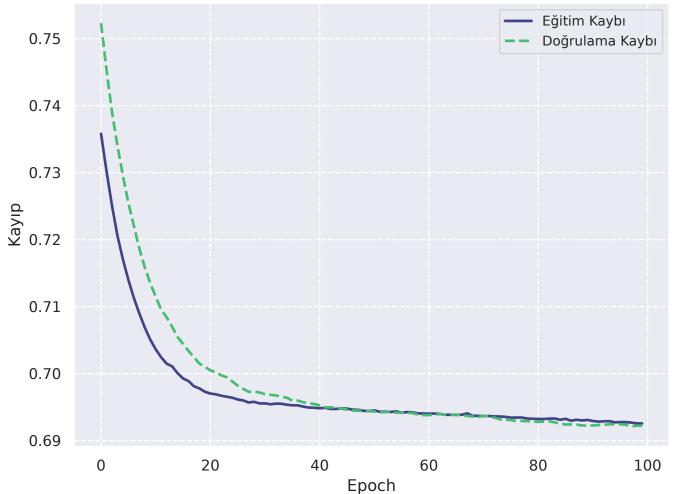


YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: batch\_gd

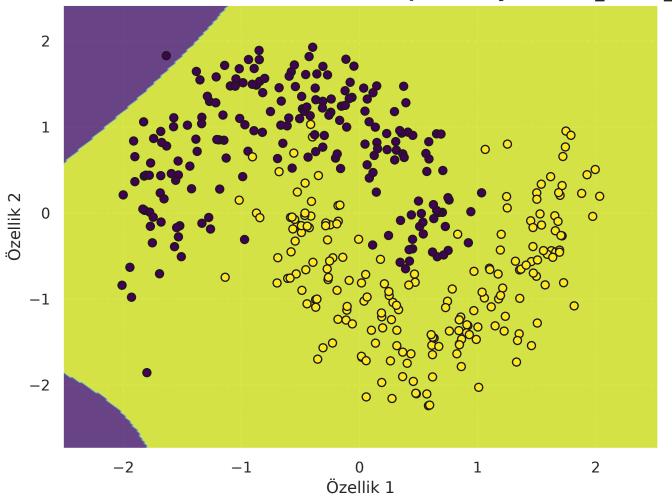


[0m	YSA - Gizli k [1m0s [0m 30ms/step	atmanlar: [10, 10, 10], Optimizasyon: bato	h_gd [1m8/8	m01	[32m
	[IIII03 [0III 30IIIs/step		[1110/0	LOIII	
[0,55	[1 ma O	Eğitim Seti Confusion Matrix:  [[ 27 93]  [ 1 119]]  Eğitim Seti Accuracy: 0.6083  Eğitim Seti Precision: 0.5613  Eğitim Seti Recall: 0.9917  Eğitim Seti F1-Score: 0.7169	[1 2 /2	[0.00	[22]
[0m	[1m0s [0m 31ms/step		[1m3/3	Įυm	[32m-
<b>10</b>	[1]	Doğrulama Seti Confusion Matrix:  [[ 5 32]	I.1 2/2		<b>1</b> 22
—— [0m	[1m0s [0m 27ms/step		[1m3/3	lom	[32m
		Test Seti Confusion Matrix:  [[ 8 35]  [ 1 36]]  Test Seti Accuracy: 0.5500  Test Seti Precision: 0.5070  Test Seti Recall: 0.9730  Test Seti F1-Score: 0.6667			

YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: mini\_batch\_gd



YSA - Gizli katmanlar: [10, 10, 10], Optimizasyon: mini\_batch\_gd

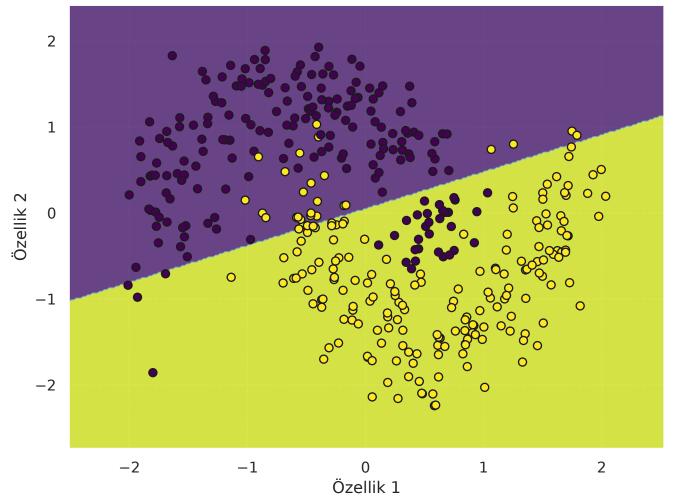


		tmanlar: [10, 10, 10], Optimizasyon: mini		_
—— [0m	[1m0s [0m 20ms/step		[1m8/8 [0m	[32m <del></del>
		Eğitim Seti Confusion Matrix:  [[ 1 119]  [ 0 120]]  Eğitim Seti Accuracy: 0.5042  Eğitim Seti Precision: 0.5021  Eğitim Seti Recall: 1.0000  Eğitim Seti F1-Score: 0.6685		
—— [0m	[1m0s [0m 20ms/step		[1m3/3 [0m	[32m———
[0m	[1m0s [0m 20ms/step	Doğrulama Seti Confusion Matrix: [[ 0 37] [ 0 43]] Doğrulama Seti Accuracy: 0.5375 Doğrulama Seti Precision: 0.5375 Doğrulama Seti Recall: 1.0000 Doğrulama Seti F1-Score: 0.6992	[1m3/3 [0m	[32m-
	[IIII05 [UIII ZUIII5/5tep		[1110] 5 [0111]	
		Test Seti Confusion Matrix: [[ 0 43] [ 0 37]] Test Seti Accuracy: 0.4625 Test Seti Precision: 0.4625 Test Seti Recall: 1.0000		

Test Seti F1-Score: 0.6325

### 3. Destek Vektör Makinesi (DVM) Modelleri

#### **SVM Karar Sınırı (linear Kernel)**



```
--- SVM Performans (linear Kernel) ---
```

```
Eğitim Seti Confusion Matrix:

[[101 19]

[ 14 106]]

Eğitim Seti Accuracy: 0.8625

Eğitim Seti Precision: 0.8480

Eğitim Seti Recall: 0.8833

Eğitim Seti F1-Score: 0.8653
```

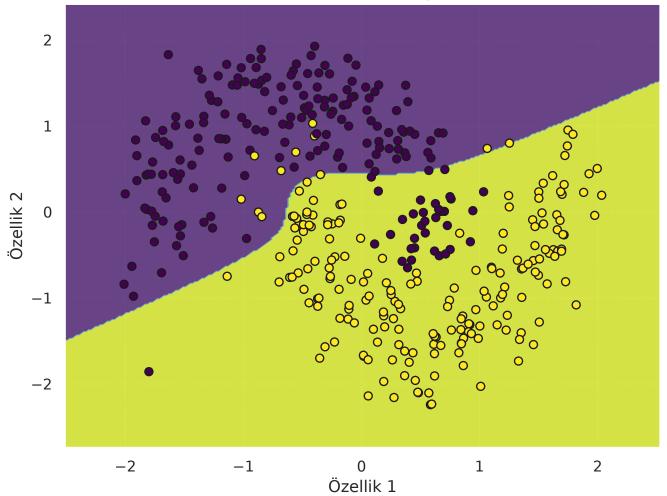
Doğrulama Seti Confusion Matrix:
[[30 7]
[ 6 37]]
Doğrulama Seti Accuracy: 0.8375

Doğrulama Seti Precision: 0.8409 Doğrulama Seti Recall: 0.8605 Doğrulama Seti F1-Score: 0.8506

Test Seti Confusion Matrix:
[[35 8]
[ 7 30]]
Test Seti Accuracy: 0.8125

Test Seti Accuracy: 0.8125 Test Seti Precision: 0.7895 Test Seti Recall: 0.8108 Test Seti F1-Score: 0.8000

#### **SVM Karar Sınırı (poly Kernel)**



```
--- SVM Performans (poly Kernel) ---
```

Doğrulama Seti Confusion Matrix:
[[30 7]
[ 2 41]]
Doğrulama Seti Accuracy: 0.8875

Doğrulama Seti Precision: 0.8542 Doğrulama Seti Recall: 0.9535 Doğrulama Seti F1-Score: 0.9011

Test Seti Confusion Matrix:

[[34 9]
 [ 4 33]]

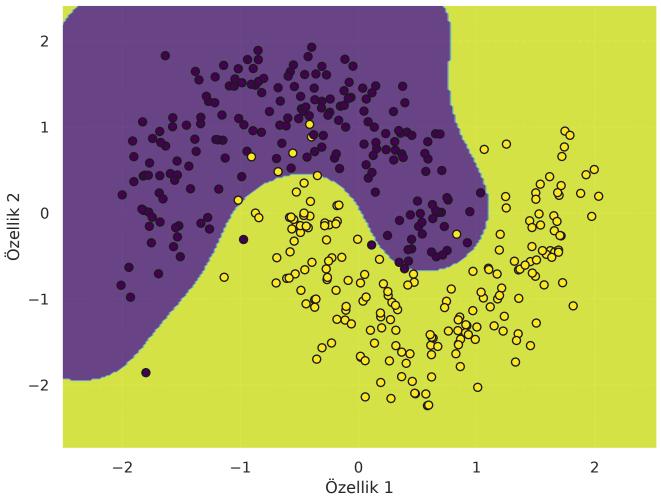
Test Seti Accuracy: 0.8375

Test Seti Precision: 0.7857

Test Seti Recall: 0.8919

Test Seti F1-Score: 0.8354

#### **SVM Karar Sınırı (rbf Kernel)**



```
--- SVM Performans (rbf Kernel) ---
```

Doğrulama Seti Confusion Matrix:

[[37 0] [2 41]]

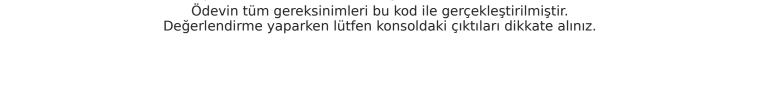
Doğrulama Seti Accuracy: 0.9750 Doğrulama Seti Precision: 1.0000

Doğrulama Seti Recall: 0.9535 Doğrulama Seti F1-Score: 0.9762

Test Seti Confusion Matrix: [[41 2] [ 3 34]]

Test Seti Accuracy: 0.9375
Test Seti Precision: 0.9444
Test Seti Recall: 0.9189
Test Seti F1-Score: 0.9315





Model performansları ve sonuçları yukarıda çıktı olarak verilmiştir.