



Derin Öğrenme Yöntemlerinin Tarımda Kullanılması

Doç. Dr. Mehmet Metin ÖZGÜVEN

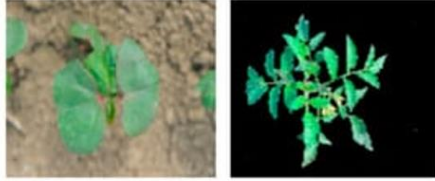
**Ankara Üniversitesi
Ziraat Fakültesi**

Tarım Makinaları ve Teknolojileri Mühendisliği Bölümü

ZTM364 Tarımda Yapay Zeka Kullanımı

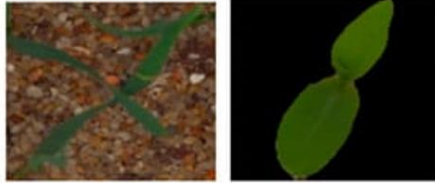
Derin Öğrenme Yöntemleri

Sınıflandırma



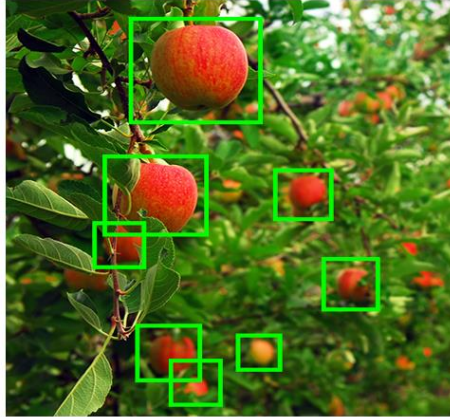
Cotton

Tomato



Common Wheat

Maize



Nesne Algılama

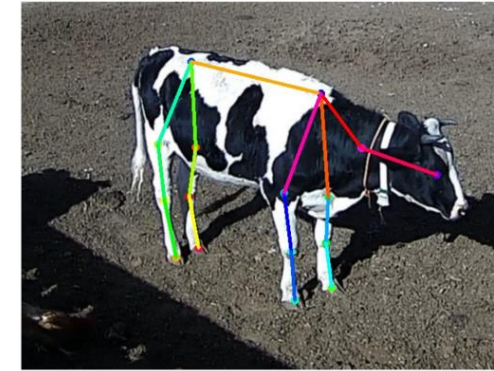
Semantik Segmentasyon



Örnek Segmentasyonu



Anahtar Nokta Algılama



Sınıflandırma

Sınıflandırma
(Classification)



%95-Downy Mildew



%98-Powdery Mildew

Veri Girişi



Özellik Çıkarma
(Feature
Extraction)



Tam Bağlantılı
Katmanlar (Fully
Connected
Layers)



Sınıflandırma

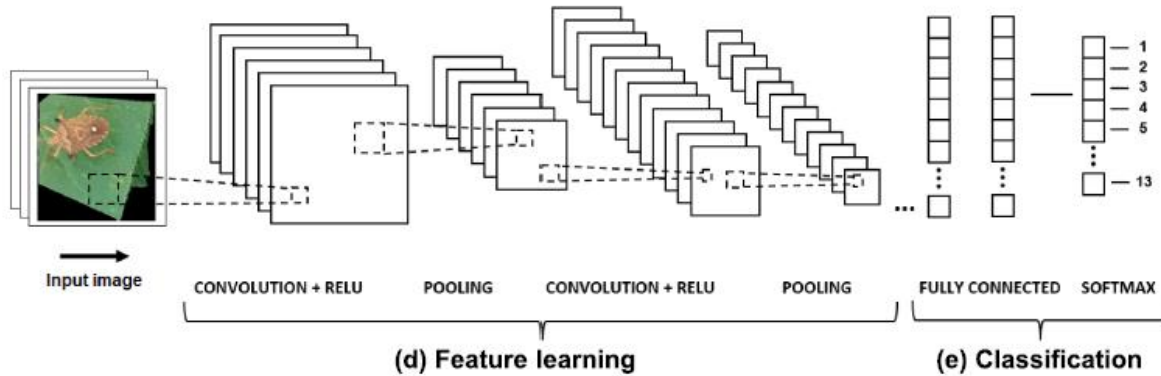
Sınıflandırma



(a) Image acquisition

(b) SLIC segmentation

(c) Image dataset



(d) Feature learning

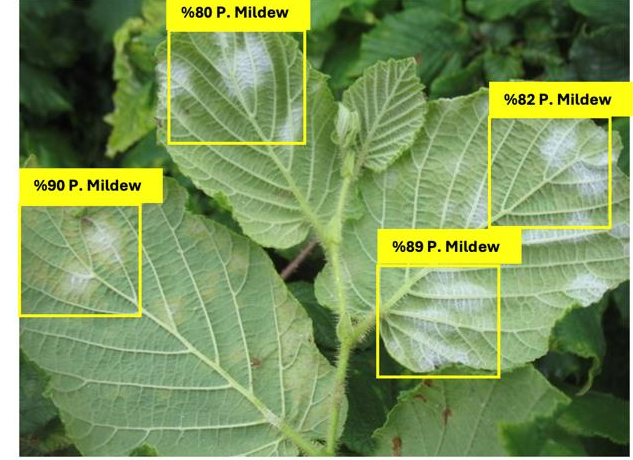
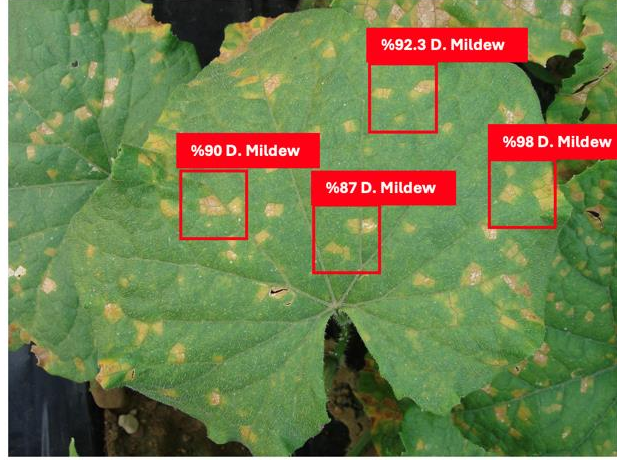
(e) Classification

<i>Acriidae</i>	38 images
<i>Anticarsia gemmatilis</i>	130 images
<i>Coccinellidae</i>	133 images
<i>Diabrotica speciosa</i>	112 images
<i>Edessa mediatubanda</i>	127 images
<i>Euschistus heros adult</i>	711 images
<i>Euschistus heros nymph</i>	827 images
Gastropoda	198 images
<i>Lagria villosa</i>	80 images
<i>Nezara viridula adult</i>	134 images
<i>Nezara viridula nymph</i>	25 images
No pests	2,208 images
Spodoptera spp.	277 images

Nesne Tespiti

Nesne Tespiti (Object Detection)

- Konum
- Sınırlayıcı Kutu
(Bounding Box)



Veri Girişi



Ön İşleme
(Preprocessing)



Özellik Çıkarma
(Feature
extraction)



Bölge Önerisi ve
Bölge Özellik
Çıkarımı

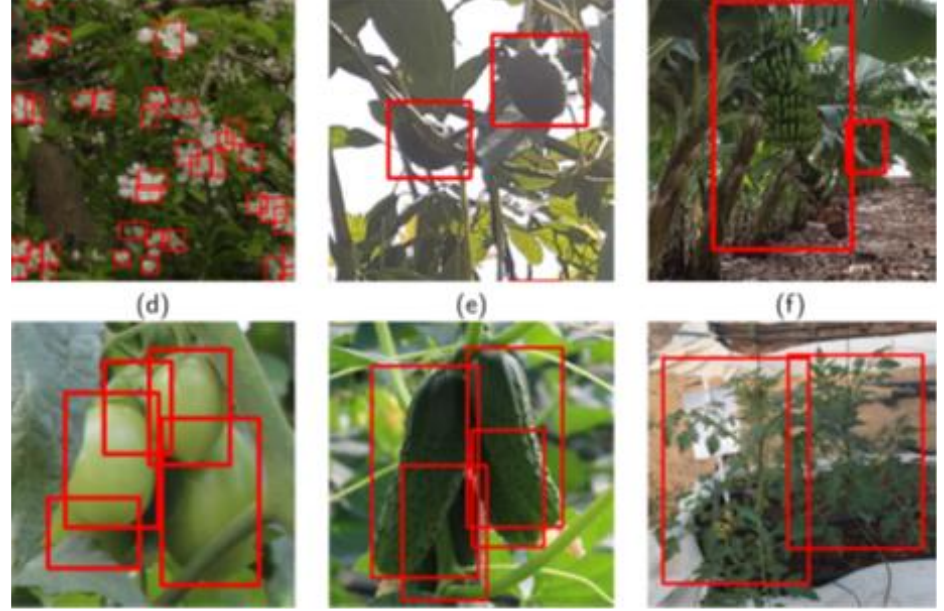
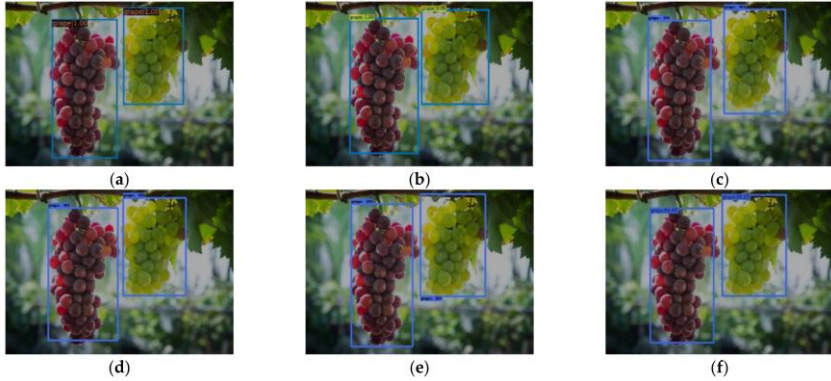
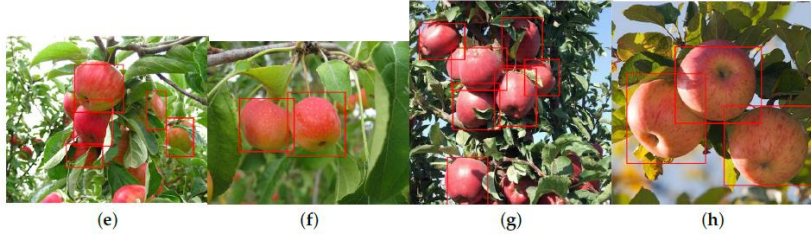
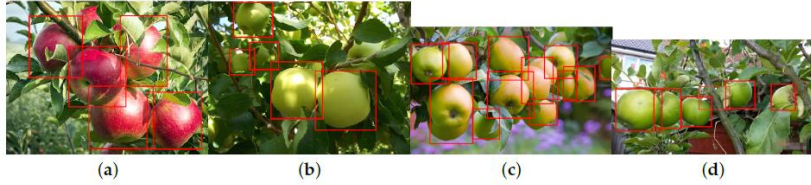


Sınıflandırma ve
Yer Belirleme



Sonuç

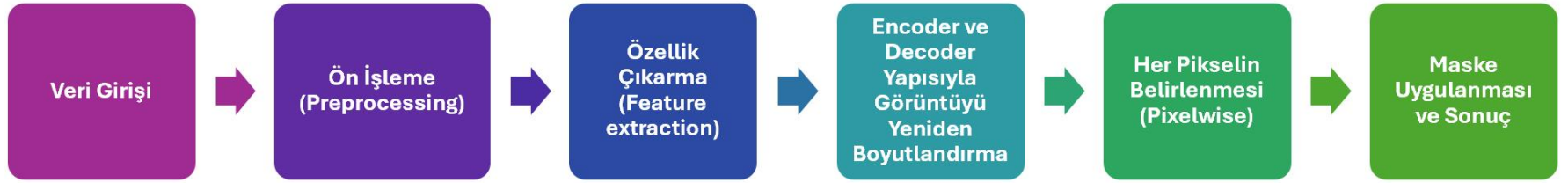
Nesne Tespiti



Semantik Segmentasyon

Semantik Segmentasyon
(Semantic Segmentation)

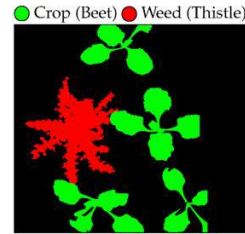
- Konum
- Maske



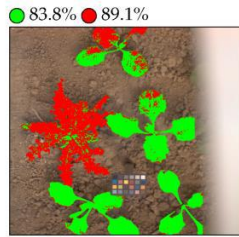
Semantik Segmentasyon



(a) RGB rendering

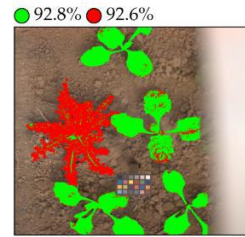


(b) Ground truth



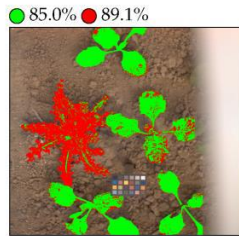
● 83.8% ● 89.1%

(c) radiance ($\overline{F1} = 83.5\%$, $\overline{Accuracy} = 87.3\%$)



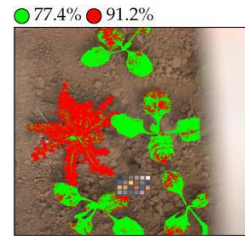
● 92.8% ● 92.6%

(d) rw ($\overline{F1} = 91.3\%$, $\overline{Accuracy} = 92.7\%$)



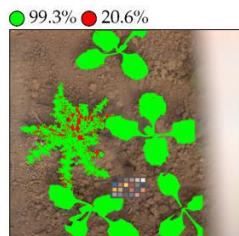
● 85.0% ● 89.1%

(e) dwd ($\overline{F1} = 84.3\%$, $\overline{Accuracy} = 87.7\%$)



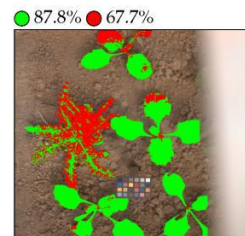
● 77.4% ● 91.2%

(f) wa ($\overline{F1} = 80.3\%$, $\overline{Accuracy} = 86.4\%$)



● 99.3% ● 20.6%

(g) ms ($\overline{F1} = 50.5\%$, $\overline{Accuracy} = 47.6\%$)



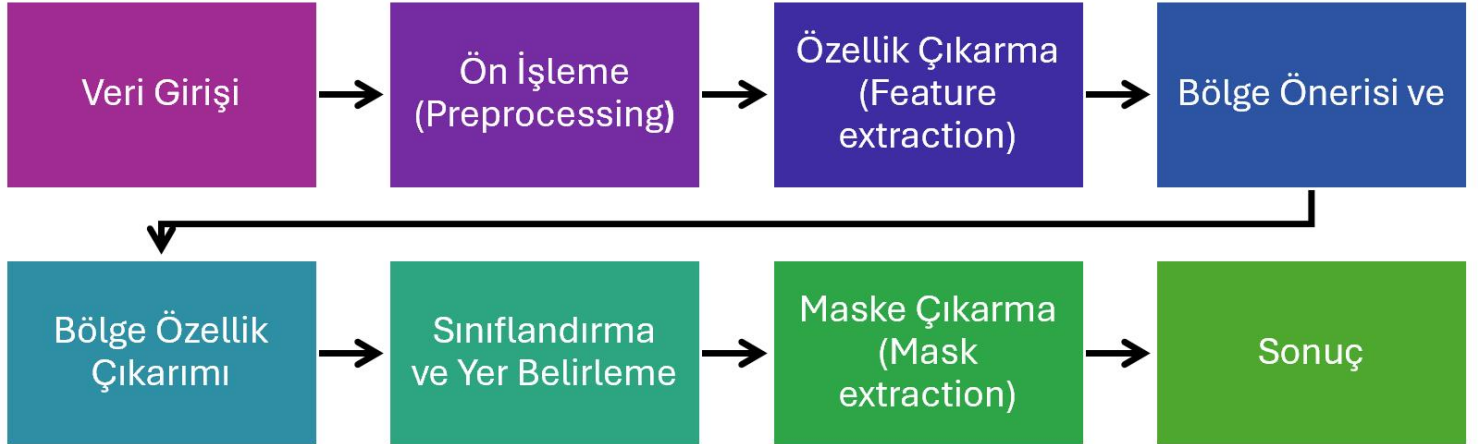
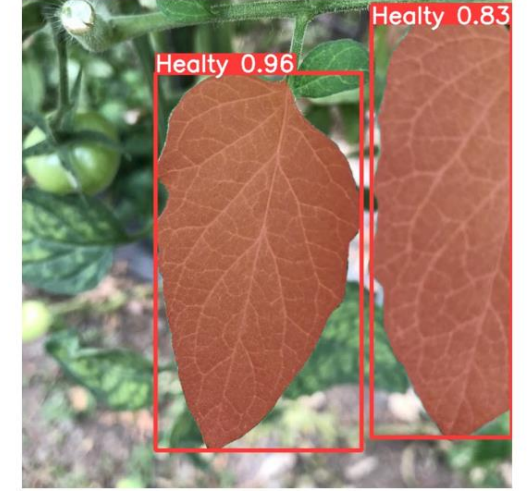
● 87.8% ● 67.7%

(h) wn ($\overline{F1} = 76.0\%$, $\overline{Accuracy} = 74.6\%$)

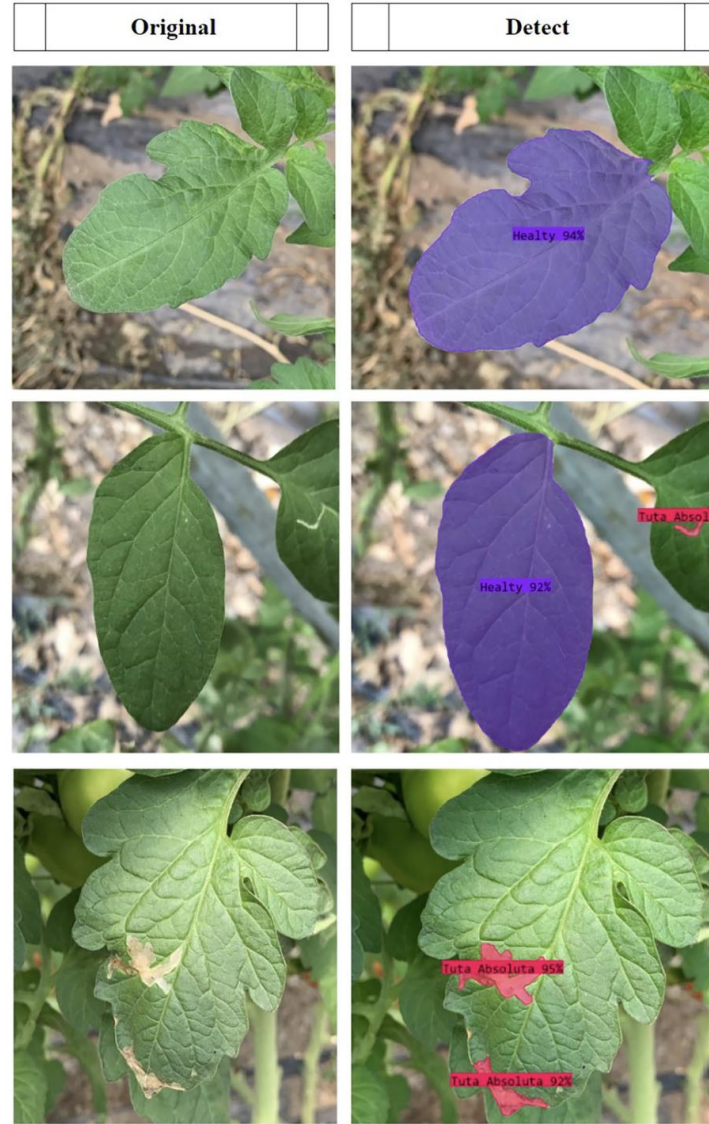
Örnek Segmentasyonu

Örnek Segmentasyonu (Instance Segmentation)

- Konum
- Maske
- Sınırlayıcı Kutu

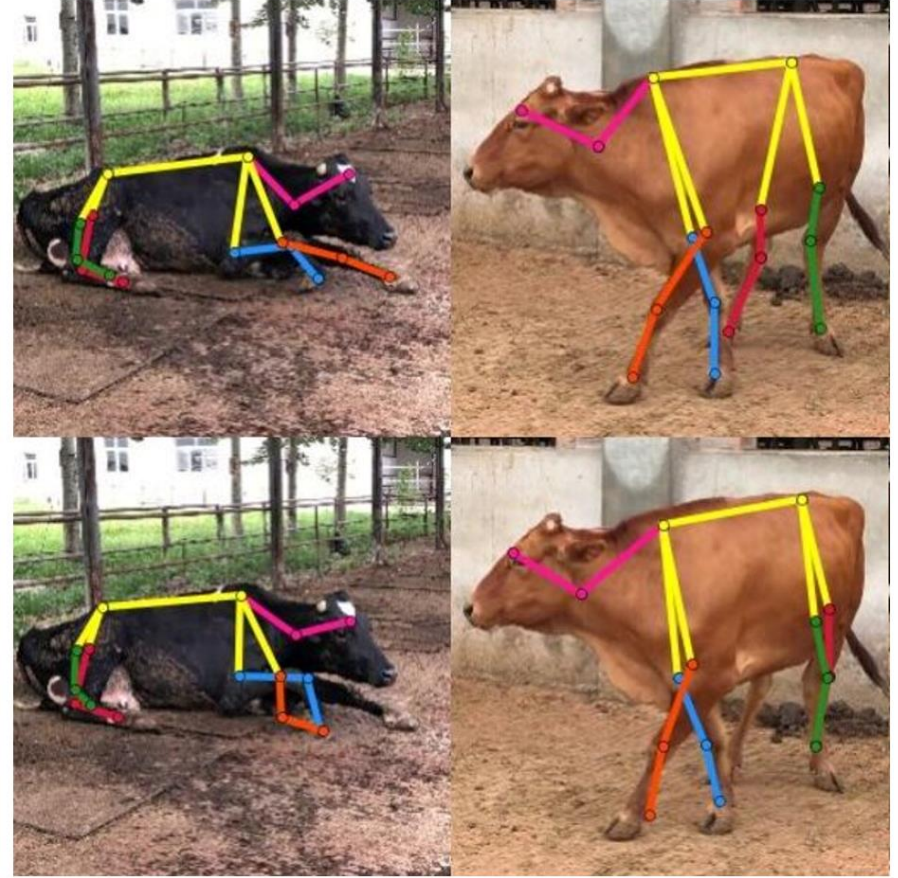
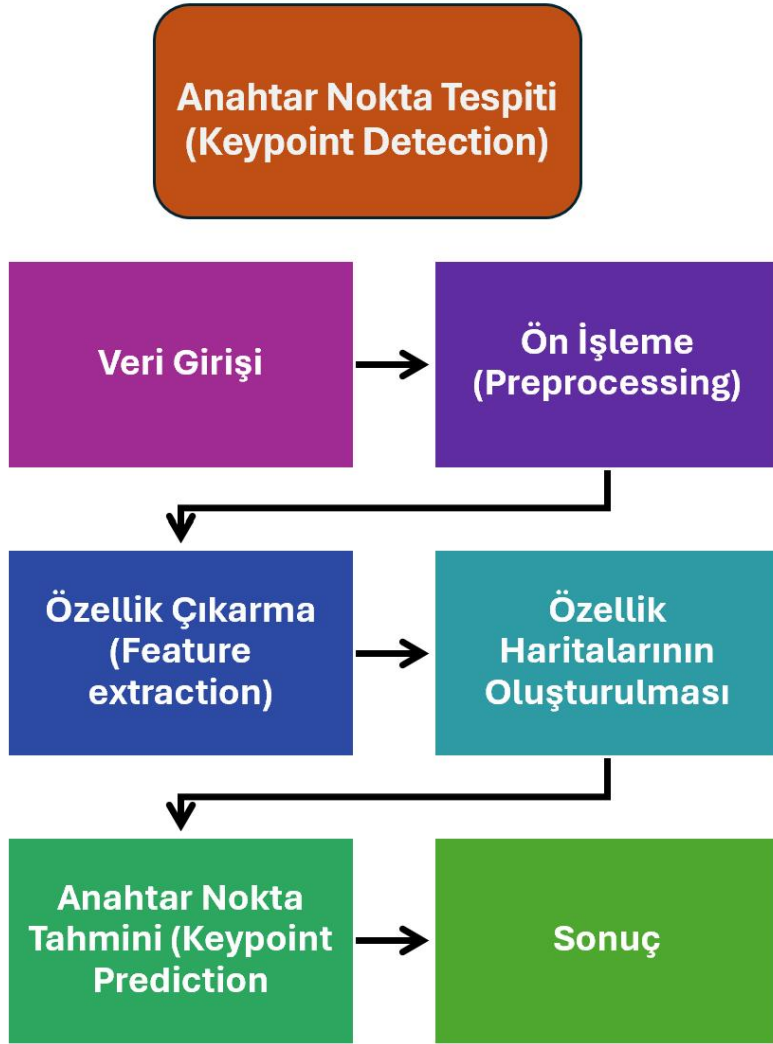


Örnek Segmentasyonu

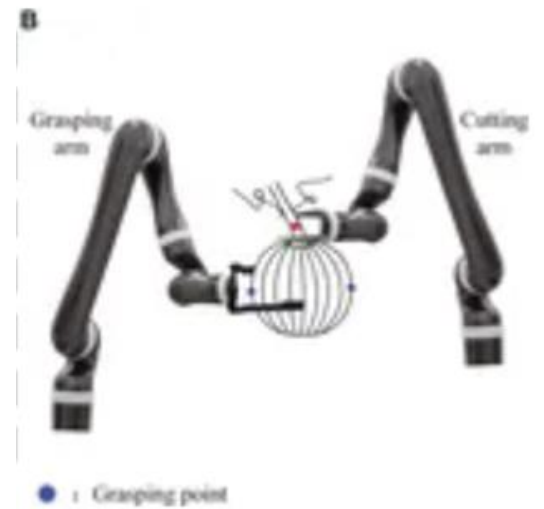
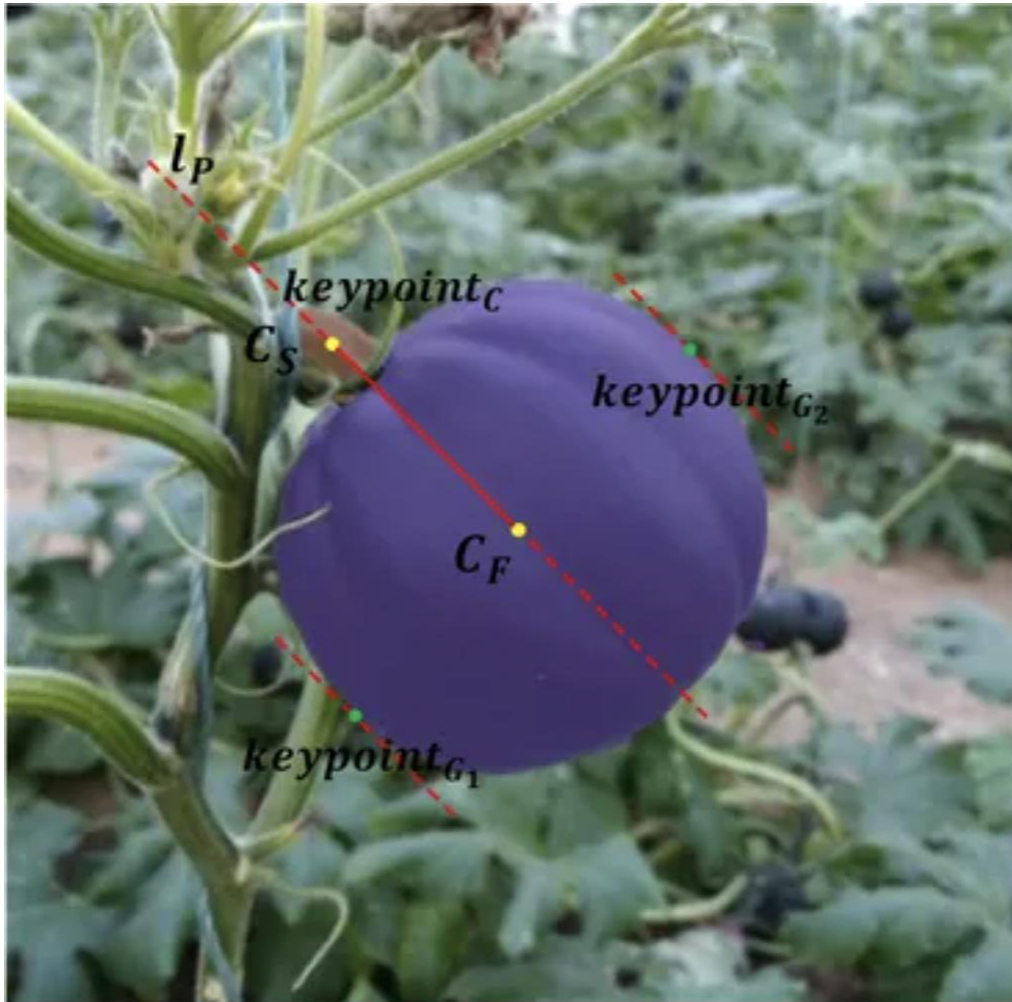


Anahtar Nokta Tespiti

Anahtar Nokta Tespiti (Keypoint Detection)



Anahtar Nokta Tespiti





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