

**Vaja:** Watershed algoritem (Vaja 3)

**Avtor:** Sašo Ivič

Predprocesiranje slike:

- Normalizacija
- glajenje z Gaussovim filtrom
- thresholding z Otsu-jevo metodo
- erozija
- določitev Evklidskih razdalj od el. foreground-a do najbližjega el. background-a

Parametri:

- IMAGE\_PATH - pot do slike
- AUTOMATIC\_MARKERS - ali želimo sami dodati markerje
- SEARCH\_LIGHT\_PARTICLES - ali je foreground svetlejši od background-a (podatek je potreben za pravilno določitev otsu\_threshold-a)
- USE\_LIBRARY - uporaba watershed knjižnice

Primeri:

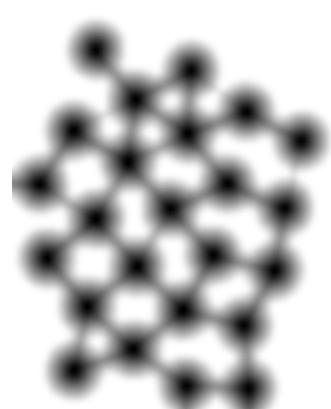
**KOVANCI:**

AUTOMATIC\_MARKERS = True

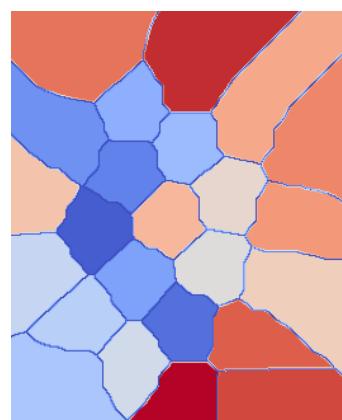
SEARCH\_LIGHT\_PARTICLES = False



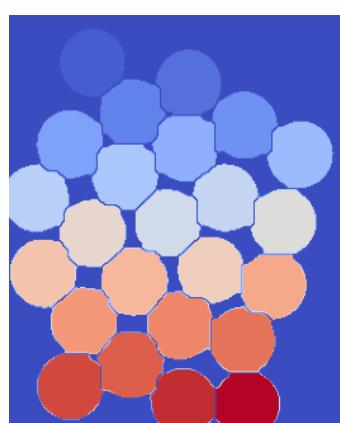
Vhodna slika



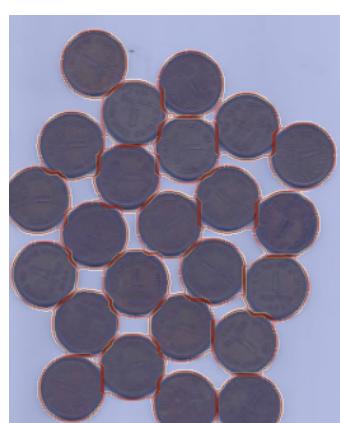
Euclidean distance transform



Watershed rezultat



Otsu metoda in watershed

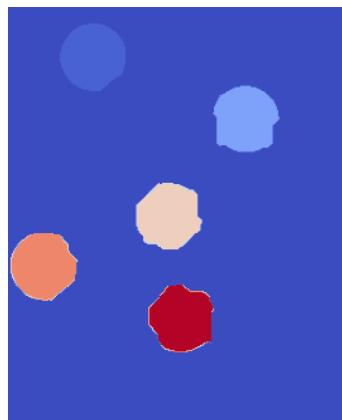


Segmentirana slika

AUTOMATIC\_MARKERS = False  
SEARCH\_LIGHT\_PARTICLES = False



Označeni objekti



Otsu metoda in watershed



Segmentirana slika

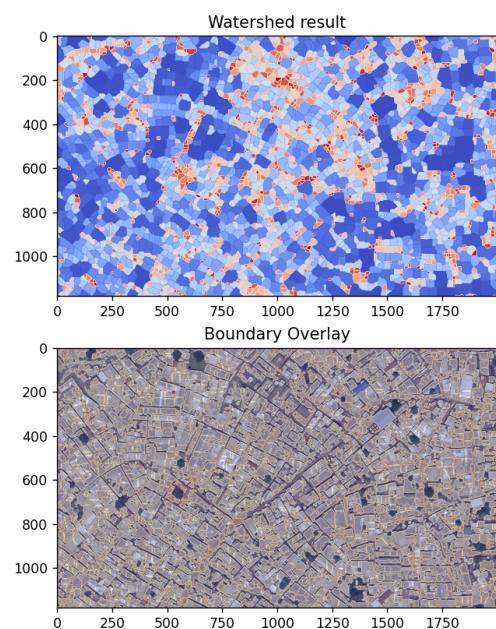
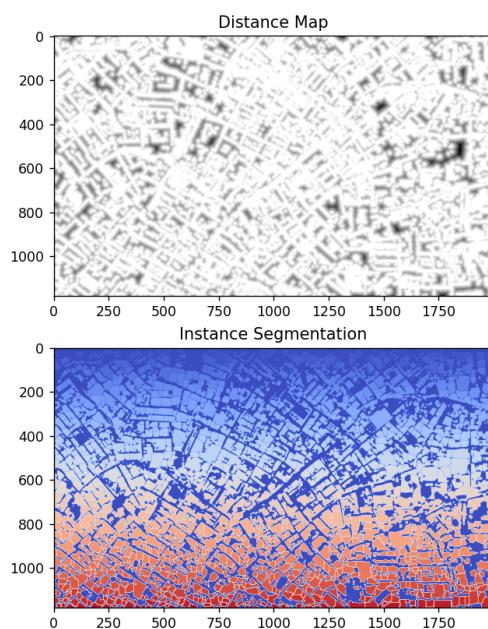
**PRIMER 1:**

AUTOMATIC\_MARKERS = True

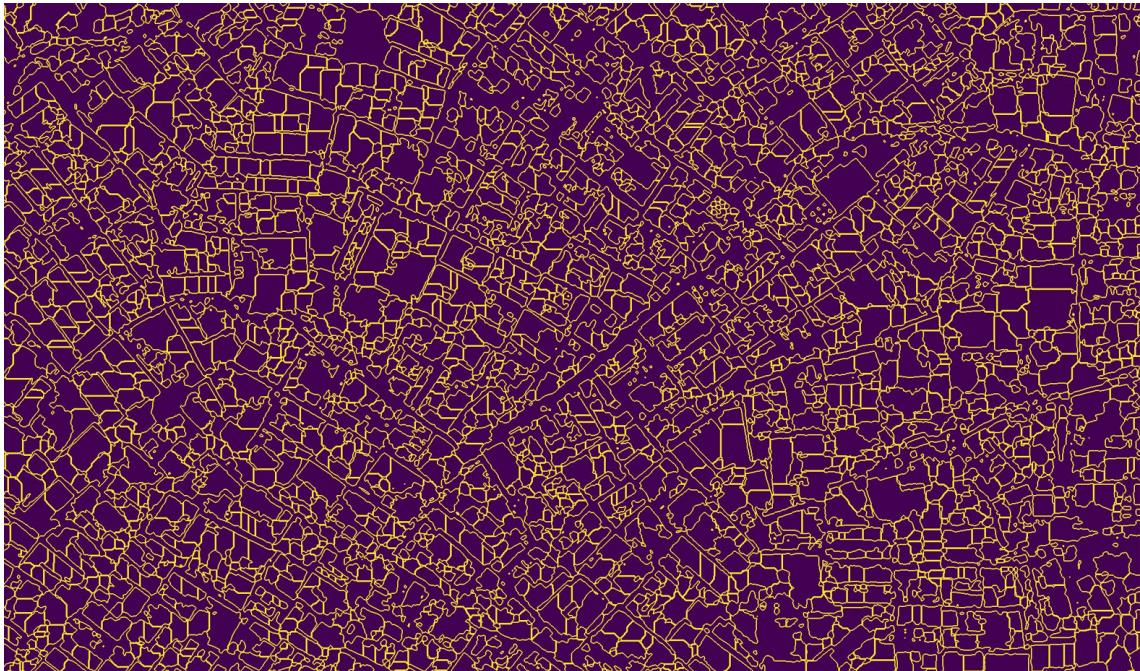
SEARCH\_LIGHT\_PARTICLES = True



Vhodna slika (primer 1)



Vmesni rezultati

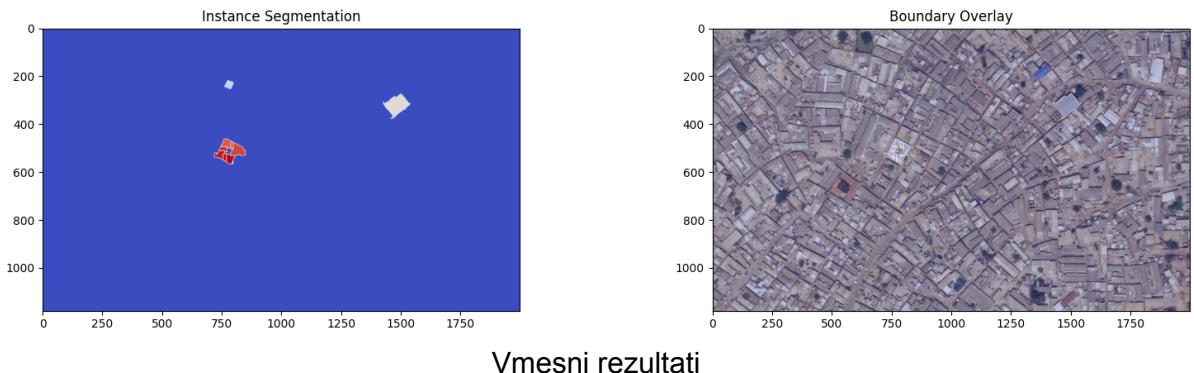


Segmentirani objekti

AUTOMATIC\_MARKERS = False  
SEARCH\_LIGHT\_PARTICLES = True



Slika z označenimi objekti



Segmentirani objekti

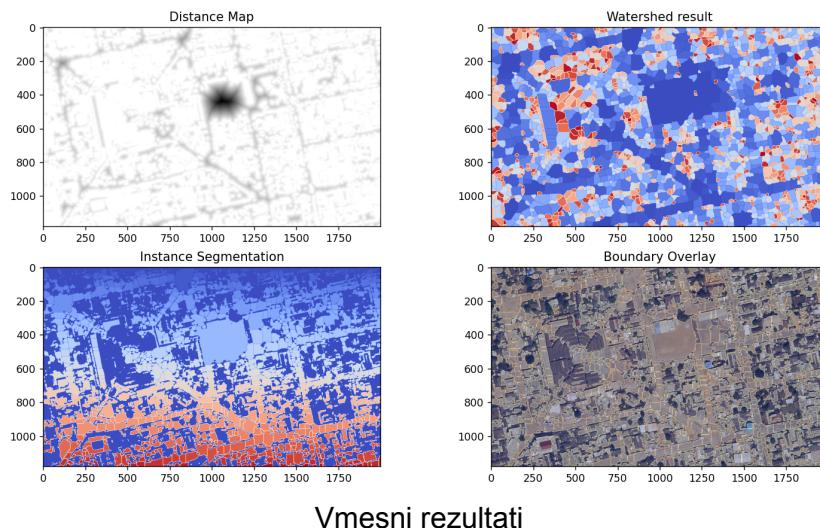
**PRIMER 2:**

AUTOMATIC\_MARKERS = True

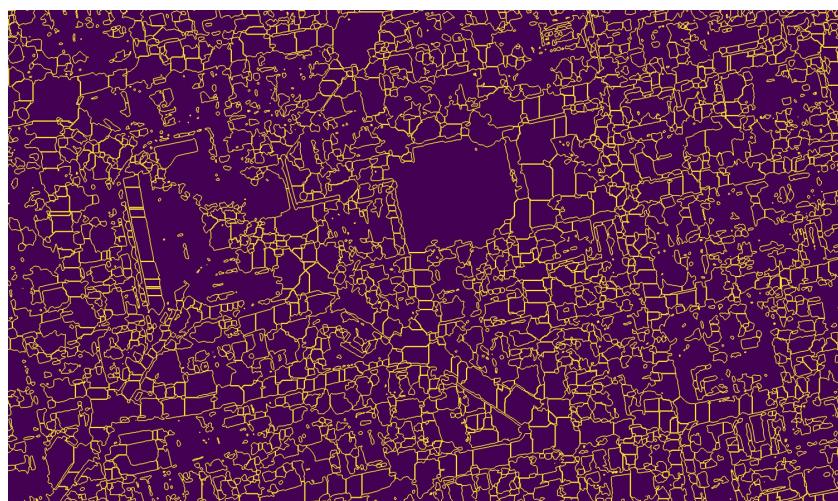
SEARCH\_LIGHT\_PARTICLES = True



Vhodna slika (primer 2)

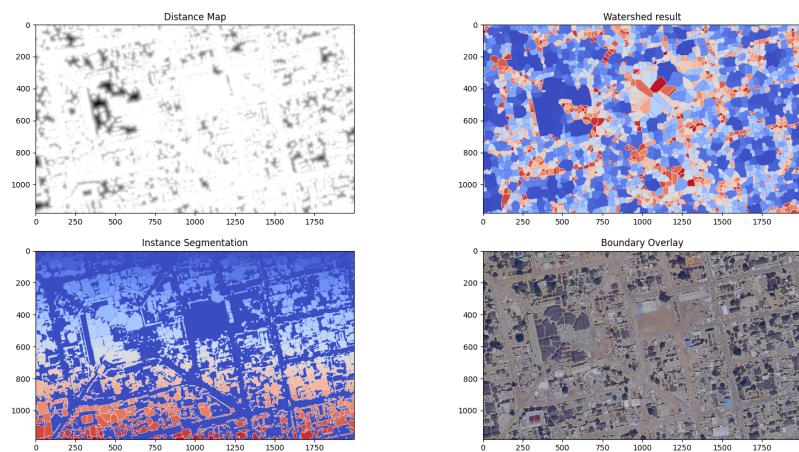


Vmesni rezultati

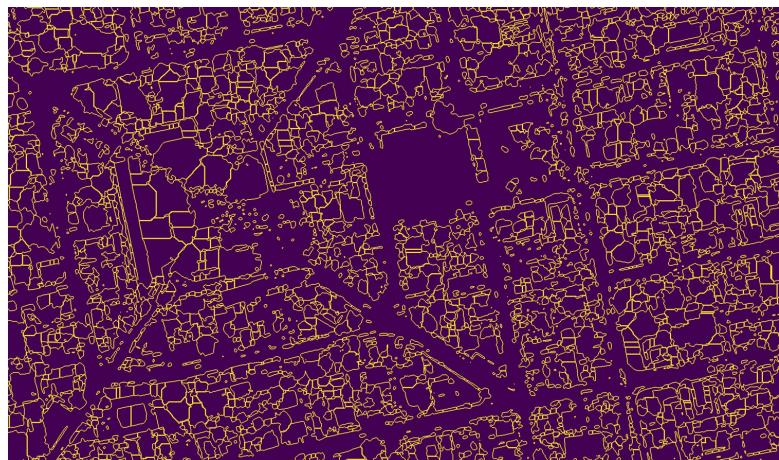


Segmentirani objekti

AUTOMATIC\_MARKERS = True  
SEARCH\_LIGHT\_PARTICLES = False



Vmesni rezultati (pri iskanju temnejših delov)

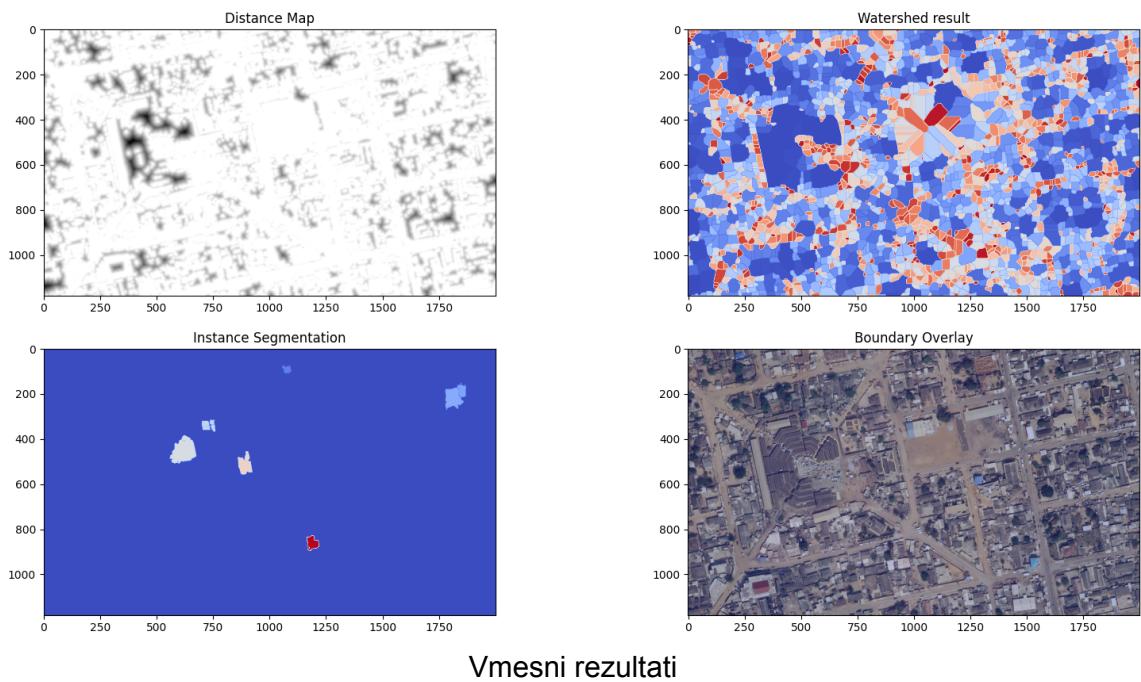


Segmentirani objekti (pri iskanju temnejših delov)

AUTOMATIC\_MARKERS = False  
SEARCH\_LIGHT\_PARTICLES = False



Izbrani objekti



Vmesni rezultati



Segmentirani objekti

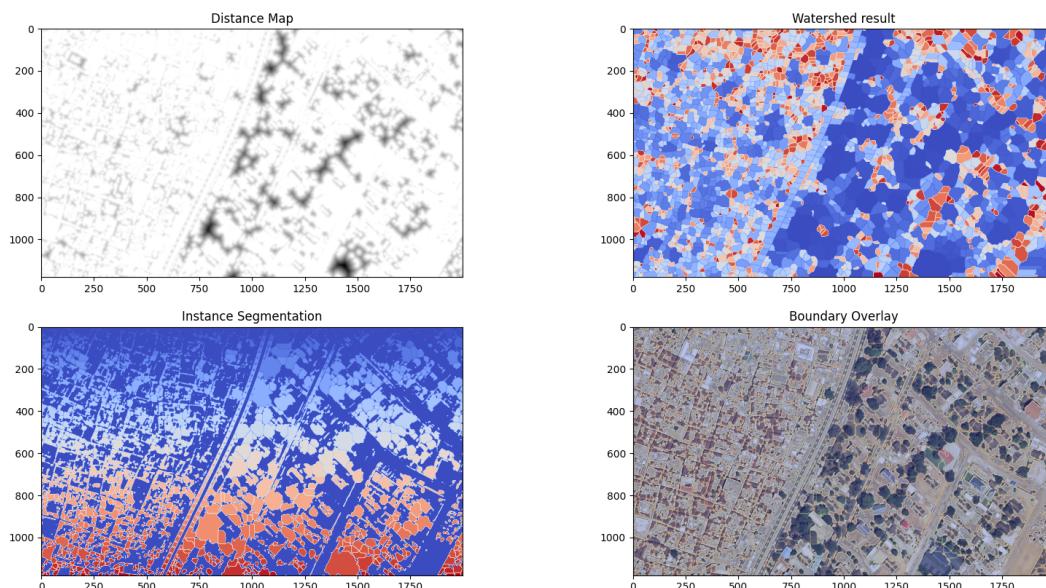
**PRIMER 3:**

AUTOMATIC\_MARKERS = True

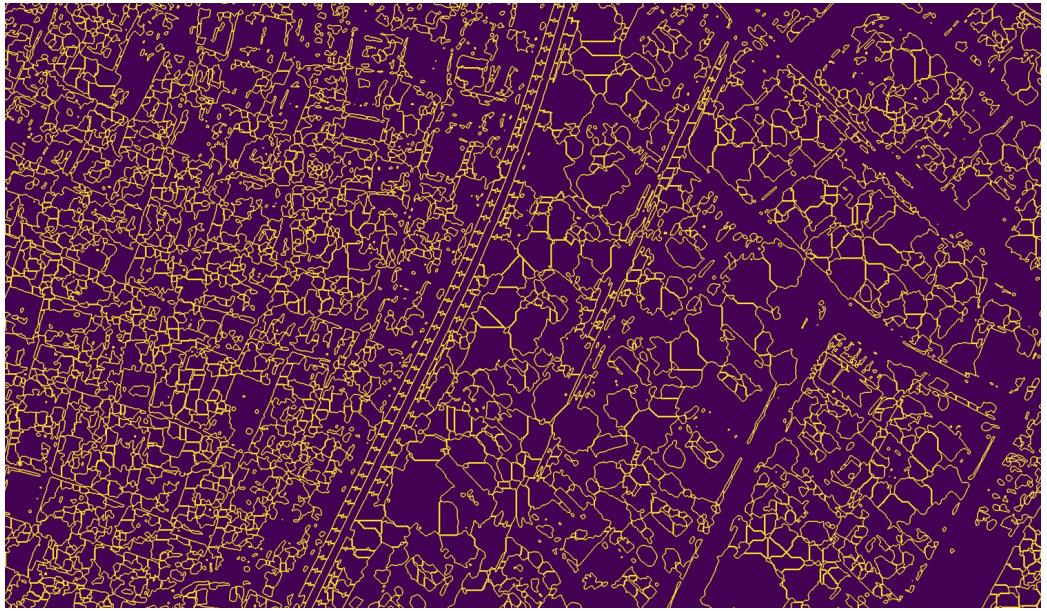
SEARCH\_LIGHT\_PARTICLES = False



Vhodna slika (primer 3)

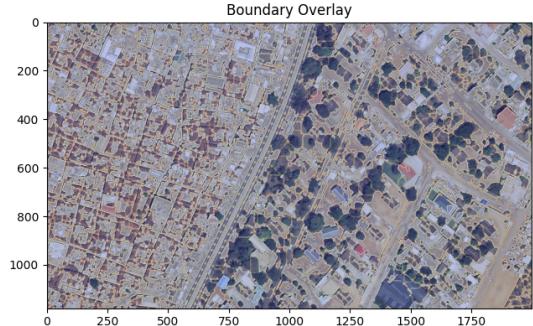
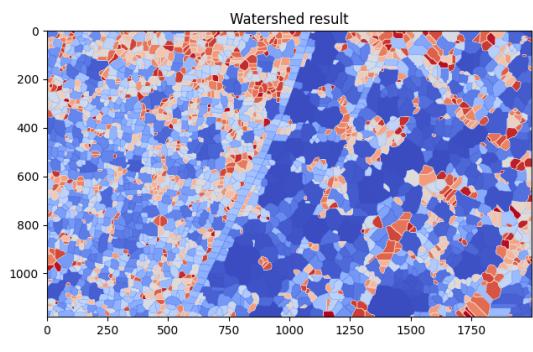
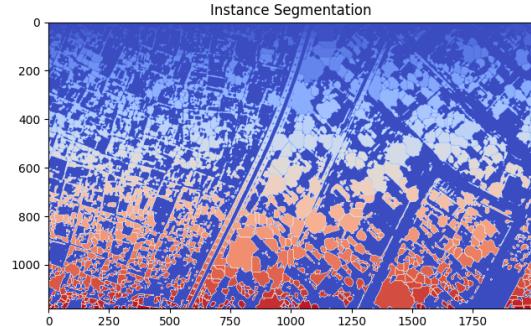
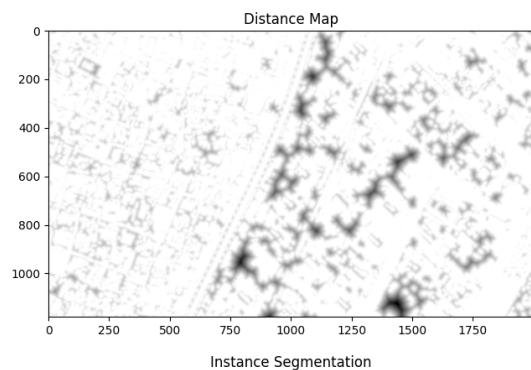


Vmesni rezultati



Segmentirani objekti

AUTOMATIC\_MARKERS = True  
SEARCH\_LIGHT\_PARTICLES = True

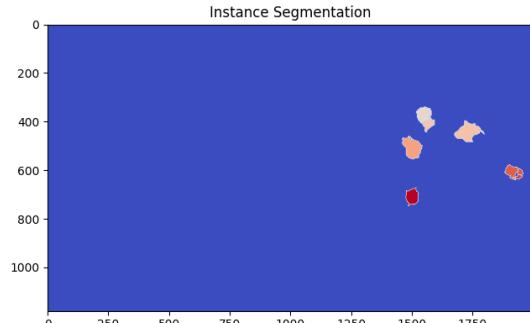
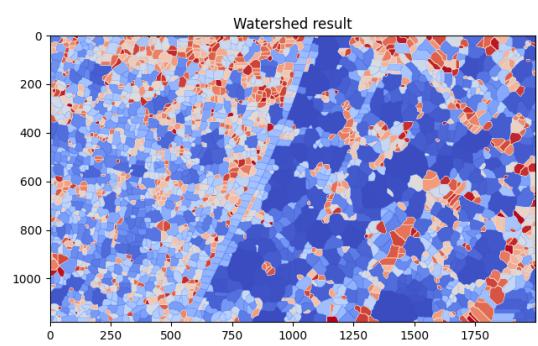
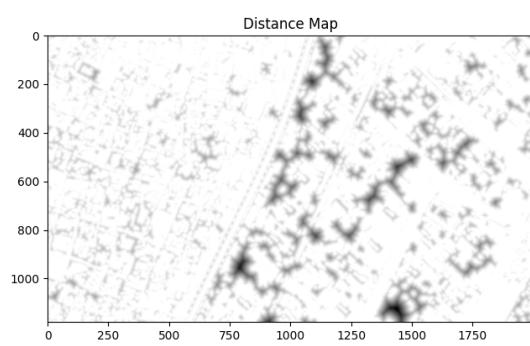


Rezultati pri segmentaciji temnejših delov

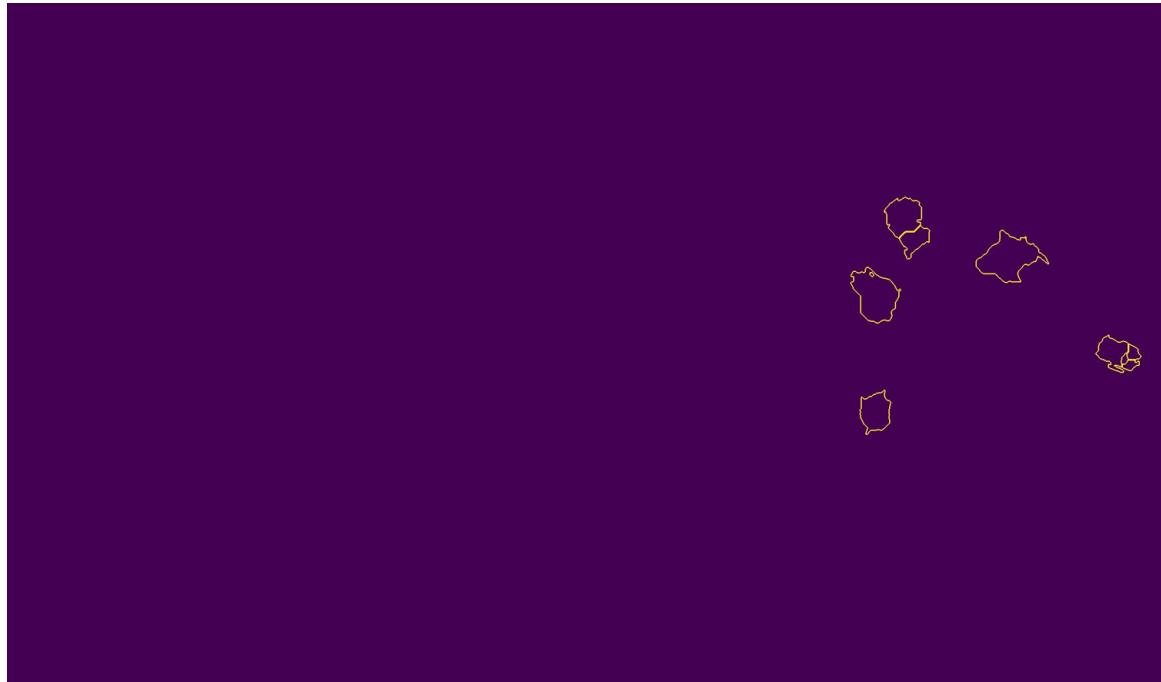
AUTOMATIC\_MARKERS = False  
SEARCH\_LIGHT\_PARTICLES = True



Izbrani objekti



Vmesni rezultati



Segmentirani deli