Bwdist explanation

Monday, 29 March 2021 11:45

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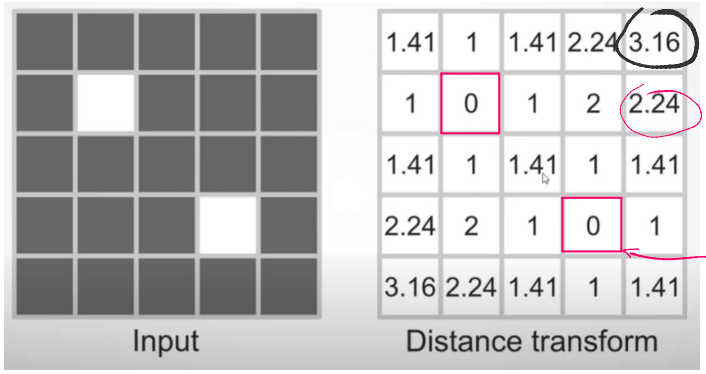
Distance transform

distance_transform_edt video

Bwdist = distance transform in matlab

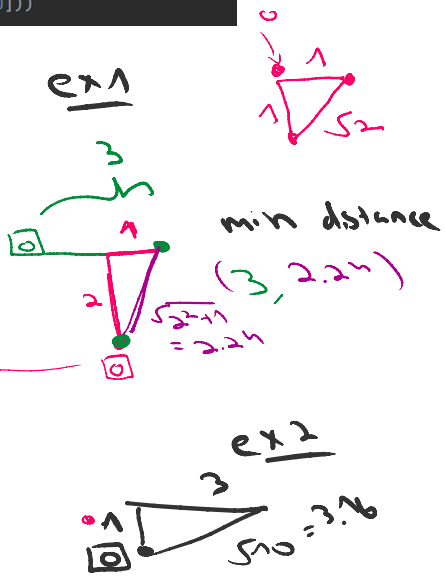
```python
def my_func(mask):
    epsilon = 0
    def bwdist(im): return distance_transform_edt(np.logical_not(im))
    bw = mask
    signed_dist = bwdist(bw) - bwdist(1 - bw)
    d = signed_dist.astype(np.float32)
    d += epsilon
    while np.count_nonzero(d < 0) < 5:
        d -= 1

    return d
```

```python
out_seg, map_lambda1, map_lambda2 = architectures.ddunet(x, is_training)
y_out_dl = tf.round(out_seg)
x_acm = x[:, :, :, 0]
rounded_seg_acl = y_out_dl[:, :, :, 0]
dt_trans = tf.py_func(my_func, [rounded_seg_acl], tf.float32)
dt_trans.set_shape([args.batch_size, input_image_size, input_image_size])
phi_out, _, lambda1_tr, lambda2_tr = tf.map_fn(fn=active_contour_layer,
                                               elems=(x_acm, dt_trans, map_lambda1[:, :, :, 0],
                                                      map_lambda2[:, :, :, 0]))
```

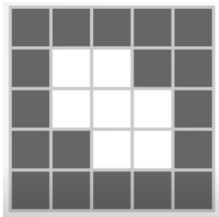


1.41	1	1.41	2.24	3.16
1	0	1	2	2.24
1.41	1	1.41	1	1.41
2.24	2	1	0	1
3.16	2.24	1.41	1	1.41

Input Distance transform



Another example

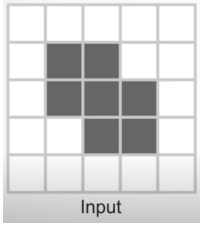


1.41	1	1	1.41	2.24
1	0	0	1	1.41
1	0	0	0	1
1.41	1	0	0	1
2.24	1.41	1	1	1.41

Input Distance transform

```python
def my_func(mask):
    epsilon = 0
    def bwdist(im): return distance_transform_edt(np.logical_not(im))
    bw = mask
    signed_dist = bwdist(bw) - bwdist(1 - bw)
    d = signed_dist.astype(np.float32)
    d += epsilon
    while np.count_nonzero(d < 0) < 5:
        d -= 1

    return d
```

inverted mask

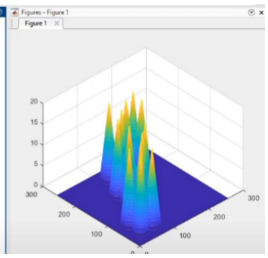


0	0	0	0	0
0	-1	-1	0	0
0	-1	-1.41	-1	0
0	0	-1	-1	0
0	0	0	0	0

Input Distance transform

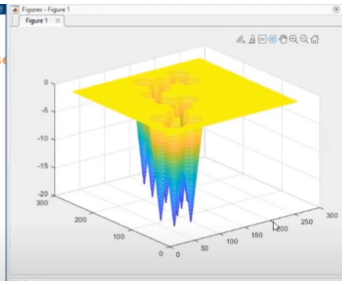
inverted

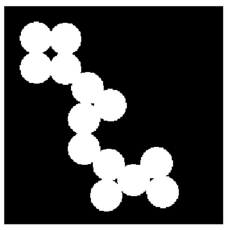
```
>> invM = ~M;
>> imshow(invM)
Warning: The initial magnification of the image is set to
'fit' in a docked figure.
> In imshow (line 322)
>> dd = bwdist(invM);
>> mesh(dd)
>>
```



negative inverted

```
>> invM = ~M;
>> imshow(invM)
Warning: The initial magnification of the image is s
'fit' in a docked figure.
> In imshow (line 322)
>> dd = bwdist(invM);
>> mesh(dd)
>> dd = -dd;
>> mesh(dd)
>>
```

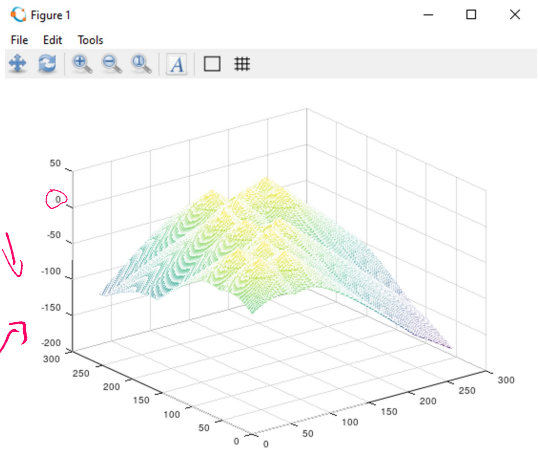


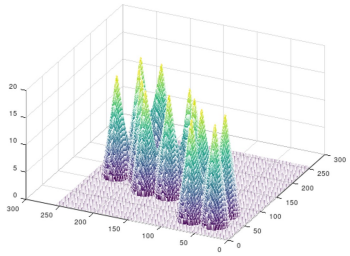


mask

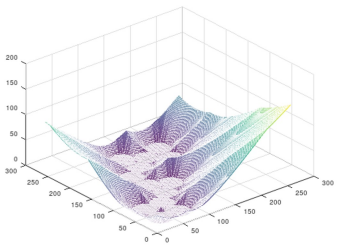
```
pkg load image

M = imread('circles.png');
imshow(M)
# white circles, black surrondings
```

```
signed_dist = bwdist(~M) - bwdist(~(1-M));
mesh(signed_dist)
```





bwdist(~M) −



bwdist(~(1-M)) =