**Algorithm 2:** Extended

**input :** *stroke, img, intersection*

**output:** *stroke*

**1** *visit* = [[0] ∗ *len*(*img*)*forinrange*(*len*(*img*))];

**2 Function** RegionalExpansion(*i, j*)**:**

**3 if** −1 *< i < len*(*imgs*) *and* − 1 *< j <*

*len*(*imgs*[0]) *and intersections*[*i*][*j*] == 0 *and img*[*i*][*j*] ==

1*and visit*[*i*][*j*] == 0 **then**

**4** *visit*[*i*][*j*] = 1;

**5 if** *stroke*[*i*][*j*] == 0 **then**

**6** *stroke*[*i*][*j*] = 1;

**7 end**

**8** *RegionalExpansion*(*i* − 1*, j*);

**9** *RegionalExpansion*(*i* + 1*, j*);

**10** *RegionalExpansion*(*i, j* − 1);

**11** *RegionalExpansion*(*i, j* + 1);

**12 end**

**13 for** *i* = 0 *to len* (*img*) **do**

**14 for** *j* = 0 *to len* (*img*[0]) **do**

**15 if** *stroke*[*i*][*j*] == 1 *and img*[*i*][*j*] == 0 **then**

**16** *stroke*[*i*][*j*] = 0;

**17 end**

**18 if** *stroke*[*i*][*j*] == 1 *and img*[*i*][*j*] == 1 *and visit*[*i*][*j*] == 0 **then**

**19** *visit*[*i*][*j*] = 1;

**20** *RegionalExpansion*(*i, j*);

**21 end**

**22 end**

**23 end**

1