Advanced Robotics

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1 Question 2

$$L_1(a,b) = |a_x - b_x| + |a_y - b_y| \tag{1}$$

$$L_2(a,b) = \sqrt{(a_x - b_x)^2 + (a_y - b_y)^2} \tag{2}$$

$$L_\infty(a,b) = \max\{|a_x - b_x|, |a_y - b_y||\} \tag{3}$$

8-connected distance equals to L_∞ [1]
Hence:

$$L_1(S,T_1) = 10 \tag{4}$$

$$L_1(S,T_2) = 8 \tag{5}$$

$$L_1(S,T_3) = 16 \tag{6}$$

$$L_2(S,T_1) = \sqrt{68} \tag{7}$$

$$L_2(S,T_2) = \sqrt{40} \tag{8}$$

$$L_2(S,T_3) = \sqrt{136} \tag{9}$$

$$L_3(S,T_1) = 8 \tag{10}$$

$$L_3(S,T_2) = 6 \tag{11}$$

$$L_3(S,T_3) = 10 \tag{12}$$

Thus, in all distance metrics the closest one to S id T_2

2 Question 3

2.1 Visibility graph

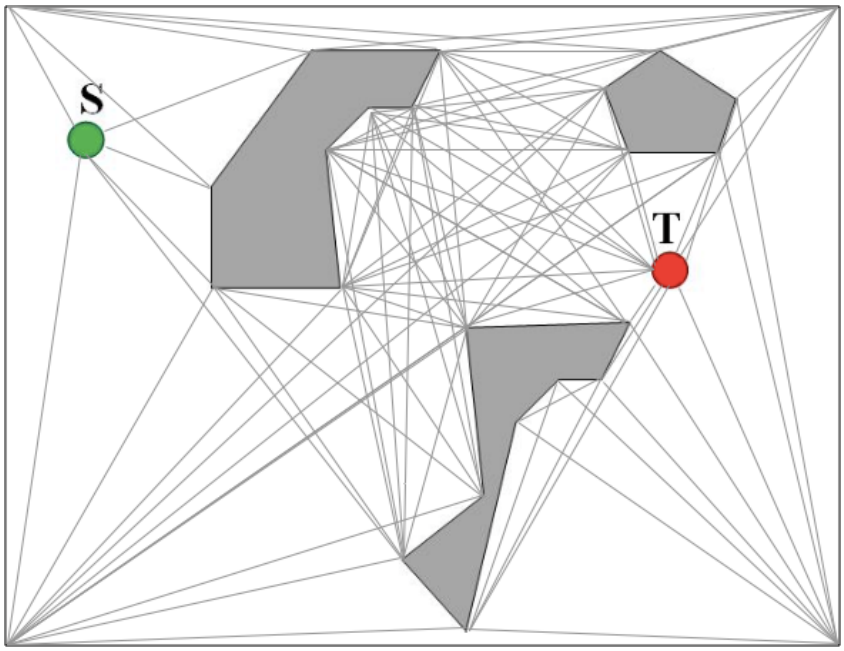

Figure 1: Visibility graph

2.2 Tangent graph

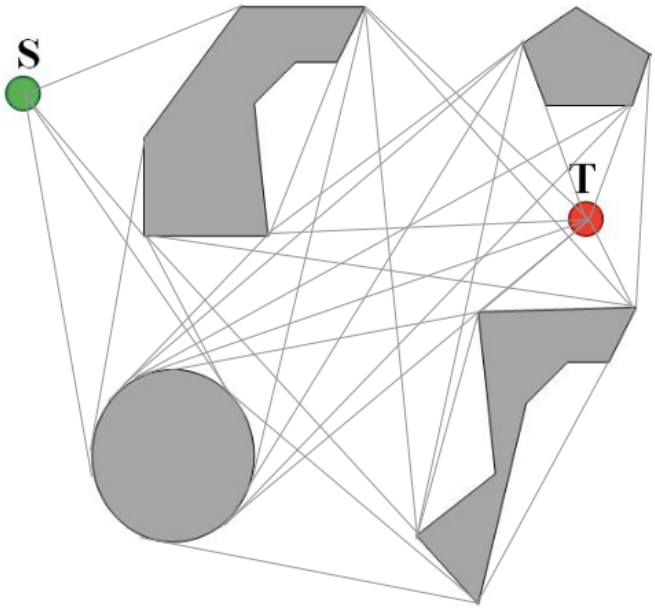

Figure 2: Tangent graph

References

[1] Morse, S Bryan, *Lecture 2: Image Processing Review, Neighbors, Connected Components, and Distance*, Bringham Young University, 1998, pp. 6–7