Probabilistic Logic Programming Exam

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1 Encoding

1.1 Structure constraints

Constraint 1 :

Constraint 2 :

2 Probability constraints

2.1 Tented Archs

Contraint TA1 : Given two E-minutiae belonging to a tented arch fingerprint, we note that the probability of existence of an edge between these two minutiae is higher if they have different directions w.r.t. when they have the same direction.

Let $M_1 = (X_1, Y_1, D_1, e)$ and $M_2 = (X_2, Y_2, D_2, e)$ be two E-minutiae. Let

$$\mathsf{weight}_d(M_1, M_2) := \frac{\left(\pi - \left||D_1 - D_2| - \pi\right|\right)}{\pi}$$

We give the value $weight_d(M_1, M_2)$ to the probability of existence of an edge between M_1 and M_2.

Contraint TA2 : Given two B-minutiae belonging to a tented arch fingerprint, the more these two minutiae are distant (either in the x-axis or in the y-axis) the less an edge between them is likely to exists.

Let $M_1 = (X_1, Y_1, D_1, b)$ and $M_2 = (X_2, Y_2, D_2, b)$ be two B-minutiae. Let max_x and max_y be the maximum value for the x-coordinate and y-coordinate, respectively. We define:

$$\mathsf{weight}_x(M_1, M_2) \coloneqq \frac{|X_1 - X_2|}{max_x}$$

$$\mathsf{weight}_y(M_1, M_2) \coloneqq \frac{|Y_1 - Y_2|}{max_y}$$

We give the value weight_x and weight_y to the probability of existence of an edge between M_1 and M_2.