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Probabilistic Relational Neighbor Classifier

The probabilistic relational neighbor classifier is a straightforward extension of the relational neighbor classifier. The formulation is changed as follows: P (c given x) equals 1 divided by Z times the sum for xj belonging to Nx of w(x,xj) times P(c given xj).

Notice that the summation now ranges over the entire neighborhood. The probabilities P(c given xj) can be the class priors, the probabilities from the local classifier, or probabilities from a previous application of the network classifier.

Here is an illustration of the probabilistic relational neighbor classifier. We now take into account the fraud and non-fraud probabilities of each neighbor node. The probability that the question mark node is fraudulent equals 1 divided by Z times (0.25 plus 0.80 plus 0.10 plus 0.20 plus 0.90), which equals 2.25 divided by Z. Similarly, the probability that the question mark node is non-fraudulent equals 1 divided by Z times (0.75 plus 0.20 plus 0.90 plus 0.80 plus 0.10), which equals 2.75 divided by Z. Again, to make sure that the probabilities sum to 1, Z equals 5, so that the probability of fraud becomes 0.45, and the probability of non-fraud equals 0.55.

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