

Lab 18

Existing data:

Node properties: Alarm

General Definition Format User properties

Σ=1 1-Σ

| | Burglary | Burglary | No_Burglary | No_Burglary |
|------------|------------|---------------|-------------|---------------|
| Earthquake | Earthquake | No_Earthqu... | Earthquake | No_Earthqu... |
| Alarm | 0.95 | 0.95 | 0.2 | 0.001 |
| NoAlarm | 0.05 | 0.05 | 0.8 | 0.999 |

OK

Match Network and Data

Drag and drop items to change associations between nodes/states and data columns/values.

Network: lab16

Matches: 3 with 0/6 name differences for nodes/states

Data: Holmes alarm data

Nodes

- Phone_Call
- Radio_News

Nodes & states

- Alarm
 - Alarm
 - NoAlarm
- Burglary
 - Burglary
 - No_Burglary
- Earthquake
 - Earthquake
 - No_Earthquake

Columns & values

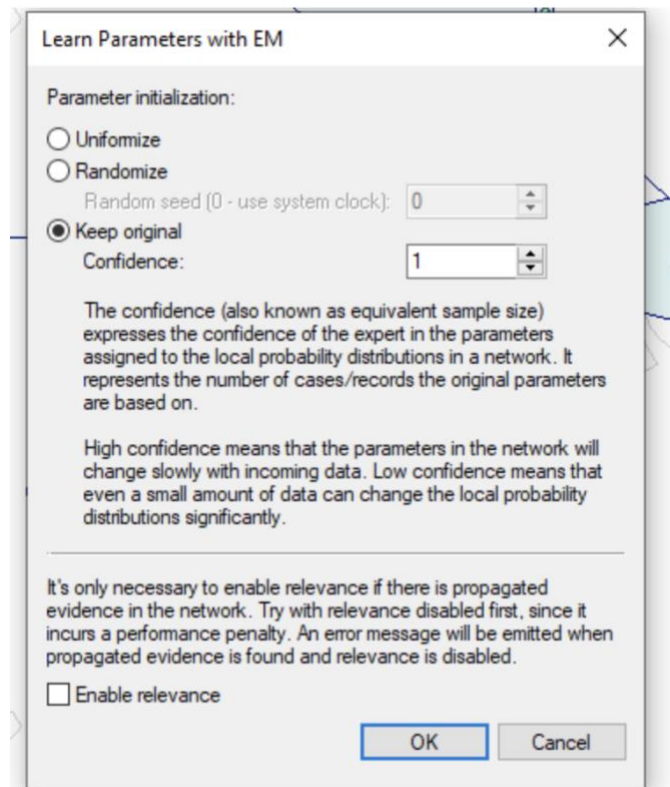
- Alarm
 - Yes
 - No
- Burglary
 - Yes
 - No
- Earthquake
 - Yes
 - No

Columns

Reset Fixed nodes... OK Cancel

The "Match Network and Data" window in GeNIe, which is used to map data columns to the nodes and states in a Bayesian network. This step is crucial for ensuring that the data imported aligns correctly with the network structure.

By accurately matching these columns and values, the data can be used effectively to update the network's parameters.

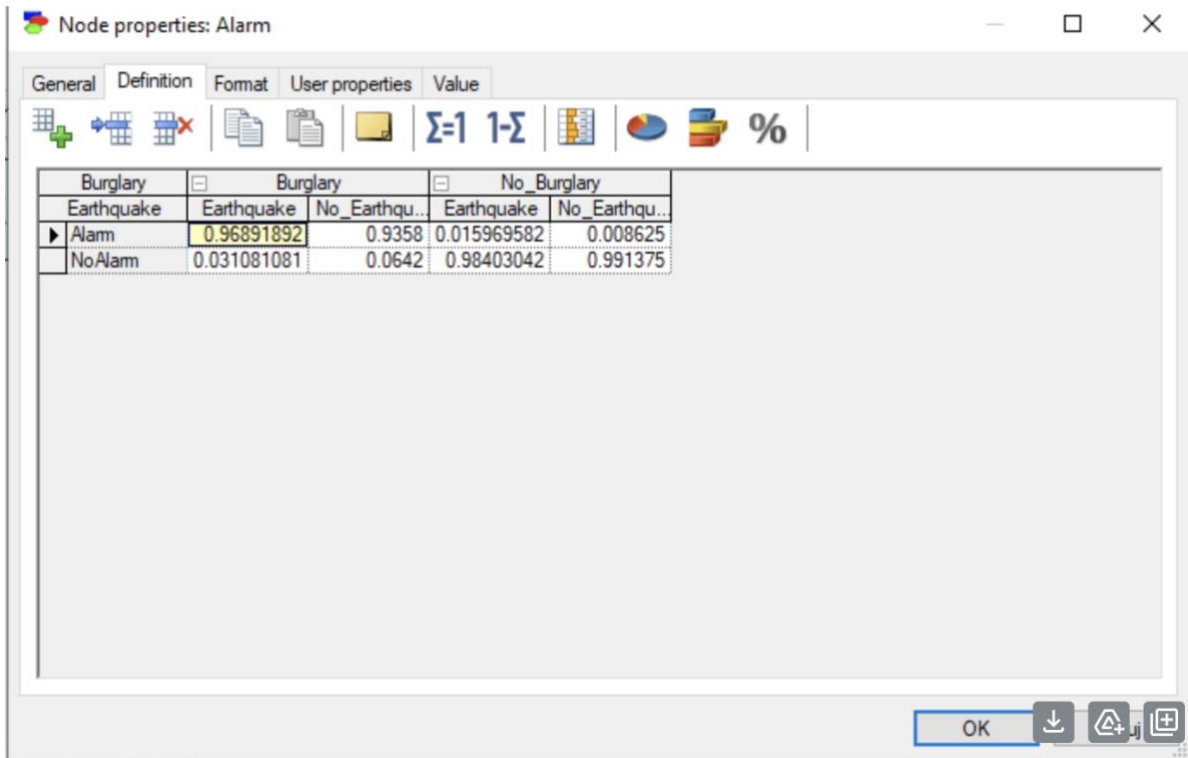


The "Learn Parameters with EM" (Expectation-Maximization) window in GeNIe is used to update the parameters of a Bayesian network based on imported data. This window is a key part of the process for refining the network's conditional probability tables (CPTs) using new evidence.

Keep Original: By choosing this option, the learning process will use the existing parameters as a starting point, making adjustments based on the new data.

Confidence: Setting the confidence to 1 means that the parameters will change in response to new data, with the new data being given equal weight to the existing parameters.

Output:



The image shows a software window titled "Node properties: Alarm". It has a tabbed interface with "General", "Definition", "Format", "User properties", and "Value" tabs. The "Value" tab is active, displaying a table of conditional probabilities. The table has columns for "Burglary" (Earthquake, No_Earthquake) and "No_Burglary" (Earthquake, No_Earthquake). The rows represent the "Alarm" node, with values for "Alarm" and "NoAlarm". The "Alarm" row shows values 0.96891892, 0.9358, 0.015969582, and 0.008625. The "NoAlarm" row shows values 0.031081081, 0.0642, 0.98403042, and 0.991375. The table is surrounded by various icons for data manipulation and formatting.

| | Burglary | | No_Burglary | |
|---------|-------------|---------------|-------------|---------------|
| | Earthquake | No_Earthquake | Earthquake | No_Earthquake |
| Alarm | 0.96891892 | 0.9358 | 0.015969582 | 0.008625 |
| NoAlarm | 0.031081081 | 0.0642 | 0.98403042 | 0.991375 |

The final results displayed in the Node properties for the Alarm node show a comparison between the updated and previous conditional probabilities. Initially, the probability of the Alarm given both Burglary and Earthquake was 0.95, which has now slightly increased to 0.96891892. The probability of the Alarm given Burglary but no Earthquake has also increased from 0.95 to 0.9358, reflecting a minor adjustment. For the scenario with no Burglary but an Earthquake, the probability of the Alarm significantly increased from 0.2 to 0.015969582, indicating a considerable change based on new data. The probability of the Alarm in the absence of both Burglary and Earthquake, initially set at 0.001, has increased to 0.008625. These updates show a general trend of increased probabilities for the Alarm under most conditions, suggesting that the new data has led to a more sensitive Alarm node.