COPULA-BASED ANOMALY SCORING

CHALLENGES: Europe in a changing world - inclusive, innovative and reflective societies

PRODUCTIVE SECTOR: Information and Communication Technology

PROBLEM DESCRIPTION

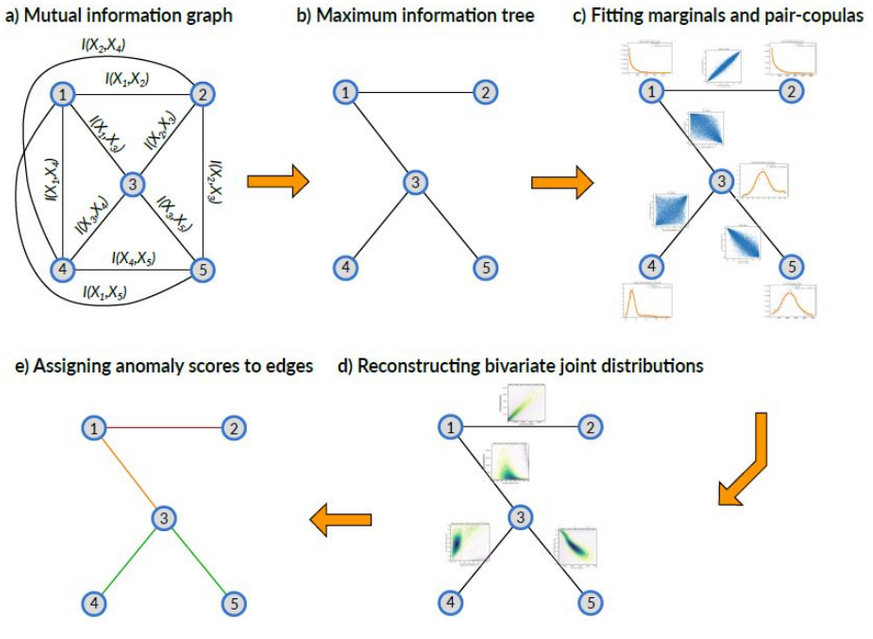
The research engineers of NOKIA-Bell Labs was interested in automated solutions for predictive detection of anomaly patterns in high-dimensional data

CHALLENGES AND GOALS

Huge amounts of versatile data for performance monitoring
The signs of sub-optimal operation can remain hidden for a potentially long time
Many such hidden issues should be isolated and indicated to the network operator
To use a model-based anomaly detection and localization method

MATHEMATICAL AND COMPUTATIONAL METHODS

New model-based anomaly detection and localization method
Relying on the multivariate probability distribution associated with the observations
Rare events are present in the tails of the probability distributions using copula functions
Determine the joint distribution of the random variables corresponding to the features
Assign anomaly scores to the observations based on the density
Identify the subspaces where the observation has high anomaly score



The outline of the proposed method

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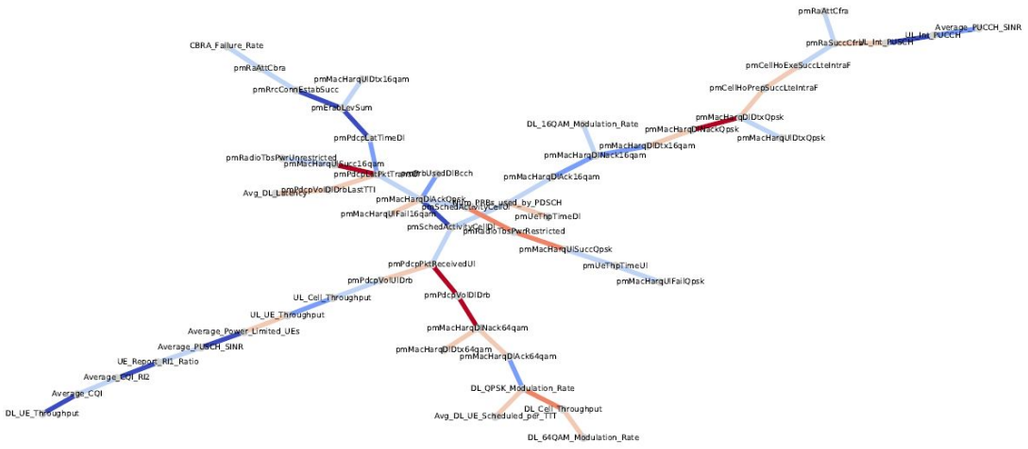
Results and Benefits

The proposed method assigns high anomaly score to those observations that are found anomalous by alternative methods as well

Can provide information on the location of the anomaly

Can operate with missing data as well

The company has an anomaly scoring and localization method that efficiently detects anomalous events confirmed by the network operator



Anomaly tree

HU-MATHS-IN
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