Term Definition

**Strict Evaluation** means the confusion matrix is defined by Root Cause Node and Target Node only in the group truth.

W is the whole set of all the nodes appearing in the group truth. Omega = W – {NrG} – {Nt} . For each issue, the group truth contains the Root Cause Node NrG and Target Node NtG

if ( NrG == NrP AND NtG == NtP )

the case is counted as TP;

else if (NrG == NrP OR NtG == NtP )

the case is counted as FP;

else if (NrP ϵ Omega OR NtP ϵ Omega )

the case is counted as FN;

else

the case is counted as failures/hallucinations of LLMs, not counted as a case of confusion matrix.

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|  | Ground Truth ( Root Cause Node NrG, Target Node NtG) | Other Nodes Omega = W – {NrG} – {Nt} |
| Prediction  (Root Cause Node NrP, Target Node NtP) | TP  ( NrG == NrP AND NtG == NtP ) | FP  (NrG == NrP OR NtG == NtP ) |
| Prediction  (Root Cause Node NrP, Target Node NtP) | FN  (NrP ϵ Omega OR NtP ϵ Omega ) | TN = 0 |

**Focused Evaluation** means the confusion matrix is defined by Root Cause Node and Target Node in the path of dependencies.

W is the whole set of all the nodes appearing in the group truth. Pathi is the set of nodes along the path of issue i. For each issue, the group truth contains the Root Cause Node NrG and Target Node NtG Omega = W – {NrG} – {Nt}.

if (NrP ϵ Pathi AND NtP ϵ Pathi )

the case is counted as TP; // both nodes are within the path of issue i

else if (NrP ϵ Pathi OR NtP ϵ Pathi ) // one of the node is within the path of issue i

the case is counted as FP;

else if (! NrP ϵ Pathi )AND (! NtP ϵ Pathi ) AND (NrP ϵ Omega) AND (NtP ϵ Omega) // both nodes are not within the path of issue i

the case is counted as FN;

else

the case is counted as failures/hallucinations of LLMs, not counted as a case of confusion matrix.

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|  | Ground Truth ( Root Cause Node NrG, Target Node NtG) | Pathi |
| Prediction  (Root Cause Node NrP, Target Node NtP) | TP  (NrP ϵ Pathi AND NtP ϵ Pathi ) | FP  (NrP ϵ Pathi OR NtP ϵ Pathi ) |
| Prediction  (Root Cause Node NrP, Target Node NtP) | FN  (! NrP ϵ Pathi )AND (! NtP ϵ Pathi ) | TN = 0 |

**Extensive Evaluation** means the confusion matrix is defined five categories. Each category has score of zero or one. The confusion matrix is defined by the threshold or cut-off value alpha. For each of the case, we calculate sigma.

Sigma = sum (Q1, Q2, Q4, Q5)

if (sigma >= alpha and Q3==1)

the case is counted as TP;

else if (sigma >= alpha and Q3==0) OR (sigma <alpha and Q3==1)

the case is counted as FP;

else if (sigma < alpha AND Q3==0)

the case is counted as FN;

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|  | Ground Truth  Threshold alpha = mean  Threshold alpha = median (50th percentile) | Threshold alpha = mean  Threshold alpha = median (50th percentile) |
| Prediction  Sigma and Q3 | TP  (sigma >= alpha and Q3==1) | FP  (sigma >= alpha and Q3==0) OR (sigma <alpha and Q3==1) |
| Prediction  Sigma and Q3 | FN  (sigma < alpha AND Q3==0) | TN  0 |

