A TOPSIS-based Multi-objective Model for Crowd Judgment Analysis

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REFERENCES

Challenges
- As it is unknown to us what are the possible options (only starting and ending coordinates are known), therefore, it is hard to find the posterior distribution of each option.
- If the range of opinions are large, then it becomes more difficult to aggregate the decisions.
- One solution can be to use binning, but it needs multiple threshold values that is a problem and there is a chance of loosing the exact information due to the merging of similar opinion in same bins.

Motivations
- We are motivated that defining the option set is not necessary when it is not available.
- Ranking of crowd from constrained opinions from them cannot be performed easily as no ground truth label is present.
- TOPSIS method for ranking can be a probable solution for ranking to reward them.
- However, the ideal solution in traditional TOPSIS for multiple objectives cannot be optimal in the presence of conflicting objectives.

TOPSIS-based Multi-objective Model for Crowd Judgment Analysis

Crowdsourcing service can be utilized very efficiently based on the available vast human resources to label data at a larger scale. Collecting independent opinions from them can solve the large annotation task in very time and cost-effective manner.

Traditional Judgment Analysis

Constrained Judgment Analysis

Multi-objective Formulation
- The aggregated judgment from multiple crowd opinions are derived by optimizing two conflicting criteria simultaneously.
- The first objective is the coverage area enclosed by K points and the second objective is the deviation of the solution from the mean.

Dataset and Analysis

Results

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Objective 1</th>
<th>Objective 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution 1</td>
<td>1.9502</td>
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<td>Solution 2</td>
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<td>Solution 3</td>
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<tr>
<td>Solution 4</td>
<td>1.6846</td>
<td>0.0519</td>
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