Approach Summary

1. Moved from traditional BERT models to Deberta v3 (Small). The 'disentangled attention' module in Deberta is much more effective at analyzing the fine requirements of logical relationships in NLI tasks, whereas the 'small' model ensures that the latency of inference stays below 50ms.
2. **Robust Auto-Calibration:** Introduced a dynamic calibration routine during the initialization process. The model is no longer trained to rely on label indices (for instance, Contradiction = 0). The model receives a fixed contradiction statement pair ("Door is open" and "Door is closed") during initialization to dynamically determine the label output index. Such label flip issues occur among different architectures of deep learning models.
3. **Bidirectional Inference:** NLI models are asymmetric; “A -> B” may receive a different score from “B -> A”. For each sentence pair, it makes inference on both possibilities and chooses the maximum of the contradiction score. It handles cases of conflict, wherein the logical divide may be more apparent in its reversed form (Fast laptop vs Waiting 5 mins).
4. **Discourse Marker Cleaning:** regex-based preprocessing techniques were applied to remove the transitional phrases such as 'However,,' 'But,,' and 'Though' before inference. Frequently, these phrases act as cues to the NLI models that a contradiction is to be anticipated, hence the models predict 'Neutral' or 'Entailment' for the contradiction. Removing them challenges the model to infer the factual statements directly.
5. **Threshold Tuning:** Decision threshold value is set to 0.80. This is a confidence filter rejecting “soft” contradictions ("mediocre quality" contradiction with “hearing noise”) versus keeping “hard” logical inconsistencies.