Conference Paper Review

Paper ID: 001
Title: Counterfactual Explanations for Inferred Medical Treatments
Author(s): Xinmiao Lin

Reviewer's Recommendations:
  i. **Writing**
     - Minor improvement suggested
  ii. **Novelty**
     - Original
  iii. **Suitability**
     - Very related
  iv. **Reviewer's Expertise**
     - Knowledgeable
  v. **Recommendation**
     - Accept if there is space

Reviewer's detailed comments: strength, weakness, suggestion
  i.   **Comments for the Authors:**
  a. **Strengths:**
  The problem and the objective of the research have been defined very well in the paper. Likewise, the research's significance and impact have been demonstrated clearly with examples like questions on the effects of choosing one medicine over the other and returning the best treatment plan with the effects.

  The ability to explain the decision made by the model is pretty novel and significant. Similarly, the results for both the experiments are clearly stated, along with discrete explanations for the obtained results. The conclusion covers the paper's major key points and summarizes the contribution and significance of the research well.

  b. **Weakness and Suggestions**:
  The title does not seem to be very appealing and descriptive of the content. It can be improved by including a few more descriptive keywords.

  I found a few grammatical errors which need to be corrected. For instance, the third sentence of the abstract "tell explain." Likewise, mixing past and present tenses in consecutive sentences (second last paragraph of Introduction – The second sentence is in past tense whereas the first and the remaining sentences are in the present tense.)

The abstract misses stating the impact and significance of the research. It should be included so that the readers are encouraged to read the full paper. Also, the abstract mentions that the work delivers good experimental results, which is too general. Some qualitative or quantitative indicators should be included to prove that the results are good instead.

A sentence in the second last paragraph, "Our work is inspired from this work [4] that uses two models to provide counterfactual explanations in videos." is not very clear. Instead of using "this work [4],", a few words indicating the work is much more appropriate.

Likewise, in the related works section of the Introduction, I suggest including a very few sentences summarizing the work instead of just mentioning the works' names and citations.

ii. **Comments for the Program Committee (will be kept confidential and NOT released to the authors)**
The paper has a novel idea, which can provide significant contributions and impacts in medical treatments. However, there are a few improvements to be made before it can be published.

Journal Paper Review

Paper ID: 001
Title: Counterfactual Explanations for Inferred Medical Treatments
Author(s): Xinmiao Lin

Goals and Contributions:
    i   Do the authors clearly state the research goals of the work?

            The problem and the objective of the research have been stated very well in the paper. Likewise, the research's significance and impact have been demonstrated clearly with examples like questions on the effects of choosing one medicine over the other and returning the best treatment plan with the impact.

    ii   Does the paper clearly indicate what the contributions are?

            The paper clearly indicates the contributions in predicting the best treatment with the treatment effects, which can help the physicians validate the decisions.

    iii   Are the claimed contributions original and significant in terms of
- Novel methodology?
- New applications?

            The ability to explain the model's decision using two sub-models, prediction and explanation model, is pretty novel and significant in terms of both applications and methodology.

    iv   Does the paper describe the methods in sufficient detail for readers to replicate the work?

            The explanations of the methods are not detailed enough for readers to replicate the work. Likewise, the information about the code has not been mentioned in the paper.

Evaluation:
    i.   Do the authors carefully evaluate the approach?

            The author carefully evaluated the approach by testing it on a standard breast cancer dataset and evaluating the results with oncologists specialized in breast cancer.

    ii.   Does the paper include systematic experiments, a careful theoretical analysis, or give evidence of generality?

            Yes, the paper includes very systematic experiments, conducted by inviting 20 oncologists to evaluate the treatment plans' validity. Two types of experiments were shown and adequately analyzed to produce the evaluation results, with evidence.

Discussion:
    i.   Does the paper discuss relevant earlier works, noting similarities, differences, and progress?

Although the paper mentions the relevant earlier works, a summary of the work and the similarities and differences are missing.

ii. Does it discuss the limitation of the approach as well as its advantages?

The limitations of the approach have not been mentioned in the paper. On the other hand, the advantages and significance of the work have been made pretty clear.

iii. Does it consider the implication of the work and outline direction for future work?

The implication of the work in the application of deep learning in medicare has been provided. However, specific future work is not mentioned in the paper.

Presentation:
i. Is the paper properly organized and well written?

Yes, the paper is properly organized in terms of structure. It has been divided into standard sections. The paper is well written, with minor improvements required in the abstract section.

ii. Is the paper grammatically correct and free of spelling errors?
I found a few grammatical errors in the paper. For instance, the third sentence of the abstract "tell explain." Likewise, mixing past and present tenses in consecutive sentences (second last paragraph of Introduction – The second sentence is in past tense whereas the first and the remaining sentences are in the present tense.)

iii. Does it use standard terminology?
Yes, all the terminology used in the paper were standard.

Detailed Comments:
The problem and the objective of the research have been defined very well in the paper. Likewise, the research's significance and impact have been demonstrated clearly with examples like questions on the effects of choosing one medicine over the other and returning the best treatment plan with the effects.

The ability to explain the decision made by the model is pretty novel and significant. Similarly, the results for both the experiments are clearly stated, along with discrete explanations for the obtained results. The conclusion covers the paper's major key points and summarizes the contribution and significance of the research well.

It misses stating the impact and significance of the research. It should be included so that the readers are encouraged to read the full paper. Also, the abstract mentions that the work delivers good experimental results, which is too general. Some qualitative or quantitative indicators should be included to prove that the results are good
The title does not seem to be very appealing and descriptive of the content. It can be improved by including a few more descriptive keywords. The abstract misses stating the impact and significance of the research. It should be included so that the readers are encouraged to read

the full paper. Also, the abstract mentions that the work delivers good experimental results, which is too general. Some qualitative or quantitative indicators should be included to prove that the results are good instead.

A sentence in the second last paragraph, "Our work is inspired from this work [4] that uses two models to provide counterfactual explanations in videos." is not very clear. Instead of using "this work [4],", a few words indicating the work is much more appropriate.

Likewise, in the related works section of the Introduction, I suggest including a very few sentences summarizing the work instead of just mentioning the works' names and citations.

Recommendation:
    The paper could be published after minor revision requiring another round of review.