Manuscript ID: OJCS-2023-01-0005
Title: State Space Explosion Mitigation for Large-Scale Attack and Compliance Graphs Using Synchronous Exploit Firing

Reviewer #1
Thank you for your feedback in your general comments and through the additional questions. The authors welcome and appreciate the feedback and suggestions you provided.

Comment 1: "The characters in figure 2 can be larger."
The characters and text size in Figure 2 have been increased. We believe this change increases the readability of the figure.

Comment 2: "There should be more detailed introduction about attack and compliance graphs."
The authors have included a "diff" file to make it easier for the reviewers to see the changes as they relate to their comments. All changes to the original submission can be identified in the diff file by the yellow highlighting of the new or modified text.

The authors have included text near the beginning of the Introduction and at the end of the Introduction that they believe provides additional insight to attack and compliance graphs.

Reviewer #2
Thank you for your feedback in your general comments and through the additional questions. The authors welcome and appreciate the feedback and suggestions you provided.

Comment 1: "The introduction of Section IV is vague and lacks necessary examples. Such as the process of synchronous exploit firing and the scheme of grouping."
The authors have included a "diff" file to make it easier for the reviewers to see the changes as they relate to their comments. All changes to the original submission can be identified in the diff file by the yellow highlighting of the new or modified text.

The authors have made significant edits to the introduction of Section IV to work toward incorporating this feedback. We believe that this edit helps to clarify the process of synchronous exploit firing and the scheme of grouping.

Comment 2: "The content and innovation points of the paper are less."
The authors have added a second example of application to improve the content and innovation points of the paper. This second example falls into a separate area of application, and we hope that this showcases the versatility of the synchronous firing feature more.

The authors have also included new entries for the tabled results to show the "State Space Reduction Factor", along with associated figures. The authors believe that this addition helps showcase the achieved goal of this work.

Comment 3: "In the experimental part, only one set of indivisible features is used to measure the performance of the synchronous firing, which can be increased appropriately. In addition, how accurate is the state space generated by this method?"

The authors have added a second example of application to improve the content and innovation points of the paper. This second example uses a different set of indivisible features. Whereas the automobile maintenance example is based on the "time" feature, this second example highlights different features that can be grouped.

The authors have also added commentary regarding the accuracy and integrity of the resulting graphs when using this method. A new "Accuracy of the Generated Graphs" subsection was added to discuss this in greater detail.

Comment 4: "The references can be increased appropriately."
The authors have worked to increase the references.

Reviewer #3
Thank you for your feedback in your general comments and through the additional questions. The authors welcome and appreciate the feedback and suggestions you provided.

Comment 1: "The introduction is not clear enough. In this section, the author introduces the problems of the current compliance graphs, however, the authors do not point out clearly which problems that will be solved in this paper."
The authors have included a "diff" file to make it easier for the reviewers to see the changes as they relate to their comments. All changes to the original submission can be identified in the diff file by the yellow highlighting of the new or modified text.

The authors have included text near the beginning of the Introduction and at the end of the Introduction that they believe provides additional insight to attack and compliance graphs.
The authors have also made significant edits to the introduction of Section IV to work toward incorporating this feedback. We believe that this edit helps to clarify the process of synchronous exploit firing and the scheme of grouping.

Comment 2: "For solving these disadvantages of current compliance graphs, what are the contributions of this paper?"
The authors have added a second example of application to greater highlight the contributions of this paper. This second example falls into a separate area of application, and we hope that this showcases the versatility of the synchronous firing feature more. The authors believe that the second example and its resulting figures depicts the advantages that this work provides in mitigating the state space explosion present in the graph generation process.

The authors have also included new entries for the tabled results to show the "State Space Reduction Factor", along with associated figures. The authors believe that this addition helps showcase the achieved goal of this work.

Comment 3: "The authors introduce many disadvantages of compliance graphs in current works, however, what is the exactly problem that the authors will be solved in this paper should also be introduced in detail."
This work presents a solution at mitigating state space explosion of large-scale compliance graphs by optionally preventing the generation of infeasible states. In traditional generation, states are generated that posses qualities that are unattainable. The automobile example illustrated in this work shows how

traditional generation produces states containing qualities where the two cars are progressing through time at different rates, rather than progressing at the same time.
The authors have included text near the beginning of the Introduction and at the end of the Introduction that they believe provides additional insight to the contributions of this work. Additional discussion on the contributions of this work were added to the new Accuracy of Generated Graphs subsection.
The authors have also made significant edits to the introduction of Section IV to work toward incorporating this feedback. We believe that this edit helps to clarify what the synchronous firing process aims to achieve.