Dear Ms. Becky

Thank you for giving us the opportunity to submit a revised draft of the manuscript “CNN Based Smart Sleep Posture Recognition System” for publication in the Journal of IoT. We appreciate the time and effort that you and the reviewers dedicated to providing feedback on our manuscript and are grateful for the insightful comments on and valuable improvements to our paper. We have done an extensive revision and incorporated most of the suggestions made by the reviewers. The changes made to the text have been highlighted in the revised manuscript.

Thank you very much. We appreciate the time and effort taken to provide feedback on our manuscript. We are grateful for the insightful comments and valuable suggestions for improving the article. Following are the responses to viewer’s comment

The authors propose a non-invasive application based on an electronic mat called Sleep Mat-e to monitor people's sleep activity and sleep posture. The integrated data acquisition module collects data from pressure sensors providing a snapshot of current posture and transmits it to the cloud server via Wi-Fi.

**Reviewer 1**

Comment 1: The authors could complement the study on non-invasive sensors for older people.

Comment 2: Some figures are low resolution and do not look good.

Comment 3: How do you ensure that there is no overlap of the original images between the two data sets?

Comment 4: In addition to the non-duplication of data in the cloud, it would be good to explain the energy consumption of the system.

**Reviewer 2**

* The motivation for using CNN is not clear as the sleep positional information does not always image.
* Authors claimed on page 5 ”knowledge, no comprehensive work was dedicated to develop a sleep quality monitoring ….accuracy by using CNN”. However, few relevant references are missing including ‘Z. Liu, X. Wang, M. SU and K. Lu, "A Method to Recognize Sleeping Position Using a CNN Model Based on Human Body Pressure Image," 2019 IEEE International Conference on Power, Intelligent Computing and Systems (ICPICS), Shenyang, China, 2019, pp. 219-224’
* As a part of an original research, related study section is longer than expected.
* The test dataset is too small, could you experiment with more test samples to illustrate the robustness of the claim?
* Quality of the images needs to be improved.
* As we are sharing data in the cloud, what will happen to the privacy of the subject(s)?

**Reviewer 3**

The paper considers the problem of sleep posture recognition and proposes a solution based on a low-cost pressure sensor and CNN. The paper is very well written and can easily be read and understood.

**Reviewer’s comment:** However, one major problem in the paper is the related work in the same context, as there are several very related papers that have not been discussed. One of these papers is “ Hu, Q., Tang, X., & Tang, W. (2020). A Real-time Patient-Specific Sleeping Posture Recognition System using Pressure-Sensitive Conductive Sheet and Transfer Learning. IEEE Sensors Journal.” Your contribution compared to this paper is that you propose a cloud-based solution that permits the end users to receive alert messages. These related papers should be discussed

**Author's Response:** Thank you very much. We agree with reviewer’s comments. We have discussed the related paper on page 5 and you have correctly identified our contribution. The discussion is highlighted in the revised manuscript.

**Reviewer’s comment:** However, papers that propose IoT based solution have also not been discussed in the related work. See, for example, Matar, G., Lina, J. M., Carrier, J., Riley, A., & Kaddoum, G. (2016, September). Internet of Things in sleep monitoring: An application for posture recognition using supervised learning. In 2016 IEEE 18th International Conference on e-Health Networking, Applications and Services (Healthcom) (pp. 1-6). IEEE. These related papers should be discussed.

**Author's Response:** Thank you very much. We agree with reviewer’s comments. We have discussed the related paper on page 5 and same is highlighted in the revised manuscript. This system was never implemented in the hardware whereas the system proposed here is a fully functional prototype.

**Reviewer’s comment:** your contribution should be highlighted,

**Author's Response:** Thank you very much. We agree with reviewer’s comments. We have highlighted the contribution and same is provided in the revised manuscript.

**Reviewer’s comment:** the results should be compared with other methods.

**Author's Response:** Thank you very much. We agree with reviewer’s comments. The comparison of our proposed method with other methods is provided in the revised manuscript.

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Reviewer’s comment: For example, diagram 2, together with a discussion of the results, should not be included in the methodology section, but in the research results;

Author's Response: Thank you very much. We agree with reviewer’s comments. We have made the suggested changes.

Reviewer’s comment: Data from pages 9 and 10 should also be included in the results section.

Author's Response: Thank you very much. We agree with reviewer’s comments. We have made the changes as suggested by you.

Reviewer’s comment: The data on page 17 should also be in the results section.

Author's Response: Thank you very much. We agree with reviewer’s comments. We have made the suggested changes.

Reviewer’s comment: The collected results should also be shown in the context of independent variables (e.g. gender, place of residence of students). It is worth presenting in the empirical part whether the group of students is homogeneous in the context of the research problems posed. It is worth going beyond simple descriptive statistics.

Author's Response: Thank you very much. We agree with reviewer’s comments. We have made significant changes and provided result in the context of independent variable as shown in Tables 1, 2, 5, 6 in the revised manuscript.

 These comments only help to make the study more readable.

Overall, the text should be assessed positively.

The text needs to be structured according to the IMRAD framework, so it should have the following format: introduction, theoretical framework, methodology (research objectives, research subject and research problems, research sample selection, research procedure, research ethics), results - where we present graphs; discussion with reference to similar experiments and conclusion.

Author's Response: We agree with reviewer’s comments. We have made changes to follow IMRaD technology as much as possible but the nature of paper does not allows to follow it fully due to three different phases of research.

- Both citations and bibliography are not compatible with the requirements of the journal. The journal's standards must be adapted;

Author's Response: Thank you for pointing this out. We have rewritten the Reference section. Both citations and bibliography are now compatible with the requirements of the journal.

- The discussion and conclusion section should be separated from each other;

Author's Response: This is confusing as discussion and conclusion section are already separated from each other.

- in the results section it is worthwhile to juxtapose the variables with each other, i.e. to deepen the calculation beyond simple descriptive statistics. For example, show differences due to gender, place of residence or other sociodemographic variables.

Author's Response: We have made some minor addition based on the available data.

Regards,

Muhammad Nadeem