To reviewer 2 of Sensors Journal

28 Jun 2019

Dear reviewer 2,

**Reply to reviewer 2 on Sensors Journal**

Ref No. sensors-530236, “An Advanced First Aid System Based on an Unmanned Aerial Vehicle and Wireless Body Area Sensor Network for Elderly Persons in Outdoor Environments”

First, the authors would like to thank the reviewer 2 and editor for their valuable comments and contributions to our manuscript. We find that the comments greatly improve the accuracy and clarity of the paper. We have revised the manuscript in accordance to the reviewer comments. Please find the author’s response to each of the editor and reviewer specific comments below:

**Reviewer 2**

Comments and Suggestions for Authors

The paper describes a wearable system which detects user falls and hear-rate failures and informs a data center, so that a UAV with a first-aid kit is sent automatically to the user position. The system is properly described, and measurements are reported which support the presented approach. The paper is also clearly written. There are however several issues that need to be clarified in order to justify the presented approach:

**Comment A)** The technologies integrated in the wearable device, such as GPS positioning, cellular connection, accelerometers and a pulse-measurement system, are currently available in conventional smartphones and smartwatches. It seems then that the presented wearable device could be replaced by these devices, so that only an App would need to be developed. Why has this approach not been considered here, while it has been considered in other works such as those detailed in Lines 390-391?

**Response A)** The reasons for not using the Smartphone in the patient side have been added to the current version. It can be found in Section 3.2.1, page 9, and lines 396-416.

**Comment B)** Time saving results indicate a saving of 90 seconds and 120 seconds with the UAV device, compared to an ambulance. Considering that the UAV brings only a first-aid kit, which in addition must be employed by an injured elderly person, while the ambulance arrives with prepared personnel with full medical equipment, do the measured time saving values justify the proposed system?

**Response B)** Using the first aid by an injured elderly person has been adding to the current version. It can be found in Section 3.2.2, page 10, lines 427-429. In addition, the benefit of using the UAV for delivered the first aid kit has been explained in the current version. It can be found in Section 6.6, pages 21 and 22, lines 761-762.
Comment C) What is the duration of the battery of the wearable device?

Response C) Battery lifetime estimation has been added to the current version, where a new section (i.e., Section 6.7) has been allocated in this regard. It can be found in Section 6.7, page 22, and lines 767-779.

Comment D) one minor correction: "ZigBee" instead of "Zigbee" in Lines 65, 145, 156 and 168.

Response D) “ZigBee” word has been corrected along the paper. It can be found in lines 64, 144, 155, and 167.