Data Article

Survey dataset on fusing RFID with mobile technology for efficient safety of construction professionals

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ABSTRACT

The fourth industrial revolution has encouraged technologies such as the RFID fused with mobile software for monitoring construction workers on site. In this dataset, a structured questionnaire was design directed to thirty-four (34) construction professionals in Gauteng province South Africa through random sampling. The set of descriptive statistics is presented with tables, bar and pie charts. The willingness level of construction professionals to adopt RFID and mobile technology on construction sites was identified. The barriers to the adoption of fusing mobile technology and RFID for construction safety can be determined when the data is analyzed. Moreover, the construction professional’s agreement with RFID as a tool for preventing health hazards on construction sites can be obtained from the analysis of the survey data.

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1. Data

The data set contains responses obtained from a questionnaire survey of construction professionals ranging from quantity surveyors, architects, urban and regional planners, civil, mechanical and

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Table 1 presents the barriers to the adoption of RFID and mobile technology for enhanced safety of construction workers. The barriers include; cost of implementation (4.53), Low technical know-how (4.50), Data security (4.29), Communication range (4.24), Storage of data (4.12), Additional weight of sensor on the PPE (4.06), Ethical considerations (3.71) and Power availability (3.62).

Fig. 1 presents the readiness of construction professionals to adopt RFID and mobile technology for enhanced safety on construction sites. The chat shows that almost half (47.1) of the construction professionals are ready to adopt RFID and mobile phones. Whereas 14.7% are neutral about the adoption of RFID and 38.2% are very ready to adopt RFID and mobile technology.

Fig. 2 revealed the construction professionals level of agreement with RFID as a tool for preventing occupational hazards on construction sites. Almost all (73.5%) of the respondents agreed with the opinion that RFID has the potentials for curbing the health hazards experience on construction site while 8.8% are neutral about the use of RFID.

2. Experimental design, materials, and methods

The weak monitoring of construction professionals activities on construction sites has been responsible for the occupational hazards of construction workers on site [2]. Towards enhancing the safety of construction professionals an experiment was conducted using radio frequency identification (RFID) and mobile technology. Radio frequency identification contains three major components which are; tag, reader and back end system [3]. The experiment proposed the fixing of the tag on the protective equipment (overall, hard hats and many other) worn by the construction professionals on the site. The safety officer’s mobile phone on site will function as the RFID reader. The experiment adopted mobile technology because it is expected to provide a fast and easy way for monitoring construction workers activity remotely on site.
Table 1
Barriers to the use of RFID and mobile technology for construction safety.

| Barrier                              | N  | Minimum | Maximum | Mean  | Rank | Std. Deviation | Cronbach AlPha |
|--------------------------------------|----|---------|---------|-------|------|----------------|----------------|
| Cost of Implementation              | 34 | 3       | 5       | 4.53  | 1    | .662           | 0.856          |
| Low technical know how              | 34 | 3       | 5       | 4.50  | 2    | .663           |                |
| Security of data                    | 34 | 3       | 5       | 4.29  | 3    | .760           |                |
| Communication range                 | 34 | 3       | 5       | 4.24  | 4    | .741           |                |
| Storage of data                     | 34 | 3       | 5       | 4.12  | 5    | .729           |                |
| Additional weight of sensor on the PPE | 34 | 2       | 5       | 4.06  | 6    | .776           |                |
| ethical considerations              | 34 | 2       | 5       | 3.71  | 7    | .799           |                |
| Power availability                  | 34 | 2       | 5       | 3.62  | 8    | .985           |                |

Fig. 1. Readiness of construction professionals to adopt RFID and mobile technology.

Fig. 2. Construction professionals level of agreement with the use of RFID for enhancing safety on site.

The data generated from the experiment was acquired through random sampling of construction professionals in Gauteng province South Africa. Past researchers [4–6] adopted a similar approach to obtain empirical data from respondents. The data was collected through a structured close-ended questionnaire directed at construction professionals (quantity surveyors, architects, urban and regional planners, civil, mechanical and electrical engineers). The questionnaire was broken down into three sections which are personal information of the respondents, readiness to adopt RFID, agreement with RFID as a tool for preventing hazards and barriers to the use of RFID and mobile technology for construction safety. The barriers to the use of RFID was acquired using a five-point Likert scale from not
agree denoted by 1 to very agree represented by 5. A total of 40 construction professionals were selected with the selection based on their involvement of health and safety on the construction site. Out of the selected construction professionals, 34 responded effectively and their response was analyzed. The dataset was analyzed using SPSS and Microsoft Excel to produce descriptive data.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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