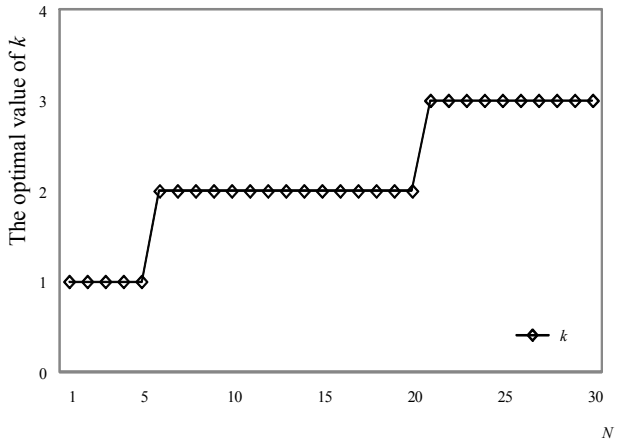

Fig 4. Effect of N on the optimal value of k

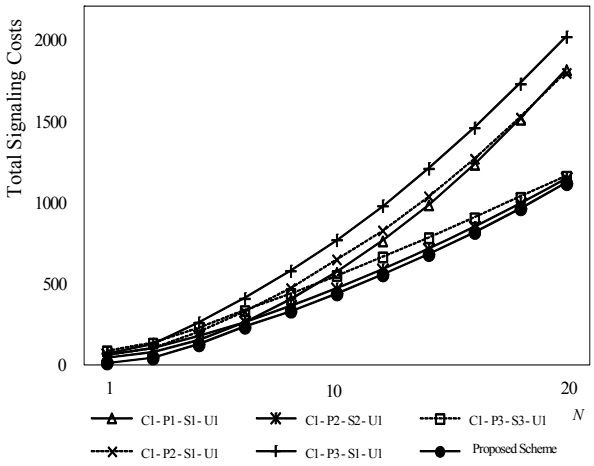

Fig 5. Effect of N on the total signalling cost

This is because when N is large, the processing and storing costs are high. Using the analytical result as shown in Fig. 4, it is possible to get the necessary optimal level k when N is given. For example, when N is between 6 and 20, the optimal level k is 2. We demonstrate the performance comparison between the HLM and AHLM schemes. Fig. 5 shows the effect of the size of collected data per unit time N for $\lambda_r = 0.5$, $T_h = 6$, and $\lambda_e = 0.1$. As shown the Fig 5, the total signalling cost increases as the size of collected data per unit time N increases. It is obvious that the whole performance of the AHLM scheme is the best. For large values of N, the performance of the AHLM scheme is better than that of the HLM scheme. This can be explained by the fact that the AHLM scheme reduces the total signalling cost efficiently by selecting the usage storage for the processing and storing. Fig. 6 shows the effect of the occurred event rate per unit time λ_e for $\lambda_r = 0.5$, $T_h = 6$, and $N = 100$. As shown the Fig. 6, the total signalling cost increases as the occurred event rate per unit time λ_e increases. In this figure, we observe that the AHLM scheme always performs better than the HLM scheme. Fig. 7 shows the effect of the retrieval rate per unit time λ_r for $\lambda_e = 0.5$, $T_h = 6$, and $N = 20$. As shown in Fig. 7, the total signalling cost for the HLM and AHLM schemes have a linear relationship with the effect of the retrieval rate per unit time λ_r. It can be observed that the total signalling cost of the AHLM scheme can be much lower than that of the HLM scheme.

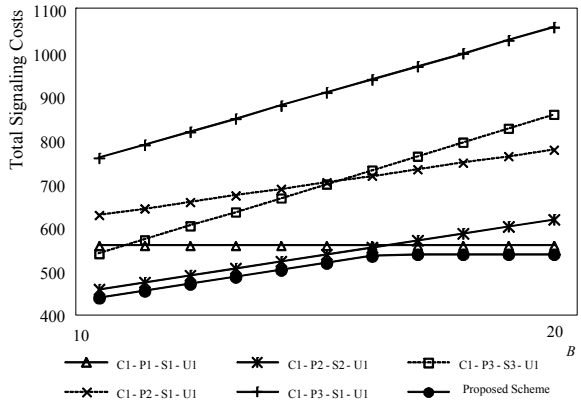

Fig 6. Effect of λ_e on the total signalling cost

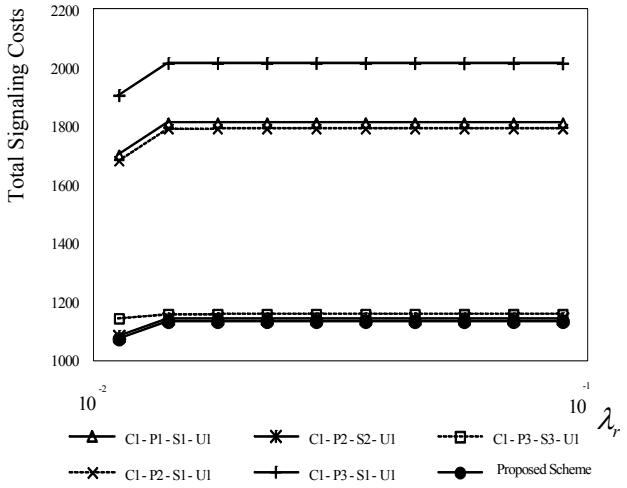

Fig 7. Effect of λ_r on the total signalling cost

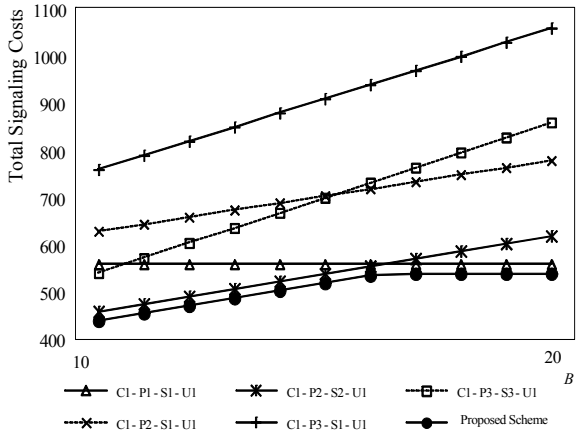

Fig 8. Effect of B on the total signalling cost

Fig. 8 shows the effect of the transmission delay B for $\lambda_r = 0.1$, $\lambda_e = 0.5$, $T_h = 6$, and $N = 10$. As shown the Fig. 8, the total signaling cost increases as the transmission delay B increases. We can see in this figure that our AHLM scheme generates lower signalling cost for lifelog management than

the HLM scheme. Fig. 9 shows how the total signalling cost are affected by the storage cost S for $\lambda_r = 0.1$, $\lambda_e = 0.5$, $T_h = 6$, and $N = 10$. We can observe that our AHLM scheme can reduce the signalling cost. Particularly, when the value of S is high, the benefit of the AHLM scheme is significant. Based on the above analysis, we find that our proposed scheme can achieve superior performance, much better than that of the existing HLM scheme.

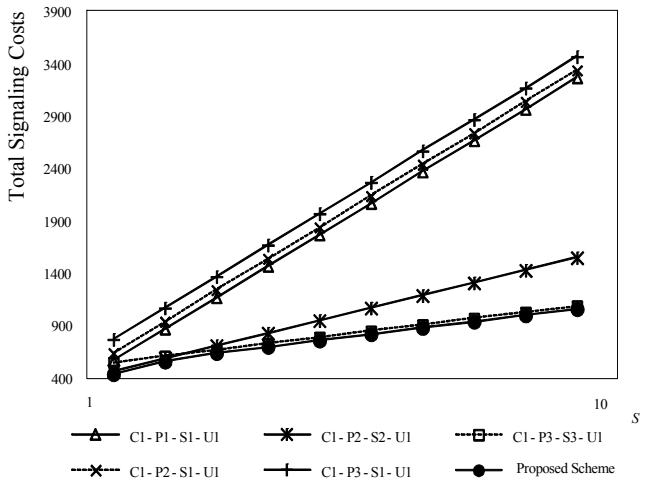

Fig 9. Effect of S on the total signalling cost

V. CONCLUSIONS

In order to achieve high-quality screening and treatment for the healthcare service sector, all lifelog data should be managed effectively because it is necessary to gather as much health information on users as possible. To address these problems, we propose a novel lifelog management scheme based on the characteristics of collected data. In our proposed scheme, the available storage is selected for the preprocessing and storing of lifelog data to reduce performance overhead. The cost analysis presented in this paper shows that our proposed scheme is superior to the existing lifelog scheme in terms of performance by selecting the storage resources.

REFERENCES

[1] Jim Gemmellm, Gordon Bell, Roger Lueder, "MyLifeBits: a personal database for everything', Magazine Communications of the ACM- Personal information management, Volume 49 Issue 1, pp. 88—95, 2006.

[2] Reza Rawassizadeh, Martin Tomitsch, Katarzyna Wac, A. Min Tjoa, "UbiqLog: a generic mobile phone-based life-log framework. Personal and Ubiquitous Computing 17(4), pp. 621-637, 2013

[3] Belimpasakis. P. , Roimela. K. , Yu You: Experience Explorer" A Life-Logging PlatformBased on Mobile Context Collection", Third International Conference on Next Generation Mobile Applications, Services and Technologies, pp. 77-82, 2009

[4] Snehal Chennuru, Peng-Wen Chen, Jiang Zhu, Joy Ying Zhang "Mobile Lifelogger – Recording, Indexing, and Understanding a Mobile User's Life, ", Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, Volume 76, pp. 263-281, 2012

[5] Prananto, B.H, Ig-Jae Kim, Hyoung-Gon Kim. 2007. Multi-level Experience Retrieval for the Personal Lifelog Media System. Third International IEEE Conference on Signal-Image Technologies and Internet-Based System : 175-182

[6] Snehal Chennuru, Peng-Wen Chen, Jiang Zhu, Joy Ying Zhang, " Mobile Lifelogger : Recording, Indexing, and Understanding a Mobile User's Life. Lecture Notes of the Institute for Computer Sciences, Vol. 76, pp. 263-281, 2012

[7] Minkyung Kim, Dong-Wook Lee, Kangseok Kim, Jai-Hoon Kim," Hierarchical structured data logging system for effective lifelog management in ubiquitous environment", Multimedia Tools and Applications, 2013.

[8] Svebor Karaman, Jenny Benois-Pineau, Vladislavs Dovgalecs, Remi Megret, Julien Pinquier, Regine Andre-Obrecht, Yann Gaestel, Jean-Franeois Dartigues, "Hierarchical Hidden Markov Model in detecting activities of daily living in wearable videos for studies of dementia", Multimedia Tools and Applications 69(3), pp. 743-771, 2012

[9] Ig-Jae Kim, Sang Chul Ahn, Hyoung-Gon Kim, "Personalized lifelog media system in ubiquitous environment. Lecture Notes in Computer Science Volume (4412), pp. 20-29, 2007

[10] Ovgu Ozturk, Tomoaki Matsunami, Yasuhiro Suzuki, Toshihiko Yamasaki, Kiyoharu Aizawa. "Real-time tracking of humans and visualization of their future footsteps in public indoorenvironments", Multimedia Tools and Applications 59(1), pp. 65-88, 2011

[11] Ovgu Ozturk, Tomoaki Matsunami, Yasuhiro Suzuki, Toshihiko Yamasaki, Kiyoharu Aizawa. "Real-time tracking of humans and visualization of their future footsteps in public indoorenvironments", Multimedia Tools and Applications 59(1), pp. 65-88, 2011

[12] Chang-Woo Song, Daesung Lee, Kyung-Yong Chung, Kee-Wook Rim, Jung-Hyun Lee, "Interactive middleware architecture for lifelog based context awareness", Multimedia Tools and Applications 71(2), pp. 813-826, 2013