SECM: Smart & Effective Crowd Mana gement with a Novel Scheme of Big Data Analytics

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OVERVIEW OF THE PAPER

- A novel scheme that can perform a precise extraction of knowledge from the complex and massive streaming of live data of the scene from the crowded place.
- The prime contribution of the proposed system is to perform enough processing over the raw and unstructured distributed data from multiple locations so that processing over distributed storage and mining can be done with lesser processing time and higher degree of accuracy.
- An experimental research methodology has been adopted to capture signal using Logitech HD C920 and processed over Intel Xeon E5540 processors with 2 GPbs connectivity.
- The raw data is subjected to pre-processing, segmentation, scene profiling, in order to get convolved data that are stored in distributive manner using Hadoop and mined using MapReduce.
- The comparative study outcome shows lesser processing time and higher accuracy as compared to existing relevant analytics.

BIG DATA

- Big Data
  - Characteristics of Big Data
    - i) Data Volume
    - ii) Data Variety
    - iii) Data Veracity
    - iv) Data Volume
    - v) Value

IMPORTANCE OF BIG DATA ANALYTICS

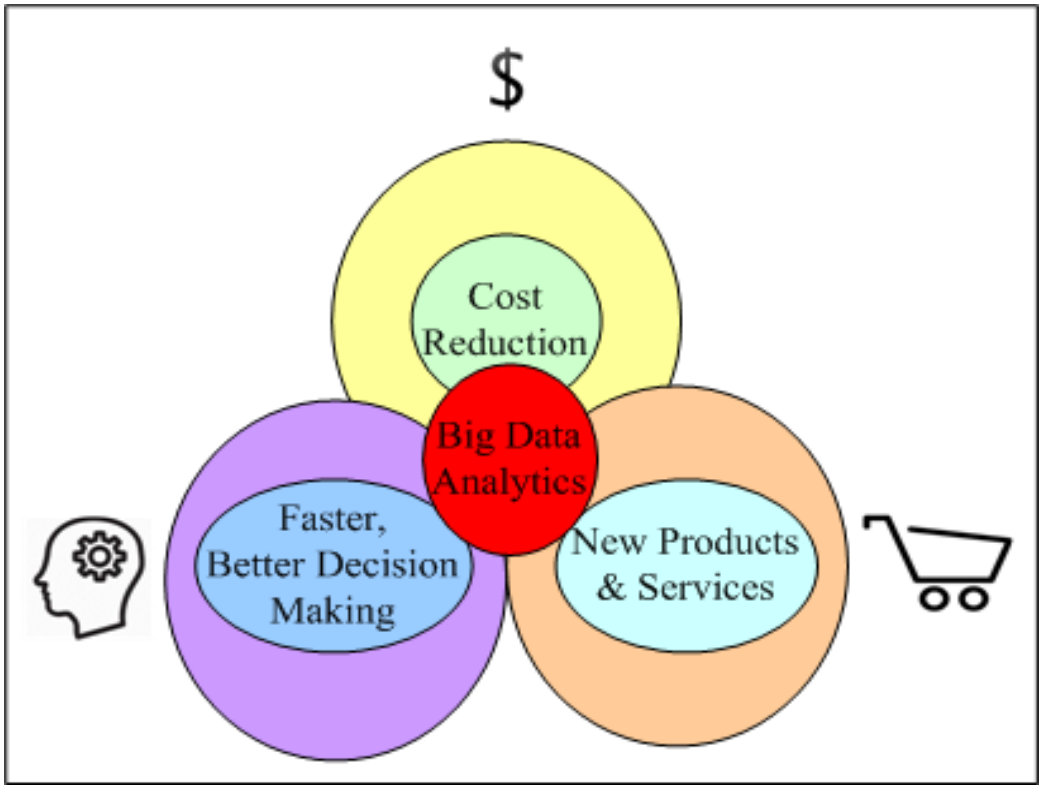

Figure 1 Architecture of Big Data Analytics Significant

RELATED WORK

- A unique term called as *nomadic computing* was found to be illustrated in study of Yu et al. [11] which performs optimization using stochastic approach as well as distributed computing.
- Big data analytics are also found to be studied along with Internet-of-Things (IoT) [12], which has the capability to integrate potential feature of knowledge extraction of big data with infrastructure of IoT.
- The works done by Stai et al. [13] have incorporated hyperbolic metric approach in order to solve the issue of massive data generation and storage.
- The problems of event detection using sensors and big data analytics were found in the work of Yue et al. [14].

RELATED WORK

- Big data analytics was also used in investigating crowd behavior [15].
- Vaquero and Cuadrado [16] have applied big data analytics over public cloud to reduce the processing time to 30%. Health care section has also extensive implication of big data analytics [17].
- However, none of the work till date has been standardized or found to address much on crowd-management problems, which could be used in extensive field.
- Majority of the existing research work is carried out using offline dataset and not on lively generated big data.

PROPOSED METHODOLOGY

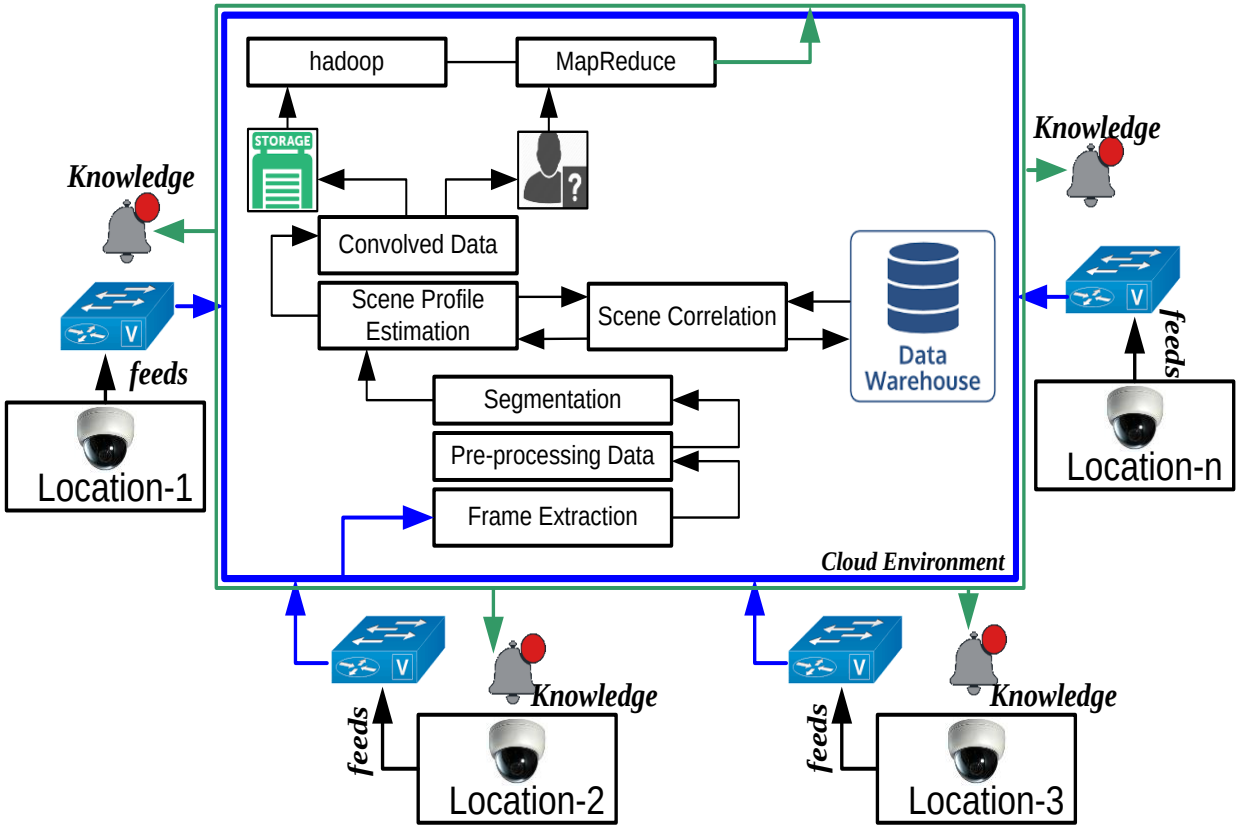

Figure 2 Schematic Architecture of SECM

ALGORITHM IMPLEMENTATION OF SECM

Algorithm for SECM

Input: d_p, f_i, S_p, S_c, C_x / C_y, H

Output: α

Start

1. *get* seg(d_p),
2. **For** (f_i>1)
3. $S_p = \sum_{j=f_i}^{f_i} [\prod_{j=f_i}^{f_i} \phi(f_j)], \forall \phi (\subseteq S_c \sim [0 \quad 1])$
4. $S_P \rightarrow \arg_{max}(S_P)$
5. **End**
6. Apply convolution, $C_p(H)=conv(gt(S_c))$
7. *iterate* it for t-interval.
7. **If** ($C_x \geq C_y$)
8. sort (C_x) & α=flag ($\arg_{max}(|C_p|)$)
9. **Else**
10. sort (C_y) & α=flag ($\arg_{max}[|C_q|$)

End

- The main purpose of this algorithm is to explore a situation in crowd which is an alarming situation.
- The algorithm considers processing various variables e.g. d_p (Processed Data), f_i (i^{th} Frame), S_P (Scene Profile), S_c (Scene Correlation), φ (Scene Correlation Function) C_x / C_y (Convolved feature of crowd in location x and y), H (Hadoop / MapReduce), which after processing yield and output of α (alarm).

RESULT DISCUSSION

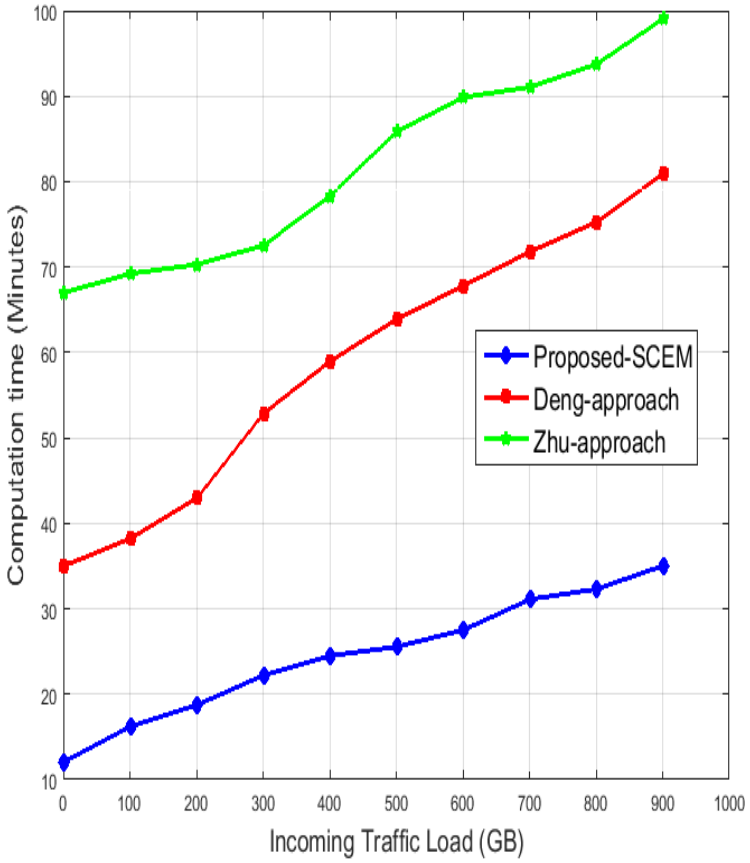

Figure 3 Comparative Analysis of Processing Time

• The implementation of the proposed system was carried out in 64 bit machine with Linux and Intel64 virtualization environment provided by Oracle Virtual Box. Hadoop clusters with configuration of 3 Intel Xeon E5540 processors and 64GB RAM is used with 2 GPbs connectivity.

•We choose the compare the outcome of proposed SECM system with the most recent and relevant existing studies of Deng et al. [18] and Zhu et al. [19] show in Fig.3.

•All the trials are executed 50 times and outcomes were studied for processing time.

•It is because we believe that processing time is the best parameter to judge the computational speed of big data analytics.

RESULT DISCUSSION

No. of Trials	Proposed SECM	Deng et al. [18]	Zhu et al. [19]
10	87.91	60.87	57.45
20	62.08	82.23	31.02
30	91.48	49.68	32.76
40	82.56	65.97	48.82
50	93.05	71.21	49.28
60	97.74	49.52	67.92
70	64.21	70.91	57.05
80	91.06	68.72	41.65
90	92.97	31.07	51.19
100	81.06	69.01	40.97

Table 1 Comparative Analysis for Accuracy

❖The numerical outcomes exhibited in Table 1 shows that proposed system offers 84.412% of accuracy level as compared to Deng et al. [18] approach (61.919%) and Zhu et al. [19] approach (47.811%).

CONCLUSION

❑ The contribution of the this research paper are:-

i)An experimentally exercised framework for big data analytics,

ii)Cost effective framework as it can be applicable on multiple scenario of implementation,

iii)Lower processing time and higher accuracy over existing research techniques,

iv)Most importantly, it can be applied over live streamed data and not offline data.

❑Hence, the reliability of the knowledge being extracted can be ensured.

❑Although, few network factor like delay may exists in lower internet connectivity as we have perform ed testing only in 2 Gbps connectivity.

❑However, it may be a secondary problem, as data accuracy is quite higher compared to existing mecha nism.

❑We will continue our investigation to include more complexities on data and will forward to perform more sophisticated framework that integrates image processing with Big data approach.

REFERENCES

[1] F. Carminati, L. Betev, A. Grigoras, Grid and Cloud Computing: Concepts and Practical Application s, IOS Press,, 2016

[2] R. Buyya, R. N. Calheiros, A. V. Dastjerdi, Big Data: Principles and Paradigms, Morgan Kaufmann, 2016

[3] S. Awaghad and S. Pokle, "Efficient design of multimedia transcoding for client side application ove r mobile interface", *International Journal of Computer Applications*, Vol.65, No.8, pp.0975 – 8887, Ma rch 2013.

[4] S. Awaghad and S. Pokle,"Video Transcoding Technique Using Tree-Based Multi-Level Block Parti tioning in OFDM Network", Inderscience Journals-*International Journal of Advanced Media and Com munication*, vol.5, No.2/3, pp.195-210, 2014

[5] S. Awaghad and S. Pokle, "Design of adaptable, optimal, and low complex JPEG2000 Transcoding of Images on OFDM Network Using DWT", *IEEE-Third International Conference on innovative Comp uting Communication Technology*, INTECH, London ,UK, 2013

REFERENCES

[6] S. Awaghad and S. Pokle, “Maintaining Image Quality on Wireless Network Standard Using JPEG2000 Transcoding and DWT”, *IEEE Symposium on Wireless Technology & Applications*, Malaysia, 2013

[7] Q. Lu, Z. Li, M. Kihl, L. Zhu, and W. Zhang, “CF4BDA: A Conceptual Framework for Big Data Analytics Applications in the Cloud”, *IEEE Access*, 2015

[8] Y. He, F. R. Yu, N. Zhao, “Big Data Analytics in Mobile Cellular Networks”, *IEEE-Access*, 2016

[9] R. Vatrapu, R. R. Mukkamala, A. Hussain, and B. Flesch, “Social Set Analysis: A Set Theoretical Approach to Big Data Analytics”, *IEEE-Access*, 2016

[10] M. A. Alsheikh, D. Niyato, S. Lin, H-P Tan, and Z. Han, “Mobile Big Data Analytics Using Deep Learning and Apache Spark”, *IEEE Network*, 2016

REFERENCES

[11] H-F Yu, C-J Hsieh, H Yun, S.V.N. Vishwanathan, I. Dhillon, “Nomadic Computing for Big Data A nalytics”, *IEEE Computer Society*, 2016

[12] Y. Sun, H. Song, A. J. Jara, R. Bie, “Internet of Things and Big Data Analytics for Smart and Conn ected Communities”, *IEEE Access*, vol. 14, no. 8, August 2015

[13] E. Stai, V. Karyotis, and S. Papavassiliou, “A Hyperbolic Space Analytics Framework for Big Net work Data and Their Applications”, *IEEE Network*, 2016

[14] P. Yue, C. Zhang, M. Zhang, X. Zhai, and L. Jiang, “An SDI Approach for Big Data Analytics: The Case on Sensor Web Event Detection and Geoprocessing Workflow”, *IEEE Journal Of Selected Topics In Applied Earth Observations And Remote Sensing*, vol. 8, no. 10, October 2015

[15] E. Ch’ng, “Crowd Behavior Mining with Virtual Environments”, *IEEE*, vol.24, No.4, 2015

REFERENCES

[16] L. M. Vaquero, F. Cuadrado, “Deploying Large-Scale Data Sets on-Demand in the Cloud: Treats a nd Tricks on Data Distribution.” *IEEE Transactions On Cloud Computing*, JUNE 2014

[17] U. Srinivasan and B. Arunasalam, “Leveraging Big Data Analytics to Reduce Healthcare Costs”, *I EEE Computer Society*, 2013

[18] L. Deng, J. Gao and C. Vuppalapati, “Building a Big Data Analytics Service Framework for Mobil e Advertising and Marketing”, *IEEE First International Conference on Big Data Computing Service an d Applications*, 2015

[19] J. Zhu, E. Zhuang, J. Fu,, “A Framework-Based Approach to Utility Big Data Analytics”, *IEEE Tra nsactions On Power Systems*, 2015

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