Critique-1

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**Paper 1**

**Article Reviewed by:**

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**Citation:**

1. Lewis, Burn L. "In the game: The interface between Watson and Jeopardy! ."IBM Journal of Research and Development 56.3.4 (2012): 17-1.

**Summary:**

In this paper, the author had primarily focused on a big data technology, IBM Watson. Here he clearly pictures the architecture of Watson and how it works, also how it communicates with another person. In this paper, they have calibrated and calculated the power of Watson and how fast it can refer the various material or references and get to a conclusion. Also, by this paper, one can assume the power of it and can apply this technology to solve the real world problems like getting conclusions on an issue in the absence of the human.

This is a kind of experiment where they have plugged in Watson machine as a participant and on the other side, we have real participants who have a great record in winning Jeopardy game like winning a number of times (with a high winning streak) and with highest earning in the game. Of course in real world, playing with these players is a difficult task but since they are testing an application/machine, this will be a strong ground to prove that machine can outperform the contestants. In the game, Watson is represented as a logo on a screen where an automatic buzzer will be connected to a computer which in turn connected to Watson server where it can process 500 GB per second, which means processing over a million books per second. Also, there is a speaker to deliver the voice after finalizing the answer.

At the starting of the round, since Watson is a machine where it can’t feel or see the clues or categories which are happening around, the communication on these categories will happen over a LAN network where it uses basic TCP/IP protocol to send the packets. Based on the current game state, clues and the current player’s scores and based on its previous success on the clues, Watson will select the clue. Then using Text to Speech system it will deliver the answer. Also to speed up this phase where to select the clues, they have used a cache system where it will store the clues as soon as they are revealed.

Once the clue was selected, the controller will send that clue to a group of powerful computers which are made up of DeepQA Engine. These machines are not connected to the internet except the private LAN connection to the computer which was at the podium. Once the Watson was almost finished with the clue search and finalize the answer, it will ring in even before making the decision. Since there is a limit of waiting for few seconds after ringing in, Watson is using that advantage for making a fast and quick decision yet not losing the opportunity window. Once ring in done by Watson, it will take some few seconds of time to finalize the answer and will deliver through Text to Speech service. The answer was sent to controller from the group of machines and controller then activate the solenoid buzzer to let them know it was ready with the answer. This decision was pretty much based on the confidence score on the answer. Usually, we can't say that machine will always be correct. So in a set of answers, Watson will ring in even the top answer is having a 50 % of confidence level.

Once the Watson was having enough confidence, it will ring-in and it will broadcast the answer to the screen also it can deliver it in the form of voice. Since it doesn’t have any connection to the internet, we can’t expect the data available to be 100% accurate. So Watson can also make mistakes at sometimes. Usually, some players tend to forget the same mistakes they have done earlier which will reduce the chances of winning. Watson will try to remember not to go to the same approach once it was proven wrong. But it can’t make sure that it will not repeat the mistakes done by the other contestants since it will not hear the previous response.

The majority of the code was written in JAVA, which is a widely used language in many of embedded systems, also an interface which will interact with some of the C++ libraries. Watson avatar at the podium was a flat-screen with a logo which was placed at the center. Once the controller gets the answer from the machine, then the laptop will make some animations on the flat-screen. There are so many alternative methods for communication like OCR and ASR.

**Critique:**

The author have concentrated mainly on how quick and fast it will make decisions based on available limited data. But coming to real world situations where almost every device was connected to the internet, how this machine will cope up with the changes in data frequently like the weather patterns in a particular chosen area. Also how will it learn from the changes happened around and based on some wrong outcomes, instead of just avoiding the same approach, why not take that as a lesson and will find an alternative solution like in Health industry if any wrong diagnosis was done, one can be saved by learning from the small mistake and can save a person’s life.

**Paper 2**

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**Citation:**

1. Hui Yang, University of South Florida and Erhun Kundakcioglu, Özyeg˘ in University “Healthcare Intelligence:Turning Data into Knowledge” Article in Intelligent Systems, IEEE · June 2014.

2. Jing Li and Teresa Wu, Arizona State University ,J. Ross Mitchell, Amy K. Hara,William Pavlicek, Leland S. Hu,Alvin C. Silva, and Christine M. Zwart Mayo Clinic Arizona in ”Empowering Excellence of Care by Radiology Informatics” .

3. Sait Tunc, Oguzhan Alagoz, and Elizabeth Burnside, University of Wisconsin–Madison in “Opportunities for Operations Research in Medical Decision Making”.

4. W. Art Chaovalitwongse, Georgia Presnyakov, Julian Cao, Sirirat Sujitnapitsatham, Daehan Won, Tara Madhyastha, Kurt E. Weaver, Paul R.Borghesani, and Thomas J. Grabowski, the university of Washington, Seattle in “Diagnostic Network Modeling of Neural Connectivity Using Functional Magnetic Resonance Imaging”.

5. Lianjie Shu, University of Macao Man Ho Ling, Hong Kong Institute of Education Shui-Yee Wong and Kwok-Leung Tsui, the City University of Hong Kong in “Spatial Clustering in Public Health: Advances and Challenges” .

**Summary:**

In this article, the authors have focused on US Healthcare system and how and why is it investing in a variety of technologies like sensors, communication technologies, and data centers.

All these rapid advancements are leading healthcare systems to have big data environments in hospitals. Based on various Big Data Analytics and knowledge discovery, the authors had different challenges.

This issue that is discussed in the article are about:

1. Empowering Excellence in Care by Radiology Informatics.
2. Opportunities for Operations Research in Medical Decision Making.
3. Diagnostic Network Modelling of Neural Connectivity Using Functional Magnetic Resonance Imaging.
4. Spatial Clustering in Public Health: Advances and Challenges.

In the first article, Jing Le and her colleagues present various ways of how we can improve and excel in health care using Radiology Informatics. For this they have presented three major areas which are:

1. Dose Index Tracking: Helped to track down the radiation levels for each patient. This helps to treat the patient in real-time and reporting and alarm notifications are really helpful.
2. Mobile application: Developed for radiology image viewing to reduce time to treatment.
3. Big Data Analytics & Machine Learning: Helped for finding inter- and intra-tumor in images thereby devising a plan for treatment specifically.

In the second article, Sait Tunc and his colleagues, in order to provide cost-effective healthcare and also to improve the health conditions of patients, they have discussed the effective use of operations research (OR) in medical decision making. They highlighted the recent successful application of OR approaches, particularly Markov decision processes, in the field of medical decision making. In addition, to that, they also envisioned future research directions of OR in medicine, including the personalization of screening and treatment, quantitative modeling of patient behaviors, and optimal communication within multidisciplinary care models.

In the third article, W. Art Chaovalitwongse and his colleagues discussed their experiences in applying network modeling approaches to analyze the brain’s functional ways and to examine whether alterations/disrupts to functional connectivity in neurological diseases can be used to improve diagnosis and they have related them with diseases like AD and Epilepsy.

Finally, in “Spatial Clustering in Public Health: Advances and Challenges,”Lianjie Shu and his colleagues reviewed basic principles and properties in the methodologies of spatial clustering of diseases, including the spatial scan method, graph-based method, and false discovery rate (FDR)-based method. They have also further pointed that there’s no flexible method that can handle various types of clustering problems. Every different clustering method has its own pros and cons. The major challenges for spatial clustering of diseases are robust algorithms in the presence of model uncertainty, multivariate spatial clustering, spatiotemporal clustering, and sensitivity and accuracy.

**Critique:**

In general, Healthcare providers lack decision-support tools that will help in handling large-scale healthcare records, Optimizing operational dynamics, extracting the certain knowledge of patient health condition and Provision of more personalized and effective services. Lack of the decision-making tool has increased the need for big data environment.

Even though Radiology is used to find major diseases like Cancer, Stroke, Heart Attack etc., extensive exposure to radiation could be dangerous. So we need a way to decrease the radiation.

P-value which is used in the Regions with significantly (p < 0.05) different average connectivity between the cognitive decline group and the control group. The author did not elaborate any further on how to calculate and how the analysis have been made using P-Value.