CUNY-IBM Watson Case Competition SPRING 2017

Group Name: Disease Predictive Analysis Team

Team Number: 5

Business Case Title: Business Case IBM Watson

1-minute Video Link: https://www.youtube.com/watch?v=IpbcrDxaGUI

Case Domain: City Services

One-liner: Automatic classification of disease reports to better track and prevent outbreaks

BUSINESS CASE

IBM WATSON

APRIL 2017

Table of Contents:

1. Executive Summary

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6. New York City's Department of Health and Mental Hygiene (NYC DOHMH) receives thousands of electronic disease reports daily. These reports are sent through a disease classification system where they will be used for disease surveillance and prevention. Data continuously converges around standards. On the other hand, reports will always differ in quality and format given numerous diseases, tests, providers, and laboratories. The current system employs a series of sophisticated business rules which help interpret these reports and classify diseases. However, the system is not perfect and many diseases are left unclassified, requiring a high involvement of human review. It would be painstaking for employees to spend countless hours reading these reports. Implementing IBM Watson Disease Classification Software(Watson DCS) will allow the classification system to be interoperable, flexible, and capable of classifying any incoming disease report. This enables epidemiologists and research scientists to accomplish more in less time and to handle an increased workload. These factors increase the productivity and efficiency of the DOHMH. Furthermore, it would accrue savings of at least $300,000 annually.

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1.1. Issue

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9. New York City is one of the most populous cities in the world. In addition, New York City functions as the capital of the global economy and as a center for tourism. Epidemiologists and research scientists at the DOHMH need to be capable of quickly tracking all diseases within the city to conduct research, detect and control outbreaks, investigate cases, and conduct partner outreach (in the case of STDs) in order to protect the welfare of the community.

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1.2. Anticipated Outcomes

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12. By centralizing and uniformly classifying data, epidemiologists at the NYC Department of Mental Health and Hygiene can address and resolve outbreaks earlier. With Watson DCS, the system would continuously make neural connections, link diseases to each other and discover the origin of such outbreaks. The response rate, containment and the source of origin of diseases/outbreaks will be determined significantly faster. As a result, employees can extract data faster than they would otherwise be able to. Consequently, employees are able to attend more high-priority work including developing statistical models, improving current systems, or conducting other research activities. These developments could be appropriated to other health departments and city health agencies which experience similar challenges.

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1.3. Recommendation

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15. Watson DCS's machine learning capabilities will allow all incoming electronic health reports to be classified in real-time. These reports will train Watson DCS to classify reports faster and enable more accurate classification as time goes on. Unique and anomalous reports that have already been classified can be fed into our system in order to identify these rare reports when they appear again. Watson DCS will also assist researchers who aim to link cases together, discover relationships and previously overlooked common factors.

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2. Problem Definition

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20. Software limitations have hindered DOHMH's ability to automatically classify electronic health reports. Failure to automatically classify these health reports makes it harder for epidemiologists and research scientists to track and prevent disease outbreaks. Informatics specialists have to manually check these unclassified documents. Their time could be better spent on auditing laboratories and facilitating the informational retrieval processes.Disease outbreaks are a major risk in metropolitan cities like New York. Any delay in preventing these outbreaks only exacerbates their risk. These inefficiencies put the welfare of New Yorkers at risk in the event of an epidemic.

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2.1. Organizational Impact

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25. Various departments, including Informatics and Epidemiology, will see an immediate growth in productivity. Informatics specialists can focus their time and resources on doing something tangible with incoming reports since information retrieval will now be fully automated. The automation of Watson DCS will promote seamless communication between informatics teams and research teams. This would increase the level of teamwork as well as the quality of service. Excess time will no longer have to be spent on monotonous work and the true value of these departments can be utilized to better keep New Yorkers safe.

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27. Personnel roles are not expected to significantly change but human capital should be able to accomplish more in less time.

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3. Cost Benefit Analysis

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33. The following table captures the cost and savings actions associated with the IBM Watson Project, descriptions of these actions, and the costs or savings associated with them through the first year. At the bottom of the chart is the net savings for the first year of the project along with estimated ongoing savings.

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35. 36. 37. 38. **Action**	39. **Action Type**	40. **Description**	41. **Potential First year costs (- indicates anticipated savings)**
42. Purchase of IBM	43. C	44. IBM Watson at $1000/month	45. $12,00

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Software installation and training	Cost	Cost for IT group to install new software and for the training group to train all employees	$75,000
Hardware Upgrades	Cost	New server and additional storage	$10,000
Employee Efficiency	Savings	Employees currently average 8 hours per project. It is anticipated that this number will be reduced to no more than 5 hours per project. At an average $24.00 per hour (using a $50,000 annual salary and 4,000 employees) this results in almost a 40% reduction in time used	-$288,000
External Support	Savings	Less frequent use of IT resources working on non-value added tasks results in approximately $42,000 savings per	-$42,000
Future Training Costs	Savings	The simpler system requires less training	-$75,000
Net First Year Savings		This includes the initial costs and is the anticipated savings for the first	**$308,000**
Ongoing Savings		This does not include the initial costs and represents anticipated	**$393,000**

Based on the cost benefit analysis above we see that by authorizing the IBM Watson Project, the NYC DOHMH will save $308,000 in the first year alone. This will increase by approximately 27.5% in the following years as well as having an ongoing positive impact on efficiency and productivity. This number is based on the conservative estimate of 4,000 relevant employees, however top level employees that are not directly affected by this almost certainly number less than 1,000 employees.

This has a significant impact because the majority of savings is directly related to the number of employees which number over 6,000.