

Group Name: Watson- SmartCall

Business Case Name: Using Watson to innovate NYC 311

Submission Video Link:

https://www.youtube.com/watch?v=mLqRdxR_XHQ&list=UUL PPrGWjWhOfoua3G9vJ-rg

(Youtube link)

Group Page Link: <http://smartpitch.org/group/watson-smartcall>

(SmartPitch.org page link)

Case Prompt: City Services (NYC 311)

(Higher Education or City Services)

INTRODUCTION

New York City employs a city-wide call system to address its people's concerns as it has the largest population of any city in the United States and one of the most complex city governments. The 311 call system has been touted as a multipurpose system addressing every issue a citizen may have, but it is far from perfect. Currently, when an individual calls 311 to raise a concern, he has to wait to be connected to a representative. There is no scaling and the process is completely randomized – an individual can call or submit an online complaint unbeknownst of whether or not someone has already reported the same issue. SmartCall is using IBM Watson's natural language processing and data mining capabilities to optimize the 311 call system into a more cost-effective and scalable tool. We will revolutionize the way the city understands what's happening. Using natural language processing, the communication between the caller and the receiver is facilitated and optimized, thus saving the city resources. Using data mining, the city will be able to generate models based on past data for future planning. By introducing SmartCall into the 311 system we are virtually reinventing the public complaint platform.

PRODUCT / TECHNOLOGY

SmartCall is a virtual agent that serves as an intermediary between the caller and the operator. The caller will voice his complaint to SmartCall, which will use its natural language processing abilities to analyze the complaint. First, SmartCall will analyze whether or not it is able to address the complaint without the assistance of a human call center representative. If it cannot resolve the issue itself, then it will route the call to either a 311 operator or an external entity depending on which it believes to be better suited to address it. While routing the call, SmartCall will send the appropriate party the analyzed version of the caller's complaint giving them a better understanding of the problem before they speak to the caller. The analyzed complaint will consist of the keywords of the call, and what SmartCall believes could be possible solutions. SmartCall will also record each call's structured and unstructured data and conduct data analyses on them. Structured data is the catalogued call information including the caller's geographic location and points of complaint. Unstructured data is the sentence from the caller including everyday language, sentence structure, grammar, slang, etc. - everything that the user communicates with his own verbal idiosyncrasies. One of the biggest assets of SmartCall is its ability to collect and analyze this type of data successfully enough to understand and categorize the caller's questions/comments. Watson will collect both this structured and unstructured data and use its predictive data analytics and pattern recognition capabilities to generate possible solutions with confidence percentages, and log these records so that they are searchable in the future.

311 must first build SmartCall's corpus with as much information as possible on everything that the call center may be asked or queried about. This process can include virtualizing physical documents by scanning, uploading virtual documents, and accessing any open or public data available on the internet. After this corpus is built, it must be kept up to date by periodically adding information on recent happenings. Now, when a caller calls 311 and asks it a question, SmartCall uses natural language processing to understand the question, searches its corpus while associating keywords in the query with keywords of similar meaning, and, if it can find them, responds to the question with the appropriate answers or facts.

In addition to SmartCall's integration with the 311 call system as a customized Watson application instance, it is a mobile and web platform that works similar to the call system. Both the mobile and the web

applications will have intuitive and user-friendly interfaces. They will have a big 'Ask SmartCall' button in the center, and if it is clicked SmartCall will provide the user with a search bar for the user to enter the question and a voice icon in case the user wishes to ask the question aloud. Either way, SmartCall will relate the user's question to any data in its corpus, and respond either with one answer if it has a 100% confidence level, or the top three answers with their confidence levels colored using a gradient of red to green to visually communicate how sure it is of the answers. If it cannot generate any answers with high enough confidence levels, then it will initiate a call to 311 or an external organization with the user's permission.

DATA ANALYTICS

IBM Watson technology is an unprecedented opportunity to drive business growth using its sophisticated data analytics capabilities. SmartCall leverages this opportunity to identify the areas in which the city can use predictive analytics to optimize how it addresses issues of any nature (environmental, societal, criminal, organizational, logistical, communications, etc.). Using Watson Analytics, SmartCall can generate easy-to-understand data visualizations that communicate relevant factors of these issues, and allow the city to strategize the best ways to solve the existing issues, predict future ones, and scale the solutions not only city-wide, but even nation-wide. Eventually, SmartCall will allow the city to transform its approach from only responding to calls and allocating the resources necessary to heavily using available data to dynamically predict and solve issues.

When a caller calls 311 and interacts with the Engagement Advisor, not only will his query be fielded and responded to, but relevant call data will be recorded to be analyzed. This data includes what he called about, when he called, where he called from, how long the call was, and keywords mentioned in the query that indicate what the call was concerning. As more data is collected, the city will gain a vast storage of information that it can analyze to learn what problems are preventing the city from becoming more efficient. It can employ Watson's analytics to generate patterns and predict any recurring problems or challenges the city has been facing. These metrics will help inform the city of the root-causes to problems that it has been addressing only the symptoms of, and allow it to make changes to how it allocates how many resources to which locations during what times to optimize addressing challenges. This rescheduling and reallocation of resources can allow the city to potentially save millions of dollars that would be lost to suboptimal responses to the city's challenges by not only responding in the best way, but also predicting these challenges before they arise.

MARKET

New York City's 311 system is the largest call system in the United States. Every fiscal year, the number of calls made to 311 increase at an alarming rate. This October alone, over 1.8 million calls were made, and an estimated 12 million calls will be made for the fiscal year of 2014-2015. Several human translators are available to assist users in over 180 different languages, and the hotline service has become so widespread that mobile apps and online services are now available. 311 now actively tackles not only complaints, but regional and community problems, before they get out of hand. According to Cory Fleming, 311 program director at the International County/City Management Association, the hotline is even used for performance measurement, economic development and community engagement. Several political officials

now use the data gathered from this service to greater understand what's going on, either in a specific area or the city as a whole. The hotline is now being used for literally any problem a New Yorker may face.

FINANCE/TIMELINE

The Average NYC 311 call costs the city \$3.42 multiplied by the millions of calls make it a huge portion of New York City's budget, With SmartCall the caller can resolve 16% of these calls by themselves, and principally deflect the calls and save a huge sum of money. By deflecting about 1,920,000 of them alone, can save up to \$6,566,400. Additionally, the implementation of Watson-SmartCall can decrease the turnover rate by empowering 311 agents. Annually, the average turnover rate is 30%, which is about 240 people working for 311. SmartCall can help reduce this rate by 10%, decreasing the amount of jobs lost. This reduction can save the training costs of new agents by over \$400,000, thus totaling the financial savings up to \$6,966,400. Ultimately, the implementation of SmartCall will not only save the city money by making the system more efficient, but also increase customer satisfaction with a higher first call resolution rate. After taking out 30% of the total savings as IBM Watson's share, the NYC government saves \$4,876,480 annually.

Using Watson to regulate and answer 311 calls will create a more organized, efficient, and quicker calling system. With its natural language processing and data mining capabilities, it is perfect for New York City's most demanding call service. In approximately 5 months, the corpus for 311 will be built and tested, containing the huge amount of data 311 holds. Once the corpus is complete, Watson-SmartCall can be implemented on 20% of all NYC 311 Calls, creating a testing benchmark. A few months later, it can be bumped up to take 50% of the calls, and within another month or so, the corpus can include most of the calls. By taking chunks at a time, SmartCall can be thoroughly tested and tweaked accordingly, before it is fully implemented. Along with New York City, several other fast growing cities are in dire need of a 311 service makeover. For example, Los Angeles, currently the 2nd largest U.S. city, runs its 311 calling center for only 63 hours a week, mainly due to the fact that each call cost about \$6.39. Additionally, approximately 45% of these calls have to be rerouted. Similar to the timeline of implementing Watson-SmartCall within NYC's 311, Los Angeles' calling system can also be revamped. Furthermore, SmartCall can easily be implemented in any of the major cities' 311 calling services, creating more advanced, efficient, and beneficiary systems.

TEAM

We are a team of four people. Saad Abbasi attends John Jay and studies economics, and has gained an advanced understanding of public policy during his internships with various politicians. Qasim Ashraf is a junior at City College of New York studying applied math with a concentrating on statistical modeling, optimization and big data. He has led organizational initiatives and efforts on operations and logistics of events and conferences with over 23,000 attendees. Hassan Naeem attends Queens College, majors in computer science, and has lead multidisciplinary teams on architectural planning and has developed numerous applications and websites. Owais Naeem is a graduating computer engineer at City College of New York, and an experienced software engineer, UX/UI architect, and entrepreneur. He has won \$80,000 in 3 entrepreneurship competitions and has founded GesTherapy, a software-based biotechnology startup. Our complimentary blend of skills including software application design and development, public policy, product/project management, business analysis, market analysis, and statistical analysis uniquely qualifies

us to identify ways in which technology can improve New York City's communication infrastructure and propose a solution.