# Assignment II: MIS 64038 Analytics in Practice

Case 2: Fraud Detection in Banking

A community bank partnered with an analytics solution provider to develop new fraud detection algorithm for ATM withdrawals. The bank provided historical data and the company trained a model that seemed to provide an acceptable performance when tested on the data. Once implemented, however, the bank faced a major tragedy: the algorithm was too slow in the production environment, and, as such, most ATM withdrawal requests were timed-out and customers were not able to withdraw from their accounts. Discuss which aspects of the project were ignored and which phase(s) of the analytics project, the problem can be associated to?

Answer:

According to the situation described, a variety of factors could have caused the project to fail:

Due to improper testing of the algorithm's performance in a production environment, there are lengthy response times and timeouts when processing ATM withdrawal requests.The possibility that the algorithm was not created or optimized to handle the projected volume of real-time ATM withdrawal requests should be considered. During the algorithm's integration into the operational environment of the bank, compatibility or data flow difficulties may have had an impact on the algorithm's performance.If the algorithm was not designed to fulfill real-time processing requirements, it may have resulted in delays and timeouts because ATM withdrawals call for prompt responses.The scenario suggests that the algorithm's use in a real-world situation without being adequately tested for performance, scalability, system integration, or real-time processing requirements during the project's operational phase may be to blame for the failure.To identify and resolve any performance issues and timeouts, conduct thorough performance testing in the production environment.In order to handle the projected volume of ATM withdrawal requests in real time, make sure the approach is scaleable.Review and address any system integration issues that may have an impact on how effectively the algorithm works in practice.Make sure the algorithm meets real-time processing requirements so that ATM withdrawal requests are promptly answered.The performance of the algorithm in the production environment must be regularly assessed and improved in order to prevent similar issues in the future.Work closely with the analytics solution provider to identify and resolve any technical issues and improve algorithm performance.By thoroughly addressing these problems, the project may be completed and the algorithm's performance may be improved, resulting in efficient and seamless fraud detection in ATM withdrawals.

Case 3: Amazon Rekognition

Amazon Rekognition is a cloud-based software as a service (SaaS) computer vision platform that was launched in 2016. It has been sold and used by a number of United States government agencies, including U.S. Immigration and Customs Enforcement (ICE) and Orlando, Florida police, as well as private entities. Rekognition provides a number of computer vision capabilities, which can be divided into two categories: Algorithms that are pre-trained on data collected by Amazon or its partners, and algorithms that a user can train on a custom dataset. In January 2019, MIT researchers published a peer-reviewed study asserting that Rekognition had more difficulty in identifying dark-skinned females than competitors such as IBM and Microsoft. In the study, Rekognition misidentified darker-skinned women as men 31% of the time, but made no mistakes for light-skinned men. The problem, AI researchers and engineers say, is that the vast sets of images the systems have been trained on skew heavily toward white men. In June 2020, Amazon announced it was implementing a one-year moratorium on police use of Rekognition, in response to the George Floyd protest. In May 2021, Amazon announced that they are extending its global ban on police use of its facial recognition software until further notice. Discuss which aspects of the project were ignored and which phase(s) of the analytics project, the problem can be associated to?

Answer: Biases in data gathering and training, as well as inadequate testing for fairness and bias during model evaluation, are to blame for the failure of the Amazon Rekognition project. The study might have neglected the requirement for diverse and representative datasets throughout data collection and preparation, resulting in skewed results in terms of recognizing women with dark complexion. The project lifecycle may not have given complete consideration to ethical aspects, such as potential biases and privacy issues. It is possible to take actions to address these problems, like employing a variety of datasets, rigorously testing for biases, and adding ethical considerations into the project. Facial recognition technology can be used responsibly and ethically with the support of regular monitoring and updates, collaboration with outside specialists, and involvement of stakeholders.

Case 4: IBM Watson in Healthcare

Some time back, MD Anderson Cancer Center, the largest cancer center in the US, announced that it is going to introduce IBM Watson’s computing system into the healthcare system. With the help of Artificial Intelligence, this system was supposed to accelerate the decision-making process of physicians while treating cancer tumors. But IBM Watson turned out to be a failure, as it did not deliver what it promised. It failed to analyze huge volumes of patients’ health data and publish studies to offer cancer treatment options. Here, are a few possible reasons why IBM Watson flopped in the healthcare industry, according to the experts. The AI technology that Watson uses is not a problem. The problem is that it is not given enough time to gather quality data and use personalized medicine. IBM launched Watson in a hurry as something that can handle something as complex as healthcare. They were quite aggressive in the marketing of their product, without realizing the importance of making it competent first. Watson was supposed to be launched as a software product, in which oncologists can simply enter their patient data and receive commendable treatment recommendations. This was how IBM advertised its Watson Health, but it failed to deliver this effect. IBM failed to work with the hospitals to ensure the proper functioning of Watson. Another reason for Watson’s failure is that IBM used data from its own development partner, MSKCC, to train it. Since the system is trained through the hospital’s own data, the results it gave after queries were biased towards the hospital’s own cancer treatments. It did not include data from other hospitals and other smaller clinical facilities. While such a trained system can be helpful in treating simple and generic cancer cases, complex ones need a different approach to the approach. Smaller hospitals cannot even access the same methods of treatment as their bigger counterparts. Discuss which aspects of the project were ignored and which phase(s) of the analytics project, the problem can be associated to?

Answer:

Multiple phases of the analytics project, including data collection and preparation, model creation and construction, and operational phases, may have presented difficulties for the IBM Watson project in healthcare. The project might have failed because of a lack of focus on customized treatment and long-term planning, insufficient and skewed data, implementation and integration issues, unrealistic expectations and marketing, and difficulty with implementation and integration. In order to address these problems, it would be necessary to gather a variety of high-quality data, adapt the system to clinical workflows, set reasonable expectations, incorporate personalized medicine methods, and work closely with hospitals and clinical facilities.

Steps like ensuring enough and diverse data, concentrating on implementation and integration, establishing reasonable expectations, incorporating personalized medicine and long-term planning, and cooperating with hospitals and clinical facilities could be taken to potentially increase the success of the IBM Watson project in healthcare. The project's difficulties might be remedied by addressing these factors, which would result in a more effective application of AI in cancer treatment.

Case 5: AI for University Admission

he researchers tried to develop a robot Todai, to crack the entrance test for the University of Tokyo. Its one of the tasks that only humans can do with required efficiency but researchers thought they could train machines for this purpose. Unfortunately, the results were opposite to their expectations as AI was not smart enough in understanding the questions. It would be better to introduce a broad spectrum of related information in the robotic system; so, it can answer the questions rightly. Respective members from the National Institute of Information gave their statement about Todai: “It is not good at answering a type of question that requires the ability to grasp the meaning in a broad spectrum”. Discuss which aspects of the project were ignored and which phase(s) of the analytics project, the problem can be associated to?

Answer:

The Todai project, which attempted to create a robot that could pass the University of Tokyo admission exam, may have failed for a number of reasons. One issue can be that the robot has insufficient training data because it was trained on a small dataset with a restricted range of data. This might have made it harder to comprehend queries that called for a wider range of relevant data. The robot may also have had poor natural language processing (NLP) abilities, which may have made it more difficult for it to correctly perceive linguistic nuance and comprehend queries that required a deeper comprehension of context and meaning. The robot may have had trouble contextualizing material and connecting it to pertinent knowledge, especially for questions that called for a larger awareness of context, suggesting that the project may have ignored the significance of context comprehension. Furthermore, if the project stressed efficiency over comprehension, the robot might have been designed for speed and accuracy in answering questions but not have the capacity to understand the meaning of queries that called for a wider range of facts. It is difficult to pinpoint the precise project phase that was unsuccessful, however problems may have occurred throughout the data acquisition/preparation and model planning/building phases, where the necessity for a variety of training data, powerful NLP tools, and contextual awareness may have been disregarded. The performance of the robot can be enhanced by improving the training data by ensuring a diverse and comprehensive dataset, enhancing NLP capabilities with sophisticated techniques like entity recognition and semantic understanding, concentrating on contextual understanding during the model planning/building phase, and finding a balance between efficiency and understanding. Regular system evaluations and feedback loops are essential for finding and fixing any flaws in the system and promoting ongoing improvement for improved outcomes throughout the project lifecycle.

Case 6: Mars Orbiter

In 1999, NASA took a $125 million dollar hit due to the loss of a Mars orbiter. The loss was later attributed to a mix-up in the units of measurement used by Lockheed Martin's engineering team and NASA's internal team-Lockheed was using English units of measurement and NASA was using more conventional metric system measurements. According to an internal review panel at NASA's Jet Propulsion Laboratory, "IThe loss of the orbiter] was an end-to-end process problem... something went wrong in our system processes in checks and balances that we have that should have caught this and fixed it." Fixing this "end-to-end" process problem likely would have prevented this loss. NASA also blamed Congressional budget constraints for a portion of the error. So, additional funding would have also helped. Discuss which aspects of the project were ignored and which phase(s) of the analytics project, the problem can be associated to?

Answer:

First, a miscalculation in the units of measurement throughout the data collection and processing phase is to blame for the project's failure. When gathering and processing data for analysis during this phase, multiple units of measurement must be utilized consistently to avoid calculation errors, incorrect data interpretation, and ultimately project failure. For instance, if NASA's internal team utilized metric units and Lockheed Martin's technical team used English units of measurement, it may have led to inaccurate calculations or misinterpretations of crucial data that ultimately resulted in the loss of the Mars orbiter. Second, system checks and processes that were used during the project may have failed. This could involve flaws in procedures for error detection and correction, such as quality control, verification, and validation. Critical concerns, such the wrong unit of measurement, could have been missed if these procedures had been improperly followed or ignored. For instance, if the procedures for ensuring the consistency and quality of data and calculations had gaps, the errors might not have been caught, which would have resulted in the project's failure. Last but not least, the project's failure may have been influenced by financial limitations. NASA explained that some of the miscalculation was due to budgetary restrictions imposed by Congress, suggesting that the research may not have benefited from less financing. A project's success might be jeopardized by a lack of resources, which include staffing, funding, and equipment. Insufficient resources can also affect how a project is carried out. For instance, financial restrictions that prevented the project from acquiring the appropriate equipment or knowledge could have hindered its capacity to deal with and fix problems like the measuring unit mix-up or put in place reliable system processes and inspections. It would be essential to put in place measures such unit uniformity and consistency, solid system processes and checks, proper resource management, thorough project management procedures, and learning from previous mistakes in order to address these difficulties. These steps can assist reduce risks, guarantee precision and quality, and increase the analytics project's overall success. The project team may reduce mistakes, enhance project outcomes, and avoid repeat failures in the future by addressing these factors and putting best practices into place.