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Now that we have proposed a solution for cloud storage to manage our newly acquired company, we are ready to assist our acquisition with developing their innovative yet still prototyped technologies. They have proposed the development of a selection of wearable technology devices used to track statistical information regarding the health of their consumers. This leads to finding a solution to analyze the data collected from each product sold. I recommend that we use machine learning (ML) technology to process this data and leverage new products that can be developed.

This new product will result in collecting and processing big data, or data collected in large volumes, in real-time; our consumers will most likely be using these devices at all times worldwide. With big data, we need to use a tool that can provide processing, collection, and visualization capabilities. There are two tools that I would personally recommend. First, Tableau is great for those with any expertise, beginners or experts, with its user-friendly interface that “allows you to prep, analyze, collaborate, and share your big data insights. Tableau excels in self-service visual analysis, allowing people to ask new questions of governed big data and easily share those insights across the organization.” (Big Data Analytics: What It Is, How It Works, Benefits, And Challenges, n.d.). Another tool we can use is Hadoop, which is an “open-source framework that efficiently stores and processes big datasets on clusters of commodity hardware. This framework is free and can handle large amounts of structured and unstructured data, making it a valuable mainstay for any big data operation.” (Big Data Analytics: What It Is, How It Works, Benefits, And Challenges, n.d.). Both of these tools can provide us with high-speed data processing in real-time and savings as we utilize tools to provide us with efficient ways to use our data, help us expand our relationship with our consumers, and help us identify trends in the markets. (Big Data Analytics: What It Is, How It Works, Benefits, And Challenges, n.d.). Also, big data tools can work together to develop data handling tools to fit the needs of their users, no matter the origin of the data and the software format in which that data was processed; as Tableau describes, “Big data analytics cannot be narrowed down to a single tool or technology. Instead, several tools work together to help you collect, process, cleanse, and analyze big data.” (Big Data Analytics: What It Is, How It Works, Benefits, And Challenges, n.d.). This applies when data is collected, analyzed, visualized, or even stored from files without regard to file type.

The star schema is a data model that can be used to organize data in a database or at a data warehouse to analyze the data efficiently and quickly. (What is star schema? , n.d.). Star schemas can process data and query large data sets, storing and revising data in real time without generating errors because of how it is designed. In the center of the star schema is a fact table connected to different dimension tables, which can represent different attributes of the processed data. For us, these attributes would include financial statistics such as revenue, and another attribute may include web traffic with the product we are proposing to sell; dimension tables represent different data sources from one set of raw data collected. Adding new data sources to a star schema model is an easy task, “the star schema can be easily extended by adding new dimension tables or measures to the fact table, making it a scalable and flexible solution for data warehousing.” (Sharma, 2023). This schema, in general, is simple to understand by data analysts, having the ability to find the data they need. Also, query performance is improved as computationally expensive joins are avoided. (What is star schema? , n.d.).

Now, using a subset of AI technology called machine learning (ML) which we want to incorporate; we should realize its relationship with other IT personnel within our new company. The pervasive nature of ML and IT personnel can affect businesses and consumers in different ways. First, implementing ML technology provides a competitive advantage to our rival companies, performing tasks that no other rival IT/Data Analytic department can perform. (Uzialko, 2023). Also, consumers might find recommendations to purchase specific products from our new company. ML technology can use customer data (in an ethical way with permission of the customer that protects their privacy online) to help our customers find the right product for them, as described in a Business News Daily article, “As people use their devices more, and as the AI technology becomes even more advanced, users will have a more customizable experience. (Uzialko, 2023). In this scenario, ML technology is no different in which IT improves the consumer’s experience, no different than any company providing their customers with a user-friendly interface. Any IT team, including our own, provides the customer with a website that is well designed and maintained and can be navigated easily, letting them know which product is available or sold out and providing the consumer with secure payment processing. As described above, a hypothetical scenario in which ML and IT can improve an organization’s ability to use the information to benefit their customers can be used to personalize the customer experience. Harvard Business Review states, “By combining historical customer service data, natural language processing, and algorithms that continuously learn from interactions, customers can ask questions and get high-quality answers. In fact, 44% of U.S. consumers already prefer chatbots to humans for customer relations.” (Wellers et al., 2017). We can use ML technology to better assist our consumers, providing them with those chatbots instead of having to interact with a human customer service representative. However, this brings forth the topic of job displacement since ML technology can perform the tasks of a customer service representative, most likely in a more efficient and skilled way.

Artificial Intelligence, AI, and Machine Learning, ML, are vastly related technology, yet they are used differently. As defined, “Artificial Intelligence is the field of developing computers and robots capable of behaving in ways that mimic and go beyond human capabilities. AI-enabled programs can analyze and contextualize data to provide information or automatically trigger actions without human interference.” (Artificial Intelligence (AI) vs. Machine Learning, 2022). Examples of AI technology include smart devices at home, voice assistants on your phone, or chatbots on a website. Machine Learning, on the other hand, “is a pathway to artificial intelligence. This subcategory of AI uses algorithms to automatically learn insights and recognize patterns from data, applying that learning to make increasingly better decisions.” (Artificial Intelligence (AI) vs. Machine Learning, 2022). Concerning the new line of wearable technology products our acquisition plans to sell, machine learning can improve the utility of these consumer devices. Implementing ML technology in these devices can automate tasks performed by the software on the device that the user typically performs manually. One example is IoT devices, smart thermostats, which, either through the wearable device or through the thermostat, can use “data-efficient algorithms that can learn optimal temperature thresholds within a week.” (Laboratory for Information and Decision Systems, 2020); without the consumer manually adjusting the temperature automatically on their wearable device. The wearable device or even the thermostat performs that task instead. This adds value to our new line of watches, and a competitive edge, by incorporating ML technologies to assist with our daily lives, all with just an internet connection.

However, ML technologies rely on any data to perform tasks, no data, no ML. Furthermore, and most importantly, ML technology uses data that most of us, especially our consumers, would not want to be public knowledge. Data collected from the new line of devices will differ depending on where the consumers want the data to be stored, either on the device itself or on the cloud, which the cloud is our data server. Nonetheless, security breaches are our biggest concern to prevent and concern that other companies worldwide face daily. Einaras von Grabrock at Cujo LLC states, “There are many popular online services and products that rely on large datasets to teach and improve their AI algorithms. Some of the data in those datasets might be considered private even by the least privacy-conscious users. Streams of data from networks, social media pages, mobile phones, and other devices contribute to the volume of information that businesses use to train machine learning systems.” (von Gravrock, 2022). Data from our new wearable devices enormously impact the ML technology we will implement in our company. It is no different than how we have protected data without AI/ML technologies. However, the ones who handle this private data are the ML technology itself and may not possess the same knowledge of data privacy laws as a fundamental data analyst (depending on if the vendor incorporates compliance checks into an ML technology). One solution to this issue might be to anonymize our collected data. As defined, “Data anonymization is the process of transforming information by removing or encrypting personally identifiable information (PII), protected health information (PHI), and other sensitive data from a data set, in order to protect data subjects’ privacy and confidentiality. This allows data to be retained and used by breaking the link between an individual and the stored data.” (Devane, 2022). Since these wearable devices can collect personal health data, it would be essential for us to perform data anonymization in order for us to comply with laws or standards such as GDPR or HIPPA. This will ensure that the data will not reappear when ML analyzes our collected data. (Tosar, 2019).

With any data that we collect, we can use this data in an ethical way to create and implement business strategies. We have described how Machine Learning can enhance the customer’s experience, but is this the only way we can use data? Do we have to use our consumer’s data to build business strategies? The Harvard Business Review describes two ways that anyone can use to incorporate ML technology our operations; if we use these techniques, they must be used ethically. First, ML can be used to hire the right employees.

Corporate job openings pull in about 250 résumés apiece, and over half of surveyed recruiters say shortlisting qualified candidates is the most challenging part of their job. Care must be taken not to reinforce any human biases implicit in initial hiring. However, the software can also combat human bias by automatically flagging biased language in job descriptions, and detecting highly qualified candidates who might have been overlooked because they didn’t fit traditional expectations. (Wellers et al., 2017).

The culture of our companies also plays a role in whom we employ, and it may not be the best to use ML entirely to assist in recruiting manners. Another way that we can implement ML is to ensure smoother supply chains. Harvard Business Review provides a scenario that may correlate with the operations of our company, “Machine learning enables contextual analysis of logistics data to predict and mitigate supply chain risks. Algorithms can sift through public social data and news feeds in multiple languages to detect, for example, a fire in a remote factory that supplies vital ball bearings that are used in a car transmission.” (Wellers et al., 2017). Our customers need to receive their new wearable devices without error from when they are produced in a factory to when the product arrives at their doorstep. Throughout any aspect of the operations at our companies, Machine Learning technology can revolutionize our workplace. The tasks performed by ML provide intelligence and skills that our employees have not yet possessed. All interactions with our customers are essential; they might have encountered issues with the product we sold to them, an issue involving financial transactions between us, or even reaching out to new customers in advertising. All of these tasks show meaning to our valuable brand. Although Machine Learning technology may not replace all of the operations in our company, we should treat this newly and continuously developed technology as a third-party guide to building the companies of tomorrow.

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