**Acknowledgement**

First and foremost, we’d like to extend our sincere gratitude towards Mr. Rasika Alahakoon, our module lecturer. We are extremely humbled and grateful to have been able to receive his mentorship, guidance and support.

The overall accomplishment of this project demanded a significant amount of mentorship and guidance from many individuals. As a team, we are extremely fortunate to have had this from start to finish.

Finally, we wouldn’t have been able to successfully complete this assignment without the hard work and assistance of all the team colleagues itself. We all enjoyed working with each other.

**Abstract**

Title: An analysis on how Tesla utilizes Data Warehousing, Big Data, Data Mining, Knowledge Management and Business Intelligence.

Subject: PUSL3110

University: Group/ 19.2 SOC/ NSBM

Word Count: 2500 words

This assignment presents our research and analysis on how Tesla has made use of Data Warehousing, Big Data, Data Mining, Knowledge Management and Business Intelligence to become the tech pioneer of the automotive industry.

**Introduction:**

In 2003, a couple of ambitious engineers wanted to boost the transition towards sustainable means of transport. They achieved this by introducing electric cars to the market. They helped deviate the market away from gasoline ridden cars towards electric vehicles. The sole intention behind Tesla is to advance the flow towards sustainable energy and transport so that the world stops depending on fossil fuels. Today, Tesla doesn’t only manufacture electric vehicles, but also an interminably extensible clean energy generation and storage commodities.

As of June 2021, the Tesla Model 3 has become the best-selling plug-in electric car, becoming the first electric car to sell 1 million units globally. With a market capitalization of $1.118 Trillion, this has officially placed Tesla at the world’s 6th most valuable company.

**Tesla and Data Warehousing**

Being the tech pioneer that Tesla is, there are a number of sources that the company derives its data from. The data collected is leveraged to improve customer satisfaction, vehicle performance, research and development, maintenance and many other aspects.

**Tesla and Cloud Data Warehousing**

Location of data warehouse that tesla uses. - Shikari

**Data Mining at Tesla**

**What is Data Mining?**

Data mining is the procedure of examining immense amounts of information in furtherance of anticipating patterns and trends. Companies utilize the process of Data Mining to acquire useful information from raw data.

**Why does Tesla use Data Mining?**

By identifying the trends and patterns from the data, Tesla can utilize this to develop more potent marketing strategies, boost sales, etc.

Tesla utilizes Data Mining to learn more about their customers and identify frequent complaints and demand trends.

**Tesla Account**

Vehicle data, operational and diagnostic data, service history, customer support activity and camera recordings

**Data Mining for Customer Satisfaction**

One tactic that Tesla uses to enhance customer satisfaction is by collecting data from an online forum which the customers have access to. This data is collected and analyzed with the aim of making improvements to the next production. Frequent complaints and demand trends are identified and catered to in forthcoming updates.

**How Tesla utilizes Big Data**

**What is Big Data?**

Big Data is a voluminous collection of data that grows at exponential speed and comes in a variety of formats. Since data is produced from a variety of sources, it could be so complex and unpredictable that it is challenging to connect and correlate it. Due to this, it cannot be processed, analyzed or stored with the utilization of traditional tools.

**Big Data and Tesla**

Companies and organizations like Tesla collect big data to utilize outside intelligence with the aim of enhancing operations, offer more improved customer service and engagement, polish advertising methods as well as improving marketing and promotion tactics.

It is undeniable that Tesla is pre-eminent in the electric vehicle game. This is mainly because of how deeply Tesla relies on big data, artificial intelligence and other aspects to outdo its competitors. Big Data plays a significant role in the company’s success. On a weekly basis, Tesla produces 2 to 5 terabytes of data on average. Tesla’s invaluable asset is the quantity of data gathered for data analysis.

Before Tesla initiated its automobile manufacturing venture, the most notable data collection tactic that it executed was the documentation of data that both consumers and cars generated in terms of product utilization. With that, they constructed a large database of customers who are interested in purchasing the latest drive technology.

**How Tesla utilizes Big Data in Autonomous Cars**

Tesla takes advantage Big Data to propel electric cars to greater heights. Autonomous vehicles (vehicles that possess self-driving capabilities) have the ability of sensing its surrounding environment and moving around with little to no human input. This entails autonomous vehicles to fully rely on data and information.

As of yet, Tesla has gathered 1.3 billion miles of data from autopilot accoutered cars that have been running all around the world in different weather circumstances. Tesla gathers all viable data analytics from their vehicle owners. Based on the data accumulated, Tesla is able to foresee and solve issues before they occur.

Cameras, radars, LIDAR and ultrasonic sensors that are installed in Tesla’s cars collect various aspects of information.

A variety of data, from the point of hazard occurrences on the road all the way to something as mere as the driver’s hand placement on the vehicle is all crowdsourced by Tesla.

The data culminated between the company cloud and car is gathered and observed. This also includes data such as weather data, real time traffic circumstance data, object mapping database (for the identification of light poles, trees, animals or humans, etc.), GPS data and data from other vehicles. Tesla’s vehicles are also equipped with sim (3G/4G) to wirelessly link vehicles to their corporate cloud for further evaluation.

From this data analysis, the driver’s actions and the car’s positions are combined and mapped. This enables Tesla’s primary autopilot data tracking system to determine the paths that the car takes.

Tesla also utilizes a fleet learning algorithm. When a vehicle observes something new from the newly updated dataset via a machine learning method, all the other connected vehicles would instantaneously learn it. A deep neural network algorithm is utilized to inculcate its autopilot with obtained real world data.

**How Tesla leverages Big Data using Artificial Intelligence (AI)**

**How Tesla leverages Big Data using Artificial Intelligence (AI) to teach Cars to Drive on their own**

In order to make Tesla’s cars autonomous, the company must leverage both Big Data and AI in order to teach the cars to drive on their own.

AI is utilized when it comes to anticipating and understanding the actions and movements of pedestrians, cars and surrounding areas. It aids in determining moves within a time span of a split second.

To do this, Tesla gathers the appropriate data needed to train algorithms to feed the AIs. The company crowdsources data from thousands and thousands of vehicles in use on the roads. This bestows Tesla with an exuberant advantage. Data that ranges from driver behavior all the way to the internal and external sensors are all gathered.

**Imitation Learning - Autonomous Cars using Big Data and AI**

An approach called “Imitation Learning” is utilized by Tesla. This particular algorithm picks up and learns all movements, reactions and decisions from millions of existent drivers around the globe. (Marr, 2021)

**How Tesla uses Big Data for Decision Making**

Not only has the collection of data aided the creation of Tesla’s famous autonomous vehicles but also in research and development, customer satisfaction, maintenance, vehicle performance and the improvement of Tesla’s future products. This data helps Tesla in future decision making. Data is also utilized from both positive and negative customer feedbacks to know where future improvements need to be made.

**How Tesla uses Big Data for Predictive Analysis**

**How Tesla uses Big Data for Customer Satisfaction**

According to Forbes, Tesla boasts the highest customer satisfaction ratings within the automobile industry. Tesla has managed to create an extremely loyal fanbase as it treats each customer as a separate individual. Statistics reveal that the company’s customers are highly loyal as 91% of customers intend to lease or buy another Tesla vehicle. (Morgan, 2021)

One tactic that Tesla uses to enhance customer satisfaction is by collecting data from an online forum which the customers have access to. This data is collected and analyzed with the aim of making improvements to the next production. Frequent complaints and demand trends are identified and catered to in forthcoming updates. (Thakkar, 2020)

1. Personalized driver profiles

Driver profiles are what distinguishes Tesla’s customer personalization efforts. Tesla’s driver profiles surpass ordinary vehicle personalization.

Changes are automatically made depending on who is driving. Driving style, radio presets, suspension, lights and even breaking are made to match the user perfectly.

1. Data driven design –

Tesla’s vehicles gather movements from a number of sensors. The data obtained from this helps strengthen Tesla’s self-driving Technology. Not only that, but it also contributes to beneficial customer insights. This helps Tesla obtain a clear understanding of who their customers are – individually and as a whole.

1. Dynamic personalization –

Apart from most of the other vehicle companies, Tesla aspires to devise a fluid system which is updatable while the system improves. Tesla has an entirely upgradable dashboard, meaning that as software upgrades over time, the improvement and development of the driving experience will also be witnessed.

Innovative and dynamic personalization is supported by the internal software and the fluid dashboard.

**Tesla and Cloud**

Every Tesla vehicle sends data to the cloud when they are not autopilot enabled.

**What is Knowledge Management?**

Knowledge Management is the cognizant process of capturing, accumulating, storing, managing and sharing organizational knowledge.

The use of Knowledge Management greatly aids organizations to advance the efficiency of managerial aspects and decision making.

It compliments a more dynamic workplace, constructing organizational knowledge, more decisive decision making and escalates employee happiness.

Tesla has understood how information cascades through a

**How does Tesla utilize Knowledge Management?**

1. Understanding Tesla’s Key Drivers –

Tesla has vivaciously understood that their electronic cars are what plays as the key driver of the company. The electronic car has been a fundamental source of Tesla’s revenue generation. Due to this, it is mandatory that it is well expressed in the market.

1. Employee Culture –

Tesla’s management makes sure that its employees are dedicated to be consequent to technology employed within the firm.

1. Employee Recognition and Appreciation –

With the aim of instilling motivation and deriving abundant productivity, Tesla presents their employees with recognition and rewards. This helps their employees become more driven and focused.

Monetary gain is the key motivative for employees, so Tesla overtures rewards of revenue.

Furthermore, this also emulates excellent work and compliments a positive working environment within the organization.

(Karamitsios)

(Ribeiro, 2020)

(Sas, 2021)

(Karki, 2020)

(Taylor, 2021)

(Abdoullaev, 2021)

(Edelstein, 2017)

(Srikanth, 2019)

**Business Intelligence at Tesla**

**What is Business Intelligence?**

Business Intelligence encompasses

**How does Tesla utilize Business Intelligence?**

**Summary**

It is irrefutable that Tesla is in the lead when it comes to the electric vehicle rat race. The main advantage that Tesla holds among its competitors is the technical approach that it follows.

The unique adaption towards innovation and cutting-edge technological advancement proves that this global technology powerhouse is imminent to leave an abiding legacy.

By leveraging big data, implementing AI and applying new strategies

**Conclusion**

(Studies, 2019)

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