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| PROJECT TITLE: Customer purchasing pattern and strategic behaviour analysis for revenue growth by using machine learning algorithm | | | |
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| ABSTRACT | | | |
|  | The massive increase in the amount of data collected and stored by organizations around the world over the past few decades is evident. In conjunction with this, the ability to access and analyze this data is quickly becoming more and more important. However, some firms do not have the resources to perform consumer analytics and it’s often inaccurate. Therefore, a much efficient and simple consumer analytics model is built by using machine learning in this research. This research will examine how data is being extracted (features extraction) and trained by Artificial Neural Network. It also aims to test the model in terms of predictive accuracy, so that it can be to be applied to solve real-life problem. | | |
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| **PROBLEM** | | | |
|  | Customer Behavioural Analytics is the analysis of the past data on what the customers do and how they act in a manner that will reflect in what they do and how they will react in the future. Consumer analytics is important to a company, it brings benefits such as understanding customers’ need, customers’ purchasing power and many more [(Erevelles et al., 2016)](https://paperpile.com/c/mPCZ3n/IEHY). If there is some strong behavioural analytics exists, it can be widely used in helping to build a smarter business with social commerce so that retailers can now record and track the customers on how do they buy, what are their choice criteria, when and how frequent do they buy and their pathing channels across the store.  The study of consumer analytics lies at the junction of Big Data and consumer behaviour. Big data is a hot issue in today’s world. 4.4 Zettabytes of data exist in the digital universe today, by 2020, the digital universe is expected to reach 44 zettabytes [(IDC, 2014)](https://paperpile.com/c/mPCZ3n/nblX). Since data provide behavioural insights about consumers; marketers are able to translate those insights into market advantage. Big data is a top business priority and drives enormous opportunity for business improvement [(Kennedy, 2011)](https://paperpile.com/c/mPCZ3n/vOVr). Nevertheless, the first problem is that manually analyse the conglomeration of raw data to gain insights is inefficient and ineffective.  Consumer analytics can be performed by deductive or inductive approaches, where deductive approaches interpret consumer behaviour based on existing theories and model, while inductive approaches do not make any assumptions or hypothesis before the interpretation. Deductive approaches have been widely used, providing good results. However, the need to obtain even more insights has directed marketers’ interest towards inductive prediction approaches. Studies have shown that using inductive approaches consumer analytics can advance the understanding of marketing phenomena more compared to using deductive approaches [(Erevelles et al., 2016)](https://paperpile.com/c/mPCZ3n/IEHY). Without interconnecting the relationship among consumers’ purchases, customers’ flow and path within the stores, deductive approaches would be inaccurate. | | |
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| Solution | | | |
|  | The experts or experienced businessman can predict the customers' needs, what they are going to buy by using intuition. However, for the ordinary marketer could not estimate the right offers for the right clients which may cause wrong prediction, resulting in high purchase of low demanding products, hence affect the store's revenue. With the use of customer behaviour analytics by utilizing the knowledge of IoT and machine learning, we can analyse the past data patterns and trends to generate likely products and outcomes that can help the business to run smoothly and successfully.  Due to the problems stated, we wish to investigate on the various methodology in predicting customer purchasing patterns and behaviours that may lead to revenue growth. To do so, we aim to further study on the most effective approach to study and analyse customers trend, so that we are able to achieve a win-win situation, where companies’ revenue grows while increasing the customer satisfaction towards the services and products provided.  **https://lh4.googleusercontent.com/8I7QrsLfeyfLvnu-yW15jxJ9uD4aEzzYrC5-LeKA-CYCx5NaGUFQFS50A3n6hwrlnh1CxldFEoC8AAQtCUXcdUwtqBwFvXXlTTdSVGOE2ZVpnxppjpft38-sIiLUaZtmTjT90Z9n**  Figure 1: Overall flow of Customer Behavioural Analytics  Knowledge of machine learning will be used in customer behavioural analysis. After we had collected both structured and unstructured data, the data will be further processed in next stage which is pre-processing. In this stage, the data collected will be cleaned up in order to make them in a best state to make the image pre-processing process easier such as removing the noises. Although the sample had been through the cleaning stage, the resulting data still consists of much redundant information. Therefore, feature extraction is carried out in order to choose the significant features necessary in image processing process. The features selected will be analysed using Artificial Neural Network (ANN) and produce the predictive model. From the predictive model, we can know the future trend and predict the customer behaviour on what will they do with higher accuracy based on the training dataset that we collected. | | |
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| **TARGET MARKET** | | | |
|  | | This solution benefits two parties: the consumer and the merchant. The system can be implemented to provide “personalized shopping experience or services to the consumer”. Furthermore, the system can also be implemented to provide sophisticated insights to assist top management in decision making, product perfecting, and more importantly, customer satisfaction. When a firm embraces new technology and constantly seeks for transformation of knowledge, the knowledge creation process grows exponentially. With these resources, a firm can improve performance better than without resources, thus the resources are considered valuable [(Kozlenkova et al., 2014)](https://paperpile.com/c/mPCZ3n/cfKq). | |
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| COMPETITION/CONTRIBUTION | | | |
|  | More and more companies embrace Artificial Intelligence to assist them in decision making. For example, Ford Motors is using consumer analytics to start its own revolution in product innovation and design [(Erevelles et al., 2016)](https://paperpile.com/c/mPCZ3n/IEHY). Ford facilitates product innovation in a rapid manner using Big Data without waiting for insights from traditional research such as focus groups and surveys [(Satell, 2014)](https://paperpile.com/c/mPCZ3n/sWwU). | | |
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| MILESTONES | | | |
|  | The proposed project milestone is as follows:   |  |  |  | | --- | --- | --- | | Milestone | Milestone Goal | Deadline | | Concept approval | Proposed concepts and development of the system is approved | 24/11/2017 | | Research / Background study | To carry out background research, including literature review, preliminary research, system background. | 29/12/2017 | | Requirement gathering & analysis | Gather requirement in the system and perform analysis. | 5/3/2018 | | Data Collection | Collect data needed for the system, unstructured data such as transaction detail. | 23/3/2018 | | Data processing | Study the data pattern and perform features extraction and normalization of the data to make sure the data is suitable to proceed with machine learning. | 23/4/2018 | | System development | Develop the predictive model with Artificial Neural Network. | 28/5/2018 | | System testing | Test the system with testing dataset to measure prediction’s accuracy. | 8/6/2018 | | Documentation | Documentation of supportive document, user guide and discussion of further improvement | 20/7/2018 | | | |
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