

# Paid Commercial on Facebook: An Estimation Using a Data Mining Approach

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**Abstract** -This paper focuses on evaluating the performance of paid publications (paid ads) on Facebook and proposes a managerial implication to maximize the paid publications' performance in reaching as many people as possible with the greatest possible engagement. Artificial neural networks, Garson's algorithm, and support vector machine weighting were used to analyze publication characteristics. The results demonstrate that in terms of number of people reached, paid publications are only 9.52% relevant, compared with 24.35% for post hour, 16.85% for total page likes, and 16.44% for type of publication. With regards to quantity of comments, likes, and shares, paid commercial contributes 10.46%, 19.51%, and 15.55% relevance, respectively. Additionally, the vital numbers of e-book enhancements from the use of paid advertisements and non-paid advertisements are in contrast and calculated. This paper provides a managerial implication for marketing managers to enhance the paid ad performance of company Facebook pages.

**Key Words:** Social media, Data mining, Paid ads, Artificial Neural Networks.

## 1. INTRODUCTION

In recent years, social media has been one of the most famous communication platforms among students (Pelling and White, 2009). Social media provides various opportunities such as reaching out to new customers, interacting with current customers, promoting, and introducing special products or services (Curran et al., 2011). Use of social media as a advertising and promoting device has been broadly diagnosed as a proven, effective device to acquire hundreds of thousands of clients (Hanna et al., 2011). Online advertising revenue increased from \$36 million in 2002 to \$6 billion in 2012 and is expected to increase further in the future (Yuan et al., 2013).

In early 2018, there were 132.7 million Internet users in Indonesia, and more than 90% of those Internet users were active on Facebook (we are social, 2018). This statistics exhibits large possibilities for on-line commercial via

Facebook in Indonesia. For companies that want to promote their products to Indonesia, using Facebook as an online publisher is probably a good strategy. Moreover, 27% of the surveyed respondents in recent studies indicate that Facebook is the most efficient marketing tool for companies with fewer than 500 workers (Needleman, 2014).

Facebook as a commercial device has two important strategies to promote merchandise or services: natural promoting and paid promotion. Through natural promotion, customers can create free agency pages or man or woman fan pages, team discussions, or even non-public debts barring any charge. However, if businesses figure out to use natural advertising (without any payment), then the enterprise fan pages should have several followers and Facebook mandates some unique publishing policies. By contrast, if companies are willing to spend money on Facebook paid advertisements (paid ads), the reach of the company to potential customers is wider and does not rely solely on the followers of company fan pages. Paid advertisements gain the corporation due to the fact plausible clients can be focused except limitation. However, numerous researchers have located that Facebook paid advertisements do no longer attain new clients correctly (e.g. Margarida, 2013).

Because paid commercials are now not cheap, every selection ought to be controllable. The outcomes of every choice must be effortlessly measured. Data mining affords some brilliant research strategies for examining a number of records units (Turban et al., 2011). Moreover, data mining is regarded as a powerful tool for extracting information from complex and copious social media data (Barbier and Liu, 2011). Machine learning is a set of data mining methods for analyzing such data sets. Artificial neural networks (ANNs) have been widely used as data mining tools for social media data (e.g. Krebs, 2017).

## 2. EXISTING SYSTEM

Theoretically, a computer should work better than a human brain. Components inside the computer enable remarkable

processing ability and memory. However, the human brain is adaptive and continues to learn and thus can manage itself during its long life (Kriesel, 2007). These versatile characteristics were implemented in ANNs for data mining operations (e.g., classification and prediction). ANNs consist of three types of layers: input layers, hidden layers, and output layers. These interconnected groups of artificial neurons propagate information through various connections.

The effectiveness of ANNs for the analysis of social media data has been proven by some researchers (e.g. Bollen et al., 2011). ANNs proved to be powerful tools in predicting users' emotions through social media post reactions (Krebs, 2017). In the information mining field, the nonlinear education skills of ANNs have been extensively diagnosed as an high-quality device specially in massive and elaborate facts set operations (Misra and Dehuri, 2007). Therefore, in this lookup we used ANNs to analyze the relevance of paid commercials on Facebook. Because ANNs generate complex hidden layers and output weights, Garson's algorithm was used to interpret the hidden layers and output weights. Garson's algorithm was invented by Garson (1991) and then modified by Goh (1995). The existing learn about used Garson's algorithm to gain the relative significance of every community input. This relative importance is calculated by three major steps. The first step is to multiply hidden neuron weights and output weights. The second step is to calculate the relative contribution of each hidden neuron. The third step is to calculate the relative importance of the inputs by the relative contribution results. In this study, for deciding the significance of every enter and subinput of e-book characteristics, SVM weighting used to be employed. SVM considers a data set as a two-group classification problem and determines the best hyperplane (Cortes and Vapnik, 1995).

### 3. METHODOLOGY

The information was once got from a UCI statistics set and consisted of five hundred posts posted from a well-known beauty organisation (Moro et al., 2016). This information was once processed with ANNs to measure the overall performance of paid ads. To interpret the results of ANNs, Garson's algorithm was used. To guarantee the accuracy of the ANNs, a grid method was used to determine the number of training cycles. Moreover, before the grid method was run, the data was split into two parts; the first part was used as training data (70%) and the second part was used as test data (30%). A complete data mining process using RapidMiner is

shown in Fig. 2. Input variables consisted of seven characteristics of each published post and four label variables of company Facebook posts. Details are described in Table 1. First, seven input variables were standardized by using Z-transformation and the dependent variable (Y) was preprocessed into the range {0, 1} using the formula:

$$r_n = \frac{y_n - \min(Y)}{\max(Y) - \min(Y)}$$

### 4. CONCLUSIONS AND FUTURE RESEARCH

Paid commercials make a contribution 9.52% of whole relevance for complete lifetime put up reach. Post hour, sort of publications, and post month have higher contributions to total lifetime post reach. This result provides useful information; rather than solely counting on paid ads, marketers should post the proper material at the proper time. Publications that used paid commercials as a method do now not have any perceptible affect on variety of comments. Paid commercials produce an common of 10.10 feedback to every submit and posts besides paid advertisements common 6.01 feedback per post. Type and category of publications have extra substantial outcomes on comments. Thus, perception these elements may also amplify comments.

In phrases of relevance, paid advertisements aid the wide variety of likes higher than whole lifetime publish reach, comments, and shares and enhance likes via 59% on average. The importance of paid ads toward number of shares is 15.55%; shares are improved 29.46% if paid ads are used. If we focus on the percentage of relevant inputs to number of likes, then category of publications is the most important factor to number of shares. Therefore, to maximize shares, agencies have to apprehend the category of every submit as a substitute of solely the usage of paid commercials as a publishing strategy. This lookup consequences advise that businesses need to recognize their publication. Having paid ads is not a bad strategy for reaching potential customers, but combinations of paid ad strategies and other content strategies (time of publishing, type, category, having more pages likes) are highly recommended.

Even if organization Facebook pages attain many humans and generate high-quality engagement, such successes do now not assurance any actual sales or revenue. Difficulties exists in measuring performance of such publications in terms of real sales because marketing touch points that affect customers' decisions are vague and hard to

predict. The touch points that convert various customer behaviors into real sales should be studied. Based on such research, the allocation of price range to unique advertising techniques ought to be determined. This procedure is known as advertising attribution. Marketing attribution for on line marketing via corporation Facebook pages is a doable theme for future research.

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