CORNERSTONE
MINNESOTA STATE UNIVERSITY MANKATO

Journal of Undergraduate Research at Minnesota State University, Mankato

Volume 6 Article 6

2006

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ASSESMENT OF THE MANKATO AREA'S YOUNG ADULT POULATION'S KNOWLEDGE OF MALL VIDEO MINING FOR MARKETING RESEARCH

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The most modern form of gathering marketing information is not as new as many people believe. The trepidation of Big Brother's cameras watching down on us puts a chill down most peoples' backs. In numerous mall stores, cameras are located in each store and are examining you. Most believe that the cameras are positioned for the purpose of shoplifting and crime, but the truth is many are also used for the purpose of marketing.

Video mining as it is known has emerged as the latest method of conducting market research. The stores that are participating in this study are diligently watching an assortment of things. Marketing analysts watch what a customer has picked up, what they have looked at, the amount purchased, colors that attract them, their facial expressions, and many other forms of movement. This information is gathered and recorded, then shot across the nation via computer to a company such as Shopper Trak that views and analyzes clips of customers shopping. Shopper Trak presently has 40,000 cameras in various stores across the nation. Most customers have little knowledge of this marketing tactic or that there are no laws prohibiting this action.

Do stores and business's have an ethical duty to reveal their practices to their customers? Is it legal for them to use the personal information or preferences of their customers to exploit them without their knowledge or consent? Finally, where is the line drawn on what is considered personal, private information?

Video Mining: Efficiency Triumph or Tragedy

ABSTRACT

Privacy issues are a growing concern in today's increasingly connected society. Advances in the capabilities to gather and store information are ever expanding. These advances give rise to questions like what information is being collected, who is collecting and viewing it and how is it being used? Another chapter in this complicated saga of information collection comes from video mining. This new form of data mining gives businesses exciting and innovative opportunities for efficiency. But what does the public think of all these new capabilities? This study attempts to answer these questions by conducting a survey of 807 college-age students and their opinions concerning video mining. An overview of video mining as well as the results from the survey is covered in this paper. A discussion detailing the survey and its goals follows the results. The potential future of video mining is also mentioned along with ways in which researchers and consumers alike can further discuss the issue.

INTRODUCTION

It seems like every day another story breaks in the news about the government requesting information about individuals from commercial entities for the sake of national security. There is little doubt in the minds of Americans which is more important, national security or someone looking at personal phone records. But what if personal information could be used to enhance the shopping experience and make retail businesses more profitable and efficient? Would consumers be willing to risk their personal privacy for such benefits? Questions such as this one have arisen with a recent advancement in the field of data mining. The advancement comes to society through a video camera lens; just like the lenses used for security purposes in stores all across the world.

Video mining is the process of using statistical data software to sift through digital video taken of customers and their behavior.[3] The process of video mining starts when customers and their behaviors are recorded into an anonymous database, usually offsite, through cameras placed in the stores by the owners or video mining companies. Following the recording stage one of two things happens; the recorded material is used by the video mining company that will perform the mining or the owner mines the information them self using purchased software. Next, the

DOI: 10.56816/2378-6949.1113

recordings are run through data mining software which can present reports based on patterns observed in the recordings. Finally, the information gained can be sold to economists, bankers, and retailers among others.[5]

While data mining, which uses only numbers, has been around since the mid 1990's, video mining, is slightly newer, first being offered around the turn of the century.[3] One reason these two types of "knowledge-discovery" practices are such recent developments is because they require massive amounts of computer storage and processing ability made possible only in the last few years by advances in computing technology.[2] Even though these technologies are so young, many businesses have already begun to tap their potential. Wal-Mart, the world's largest retailer, was a pioneer when it came to using data mining technologies.[3] As of 2004, a leading video mining company, ShopperTrak RCT, reportedly had over 40,000 cameras in 380 malls and 130 retail clients to boot.[4] While the numbers are staggering, ShopperTrak is not alone; other companies such as Advanced Interfaces Inc.'s aptly named VideoMining unit also sell software and perform video mining services. Some of ShopperTrak's clientele include well known retailers such as Gap, Banana Republic, Victoria's Secret, American Eagle Outfitters and PaylessShoe Source.[5] Noting the number of cameras already in use, the CEO of Advanced Interfaces Inc., Rajeev Sharma, says the market for video mining is growing and this is only the beginning.[8]

As mentioned before, video mining is a fast growing industry and is of great importance to businesses of all kinds. However, if video mining is so important, why is there an uproar about personal privacy? To answer that question, an understanding of the abilities of video mining must be explored as well as the pros and cons associated with those abilities. Video mining software is able to automatically characterize a customer's gender, ethnicity and age by using proprietary face detection and pattern recognition software.[9] The software, depending on its individual specifications, can then discern information concerning a vast number of topics of interest to retailers. These topics include how many people enter and exit the store, where they go, what they pick up, what they purchase, how long they are in each part of the store, how long they look at each item and what their intent is based on comparing the previous statistics.[9] Technologies in development allow stores to place cameras that can then provide information from a customer's facial movement and gestures.[9] There is almost no limit to the type and amount of information video mining can gather regarding a retailer's customers.

The positive aspects of video mining are many. Video mining enables businesses to be more efficient in their practices and to better serve their patrons. More specifically, video mining helps businesses by letting them know when and where to schedule employees, where to place advertisements, where to locate products and how much product to stock, along with many other invaluable efficiency aspects.[6] Customers also benefit by businesses becoming more efficient in this way because the items they want are placed in more convenient locations and the advertisements that concern them are targeted to them, resulting in a more effective shopping experience.[8]

Even while the positive aspects of video mining are so obvious, the negative ones cast an ominous shadow. Unlike data mining, video mining gives retailers and other interested parties the unique ability to link faces with information. Currently, those involved with video mining are quick to point out that no humans ever see the recorded video and that only software analyzes the data.[5] They also point out that all recordings are promptly deleted after the mining has taken place.[5] While this may comfort some, critical thinking skills will lead us to suspect that like everything else in today's digital world, nothing recorded on a computer is truly permanently erased. Furthermore, the statement regarding confidentiality is one made on the honor system.[5] No laws currently govern the use of the data gathered from muted video surveillance by commercial entities.[5] It is here where the personal privacy issues take hold. As with all good things, it is only a matter of time before they are used in a corrupt manner. Rajeev Sharma also points out that in the future it is theoretically possible for retailers to create a sort of personal profile about their patrons by linking personal information from credit cards and other payment sources with the information gathered through video mining.[5] Even more disturbing is the fact that because this information is digital and sent over the Internet, it is susceptible to hacking associated with identity theft.[1] The last issue concerning video mining is rooted in ethics. In the past it has been thought unethical for an employer to monitor its employees without their knowledge.[4] Is it not then unethical for businesses to monitor their customers to this degree without their knowledge or consent? Academia and other research institutions are subject to strict ethical standards when conducting research on human subjects. Why should the business world be able to escape such ethical parameters entirely? There is no legislation concerning this issue either.

Currently, there is a plethora of information about data mining and video mining, but there is almost no information concerning the public's opinions toward the growing use of these technologies and their potentials. In view of the ominous consequences and despite the vast benefits video mining provides, these researchers hypothesize that, "If the public were polled, regarding their thoughts and opinions about video mining, then the majority would be concerned with its use." This research study addresses this notion to assess the public's feelings about the subject.

RESEARCH

In order to test the hypothesis, research was conducted through a survey. The survey contained five short questions concerning public opinion associated with video mining. In order to eliminate redundancy and in order to avoid any other problems with consent, disclaimers were clearly printed at the top asking students who had taken the survey not to take it again and that the survey was optional. Questions were stated on a half sheet of white paper as follows along with a section where students could note any additional comments they may have had:

1. Did you know this occurs?
2. Does this invade the privacy of the consumer?
3. Would you change your shopping habits if the store used video mining?
4. Would you shop at a store that used video mining?
5. Does this marketing technique concern you in any way?

Additional Comments:

The survey was given to 807 students on the Minnesota State University, Mankato campus. Surveys were given to students in classes with different curriculums such as music, biology and sociology among others. The classes were for the most part introductory level classes. The process of conducting the survey occurred in the following fashion: A researcher gained permission to conduct the survey from the professor. The researcher then proceeded to pass out the survey in the first minutes of the class period. After the surveys had been handed out, the researcher gave a brief three minute or less description of what video mining is, where it is occurring and why the controversy is occurring. The surveys were promptly filled out and the researcher then collected them. Next, all the filled out surveys were compiled together and

entered into a Microsoft Excel spreadsheet using ‘y’ and ‘n’ to signify yes and no answers. Each column containing the responses to a single question were sorted individually providing a total number who responded either yes or no to each question regardless of how the individual answered other questions in the survey.

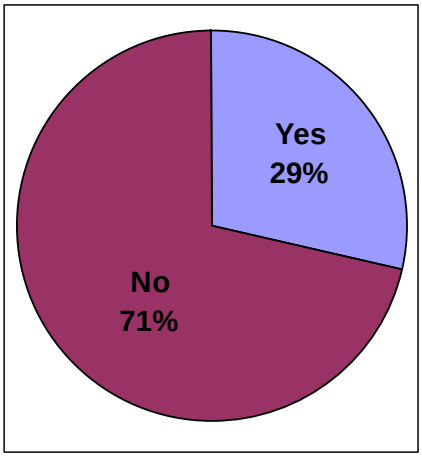
RESULTS

Table 1 displays the numerical results from our survey. Each column labeled, “Question #”, contains the number of students who responded either ‘yes’ or ‘no’ to the particular question and the total number of students who responded. Each of the figures displays the numerical data from Table 1 in the form of a pie graph with one section signifying ‘yes’ and the other ‘no’. Below each figure is the question which was asked in the survey. These sections also contain the percentage of those who answered ‘yes’ or ‘no’ for easier reference.

Table 1

Answer	Question #1	Question #2	Question #3	Question #4	Question #5
Yes	**231**	**268**	**169**	**600**	**252**
No	**576**	**539**	**638**	**201**	**555**
Total	*807*	*807*	*807*	*807*	*807*

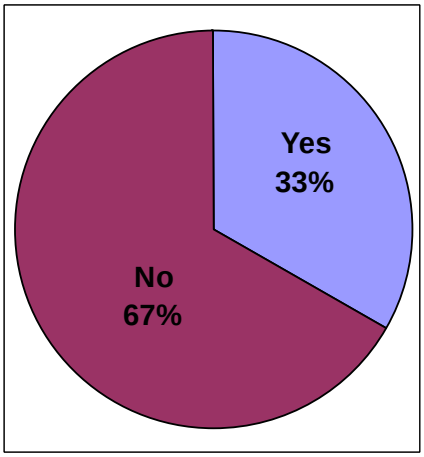
Figure 1



1. Did you know this occurs?

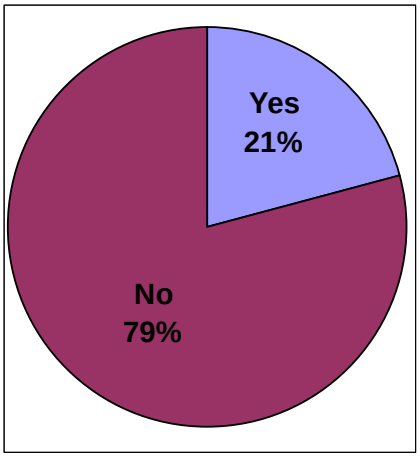
Figure 3

Figure 2

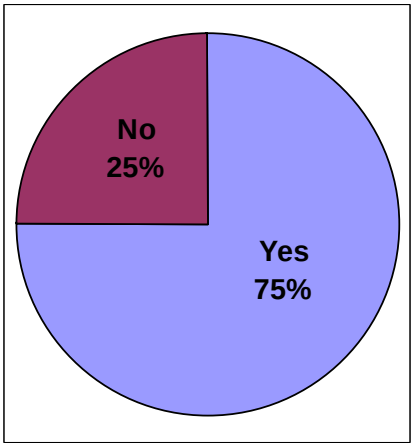


2. Does this invade the privacy of the consumer?

Figure 4

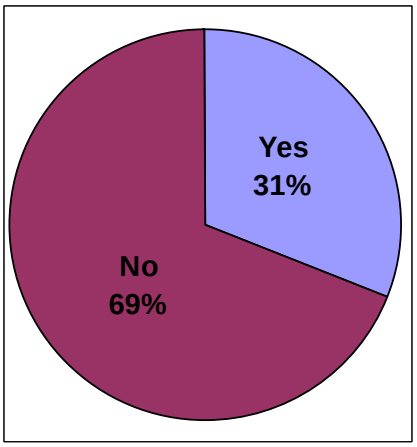


3. Would you change your shopping if the store used video mining?



4. Would you shop at a store that used video habits mining?

Figure 5



5. Does this marketing technique concern you in any way?

DISCUSSION/CONCLUSION

The goal of this study was to gather data on public opinion concerning video mining to address our hypothesis which stated, “If the public were polled, regarding their thoughts and opinions about video mining, then the majority would be concerned with its use.” Aside from simply asking, ‘Is video mining good or bad’, we wanted to know a little more about the publics perception of the issue. This begs the question, why did the survey contain the questions it did? Each question in the survey was designed to tell us something different.

The first question inquired whether the students had any idea this knowledge discovery technique was occurring. In asking this question, we wanted to know if video mining was rather obscure or of general public knowledge. Obscurity would lead us to believe that either those

using video mining do not want the public to know about its use or that not enough is being done to inform consumers of its presence.[5] The results from Question 1, noted as percentages in Figure 1, tell us that the use of video mining is not public knowledge and with almost three-quarters unaware of its use, it is rather obscure. Other possible reasons for the obscurity lie in that the technology is not used by every retail business and that it is only an emerging industry.

The second question was designed to get a sense of how the public feels about the use of video mining and whether it is an invasion of privacy. By referring to Figure 2 it can be seen that only one-third of survey participants thought video mining was an invasion of privacy. These results could be derived from many different reasons. Most notably, the that fact that only relatively young people were surveyed and it has been pointed out in other research that this generation is somewhat numb to privacy issues in light of the Internet age and post-9/11 America. Also, participants were all in attendance at a public university, which is notoriously liberal and maybe more accepting to new technologies. Other reasons explaining the results of Question 2 could stem from the fact that those surveyed were given very little information about video mining, its uses and potential before they filled it out. One student noted in the additional comments portion of the survey that, “Any answer I gave was based only on what I was told five minutes ago.” Despite this concern, there was a reason students were told very little. It was the intent of the survey to get the students ‘gut’ reaction to the topic rather than a well thought out opinion. Another reason for the results could lie in the type of information video mining gathers. While some would consider their personal shopping habits and preferences private, most might only consider things such as their medical records and financial information as personal.[1] Therefore, anyone delving into the habits of consumers would be welcome without hesitation, especially if the possibility of a more efficient shopping experience could come of it.

Questions 3 and 4 were written from a business standpoint. We wanted to know how businesses and the information they gather through video mining would be affected if they made it a point to let customers know video mining was taking place. The third question asks whether the participant would change his or her shopping habits if he or she were aware of being observed. What this question is really getting at is if businesses let their customers know they were being watched, would that fact skew their results obtained through video mining, ultimately nullifying the use of the technology? Referring to the percentages in Figure 3, one can see that almost eight out of ten would not change their shopping habits. This leads us to believe that

consumers are not sensitive to a camera recording their movements and that observation of their personal shopping habits are of little importance.

The fourth question was written to determine whether a business would be affected if it made its use of video mining known to its patrons. Question 4 simply asks if the participant would shop at a store in that he or she knew used video mining. Figure 4 points out that three-fourths of those who filled out the survey would shop at a store that they knew used video mining. While this is not surprising based on the previous questions, the fact that one in four would not is significant. Any business owner would consider losing 25% of his or her business to be a drastic loss. This question warrants further inquiry into public opinion and how to educate the public about the benefits and potential problems concerning the use of video mining. Because information about the use of video mining will become common knowledge in the future, it is of great importance that businesses devise a positive means of informing their customers about video mining, otherwise, according to this survey; they could potentially lose 25% of their business, which is a substantially negative repercussion.

Question 5 is the most important of all the questions and is the most straightforward. The question asks if video mining is of any concern to the participant. This is the topic that our hypothesis is based on. Our hypothesis predicts, as mentioned in the introduction, that the majority of those surveyed, meaning more than 50%, would be concerned with its use. In complete contrast to our hypothesis, the results of Question 5 as seen in Figure 5 point out that only 31% of those surveyed were concerned. Potential reasons for this result largely parallel the reasons stated for the results of Question 2. Despite this divergence between our hypothesis and the results it must be noted that after conversing with some of those who participated in the survey, it seemed as if those who were extremely concerned about the use of video mining became more comforted with its use as more information was provided. In addition, it seemed as though those who were unconcerned with its use became more concerned by its potential as more information was disclosed.

As with every opinion-based study, being biased toward one side of the issue was a concern. In order to address this concern a few different practices were employed. First, in addressing potential bias, we attempted to formulate questions that would not lead the participant to feel strongly for one side or the other. We also created the survey to be short and to the point. Two reasons were noted for this, the first being that we felt more students would be willing to

participate if it was short; the second being that, as noted earlier, we wanted the participant's 'gut' reaction to the topic rather than a more informed and potentially biased answer based on background. Another way we attempted to eliminate bias was by selecting whom we surveyed. As mentioned in the introduction, surveys were handed out in clusters to students in lecture halls with differing classes in order to eliminate bias that might accompany their major and personality type. Finally, in attempting to eliminate bias from our survey each researcher provided only the bare essentials for details concerning video mining and its use. Researchers were also careful to not make one side of the issue more appealing than the other in their description of the issue. As far as validity is concerned, we felt that the results were relatively consistent in that all of the percentages were either between 20 and 30% or between 60 and 80%. We also felt that the more participants we had, the more accurate the results would be in portraying the opinion of those we surveyed. It is because of this that we chose to survey 807 individuals from different classes rather than a single class.

After reviewing all of the precautions taken to help subdue biases, inherent limitations were noted. Such limitations include the fact that the survey was not truly random; therefore it is quite possible that the conclusions drawn by these researchers were inaccurate or biased in accordance with who was surveyed. Also, as mentioned earlier, the survey only covered 807 students at a single university. This is a severe limiting factor when inferring about potential public opinion because it is only a narrow scope. Another limitation lies in how much information was gathered and how it was analyzed. While it was the goal of the researchers to make the survey short and to the point, very little information about the participant was gathered making it difficult to do further demographic analysis. Also, survey data was only ordered and counted for the percentages that are used, limiting potential results which could have been gathered through detailed cross-tabulation analysis.

This paper is of great importance to many different groups for a variety reasons. It is important to businesses because the use of video mining can potentially uncover vital information that could aid them in becoming more efficient and profitable. Furthermore, the results of this research are crucial to businesses because they focus on the younger population and provide insight into the minds and opinions of the next generations of shoppers. The study is important to individuals because it exposes the use of video mining and brings a potentially controversial privacy and ethical issue to the forefront. This paper and the survey on which it is

based is one of the first of its kind that deals with public opinion concerning the use of video mining technology.

What does the future hold? With video mining there are many scenarios. What is known is that the use and capabilities of the technology are expanding rapidly. In the future, businesses will not be able to compete if they do not use video mining because of all the information it can provide. What is less certain is how the information collected through video mining will be used negatively from the perspective of the consumer. As stated earlier, no laws govern the use of data collected through video mining. It is, however, somewhat encouraging that, historically, the law usually follows technology. This means that as the relatively new industry of video mining expands, appropriate laws will surely follow. At this moment, it is too early to debate the merit and consequences of video mining. More information needs to be collected on how the public views the topic and what they feel should be done. This study is a first step in the right direction.

Further research could be conducted through expanding the survey nationwide or even worldwide as corporations become increasingly international. Demographic comparisons could be made by asking for such information and suggestions could be taken as to how to inform consumers in a positive manner about video mining. A cross-tabulation analysis could be used to show if individuals answered, ‘yes’ or ‘no’ to Question 1, then how did they answer Question 5? This study shows us that the issues of video mining and privacy concerns associated with its use are an important subject and warrant further research, discussion and legislation.

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Author's biography

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Faculty mentor's biography

Vicki Luoma is an Assistant Professor in the College of Business at Minnesota State University, Mankato. She earned her B.S. in Education at Taylor University and her M.A. at the University of Dayton, following which she earned her Juris Doctor degree at Northern Kentucky University. She is currently a candidate for the Ph.D. in Business at Capella University. She has practiced law and served the business community as a consultant in Minnesota for over 25 years. Further, she is a former vice president of a small private business university.