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#### **Individual Project Proposal**

Lakshmi Sravya Vedantham  (002989684)

ALY6080 - Integrated Experiential Learning, Northeastern University

Instructor - Mathew Goodwin

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**Abstract**

Merry Maids is a worldwide company with over 1000 franchised small businesses in the United States, the United Kingdom, Canada, and Australia that supply household cleaning services. Merry Maids was founded in 1979 and bought out by ServiceMaster in 1988. Despite being one of the best, the system was quite slow and dealing with one customer took 30 minutes due to the lack of an eCommerce platform. Even before the covid, this resulted in the loss of several recurring revenues in the previous year. To tackle these challenges and speed up the process, I have produced some fascinating concepts that can be effectively discussed in this document. There is a plethora of intriguing AI (Artificial Intelligence) concepts that can make our jobs easier. It might be through virtual assistants and questionnaires, or it could be through other tools that can improve and speed up interactions.

*Keywords*: Predictive modeling, Chatbots, machine learning and NLP models

**Introduction**

The Merry Maids is a service master who employs all cleaning services. To handle the business, they used to go to the owners of Bunch of Merry Maids. However, gathering all the details, such as sales data and services needed, takes around 30 minutes on average, and home and small business owners typically have a lot of leads. There were approximately 106000 calls in lag throughout the covid, making it incredibly impossible to attend and manage each conversation for 30 minutes. As a result, losing many clients would have a significant impact on recurring revenue. They lacked an eCommerce platform that would have made things easier. Because labor will consume 10% of total sales, they do not want to invest more in eCommerce because they have had limited success with it.

**Background research and literature**

There are many models and answers for the issues that the Merry Maids are dealing with. Predictive analytics uses historical and stored data, statistical tools, and machine learning to forecast outcomes based on earlier behavior. This is not a new science; people have been using predictive analytics to wager on sporting events and horse races for years. However, the accuracy of predictive analytics has improved because of the quality and volume of data paired with big data methodologies, making it more beneficial for increasing sales and income. Analytics can help you in finding where specific ability is needed and how to distribute areas for best results. We can figure out which models will generate more revenue and sales. Microsoft, for example, wants to improve sales success. On the other hand, a chat bot can help you think faster. With the help of a virtual assistant, we may get as much information as possible. Companies like eBay, Starbucks, and Spotify have improved their customer service and sales with the help of chatbots. Chatbots have not only improved customer service, but their quick adoption by businesses proves how A.I (Artificial Intelligence). technology may radically disrupt an industry.

**Statement of purpose**

The goal of this project is to fix the problem that the Merry maids' franchise is having, make things faster, and increase recurring revenue. The time spent waiting for each customer is excessive. There are many options for dealing with the wait. For all of this, a virtual assistant is the finest alternative. When I tried to contact a couple of airlines for aid with a booking, phoning, and waiting was too much. If a consumer does not have any specific requirements and only needs service information and to book a service, he can employ virtual assistants instead of waiting for extended phone calls. If they need special help, the call can be sent, prioritized, and placed in the queue. Another possibility is to create a questionnaire with yes or no or multiple-choice questions. Customers can respond to these questionnaires and select the services they want. We cannot disregard new customers, even if we are worried about regular revenue. We must figure out the possibility of a customer's behavior, whether he will become a loyal customer or not, and then use sales to entice them.

**Scope of Project**

Because of the long wait times, Merry Maids is losing consumers. This project will now have access to all the data from an AI assistant model that has been well-trained for a maximum of 1000 questions that a client can ask, and new questions can be sent back to the model and reissued. The accuracy of every chatbot with customer support is around 95% in major airlines, Airbnb, and eCommerce web businesses. This chatbot model can also help predict if a consumer will become a regular customer based on the data it collects from each conversation. As a result, the dataset for the chatbot will have a minimum of 1000 questions, which can be chosen via a survey or by the team. I am unable to drop new clients who fall into the non-recurring group. To make them recurrent consumers, we need to figure out the likelihood of the customer and decide whether they are likely to become loyal customers using predictive modeling. I will need the same data set that the merry maids gave for this predictive modeling. There are presently 90000 client records in this database. Using the same dataset, I can decide the likelihood of a customer's status. R and Tableau may be used for analysis, while Python may be needed for data modeling and chatbots.

**Design and Implementation**

**Chatbot** Modeling is needed for two components of the project. We need to build a chatbot that can cut down on client wait times. The model is loaded with all the questionnaires that need to be asked of the customer. We will need data or at least 1000 questions for this model. To make the bot learn and be ready for the real world, we should apply NLP (Natural Language Processing) models and deep learning technologies. If the data has not been learned yet, NLP methods such as bagging models and Deep learning models such as neural networks and LSTM (Long Short-Term Memory) can aid the chatbot to learn it. The better the model is, the more data you have. Text mining is a lot better approach because dealing with text can be difficult at times, and we can use other NLP (Natural Language Processing) models like BERT, Electra, and others. They are big models, but they are the best when it comes to handling communications. It would take a maximum of 3 months to develop one of these models, including data collection, analysis, and deployment.

**Predictive Modeling**  Another aspect of the project entails deciding the possibility of a consumer becoming a repeat customer. We will need to use machine learning models like SVM (Support Vector Machines), random forest, and logistic regression to do this. This is a similar approach to what we are taking with the XN group project. Except that our main goal would be to discover how to become devoted consumers as quickly as possible. This model requires study and modeling to decide the best features. This model is simpler than the chatbot and can take up to two months to analyze, create, and launch if a dedicated team is assigned.

**Limitations**

Though chat bots or virtual assistants are preferable solutions for speeding up the process, there are several issues that text mining might provide. The chatbot does not always act as expected. Because of the customer's changing input behavior. This may lead the consumer to be burdened, and there is a risk of upsetting the client because of the inappropriate model conduct. This is something we should keep in mind while we work on this project.

**Conclusion**

Based on the findings of our research, Merry Maid Service Master is a fantastic company that has struggled to reach the top of the sector due to a lack of an eCommerce platform. Using AI assistants or chatbots to speed up the process and learn about consumer behavior through these bots or AI assistants is the greatest approach to keeping customers happy. From the above models, the model with the best precision and the lowest modeling time will be chosen. This will not only improve the experience of current customers but will also lead to repeat purchases. In the future, I would like to work more closely with voice assistants and chatbots to improve their effectiveness. This is followed by an annotated bibliography of a few relevant publications about the models that have been implemented thus far.

# References

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**Annotated Bibliography**

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This article describes in detail how Chatbots affect every organization in this new technological era. Chatbots supply a rapid and engaging client experience by simultaneously delivering troubleshooting services, an on-demand help desk, and a personal assistant. This article is quite beneficial to the project. The merry maids spend 30 minutes with each customer, trying to close the deal. If no specific requests are made, this chatbot can handle a few first queries and get as much information as possible while engaging the user with the services. This way, the time spent with each client can be reduced, and customers will not be disappointed while waiting.

Xu, J. (2021, December 13). *How To Create a Chatbot with Python & Deep Learning in Less Than an Hour*. Medium. <https://towardsdatascience.com/how-to-create-a-chatbot-with-python-deep-learning-in-less-than-an-hour-56a063bdfc44>

Some people have a true aversion to interacting with others. They feel disconnected and awkward whenever they are compelled to mingle or attend activities with many people. I consider myself to be the most outgoing because I get my energy from engaging with others. This post is quite fascinating and provides extensive instructions on how to build a chatbot with all the necessary materials. This truly supplies all source information, and the whole time it takes to deploy a chatbot for a modest dataset would be 2 hours. This can be used in this project to make things easier for the analyst and developer, as well as to aid with the problem definition.

AlexMarandon, & AlexMarandon. (2016, October 4). *Using machine learning to predict customer behavior*. Data Science Central. Retrieved April 29, 2022, from <https://www.datasciencecentral.com/using-machine-learning-to-predict-customer-behaviour/>

This is yet another fascinating piece I have discovered. As the author AlexMarandon points out, dealing with dissatisfied clients is quite difficult. Predictive modeling in machine learning may simply be used to forecast customer behavior in the future. Every data analyst examines the data and figures out the best model to fit the data. Model fitting is constantly dependent on the analyst's efforts, but the fundamental goal is to find a better solution to the problem at hand. A non-linear machine learning model would be a better fit for these times than a linear machine learning one. This problem statement perfectly describes the goal I am pursuing. All I wanted was to turn dissatisfied clients into engaged and devoted customers. There is a good likelihood of increasing recurring sales this way.

Originally published by Emmanuel Sibanda on. (n.d.). *Predicting the likelihood of a customer to make repeat purchases using logistic regression*. Hacker Noon. Retrieved April 21, 2022, from <https://hackernoon.com/predicting-the-likelihood-of-a-customer-to-make-repeat-purchases-using-logistic-regression-b430c9719994>

This is a fascinating essay in which the author, Emmanuel Sibanda tried to undertake exploratory analysis using a Kaggle dataset from a Brazilian eCommerce site. He also tried EDA (Exploratory Data Analysis) to have a better understanding of user behavior and patterns. He also used a machine learning classification algorithm to forecast the chance of a client repeating a purchase based on the customer's earlier behavior.

The problem statement in this article is comparable to that of the sponsors. In both scenarios, we must predict repeat clients and develop a more correct predictive model for the provided dataset. This way, recurring sales can be enhanced by capturing active, committed clients.