

# Capstone Project Proposal



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## Business Goals

<b>Project Overview and Goal</b>  What is the industry problem you are trying to solve? Why use ML/AI in solving this task? Be as specific as you can when describing how ML/AI can provide value. For example, if you're labeling images, how will this help the business?	<b>Project Name:</b> Costumer service intelligent chatbot  The industry problem that I aim to solve under this project is the costumer satisfaction and service time cost for the customer service department. With the increase in work time and automation space, coupled with the fast computational speed, I believe that NLP/ML can be implemented in this project to make it practical in real world. Moreover, as the projects helps in contacting the customer and raising report tickets 24/7.
<b>Business Case</b>  Why is this an important problem to solve? Make a case for building this product in terms of its impact on recurring revenue, market share, customer happiness and/or other drivers of business success.	Several millions of customer service reports are raised daily to be handled by thousands of employees. Requiring multiple offices and hours to cover the demand rate for the customers. Therefore, the creation of a chatbot that can contact the customers and interact with them 24/7 with fast and accurate unified responses an help companies focus their manpower and time resources on improving their products and services to be tailored to the customers expectation.
<b>Application of ML/AI</b>  What precise task will you use ML/AI to accomplish? What business outcome or objective	The precise task in the implementation of the costumer services chatbot, would be to analyze the incoming reports raised by the customers onto the customer support platform to understand and reply to customers using NLP and Sentiment analysis technologies. In case the customer needs more support the intelligent chatbot

will you achieve?

can refer the customer to real live agent. Resulting in giving the customer support employees space to focus more on the high priority complex cases while the intelligent chatbot handle the routine more mundane reports.

## Success Metrics

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What business metrics will you apply to determine the success of your product? Good metrics are clearly defined and easily measurable. Specify how you will establish a baseline value to provide a point of comparison.

The business metric that I would use to determine the success of the product, would be customer feedback survey rating results and comments along with customers served and the serving time for each conversation. If the amount of positive rates goes up or the customers served increased then it would be a success for the product. Moreover, to establish a baseline to reflect the real live product impact, we could have a comparison between the costumers' satisfaction rate and serving time interacting with the chatbot or the Customer service agent.

## Data

### Data Acquisition

Where will you source your data from? What is the cost to acquire these data? Are there any personally identifying information (PII) or data

The data for the intelligent chatbot can be acquired from multiple resources, that include using of public domain data (on platforms like UCI, Kaggle, etc.), or the company customers database and internal systems. I would recommend the usage of the company's customers database and internal systems for the whole timeline of product lifecycle (to ensure that the chatbot interactions and analysis are tailored to the specific

<p>sensitivity issues you will need to overcome? Will data become available on an ongoing basis, or will you acquire a large batch of data that will need to be refreshed?</p>	<p>company experience and identity). Furthermore, the data would be updated on a daily or weekly basis to ensure constantly updated models in the deployed state. As for the PII we'd take special care to get necessary permission steps and use high cyber security technologies to ensure the high encryption that would protect the users' identity to avoid any issues in the future.</p>
<p><b>Data Source</b></p> <p>Consider the size and source of your data; what biases are built into the data and how might the data be improved?</p>	<p>The source for the data acquisition process would be an embedding of the company's customers and services databases and APIs. To avoid any possible biases in the data we can classify customers according to the company's policies and requirement to ensure the chatbot stays coherent with the company's aims and goals. The size would represent the company's clients number so if we're making the chatbot for big global impact company's we'd need around 1-10 million customers size of a dataset, if it's a startup we might need a couple of thousands.</p>
<p><b>Choice of Data Labels</b></p> <p>What labels did you decide to add to your data? And why did you decide on these labels versus any other option?</p>	<p>The decision for the data labels for this project is tailored to the company's services names and categories, this is a classification problem. Therefore, the labels decided for the intelligent chatbot is designed according to the company's industry and services provided to the public and private customers; as this would enhance and satiate the chatbot experience to the meet needs of the customer service effectively.</p>

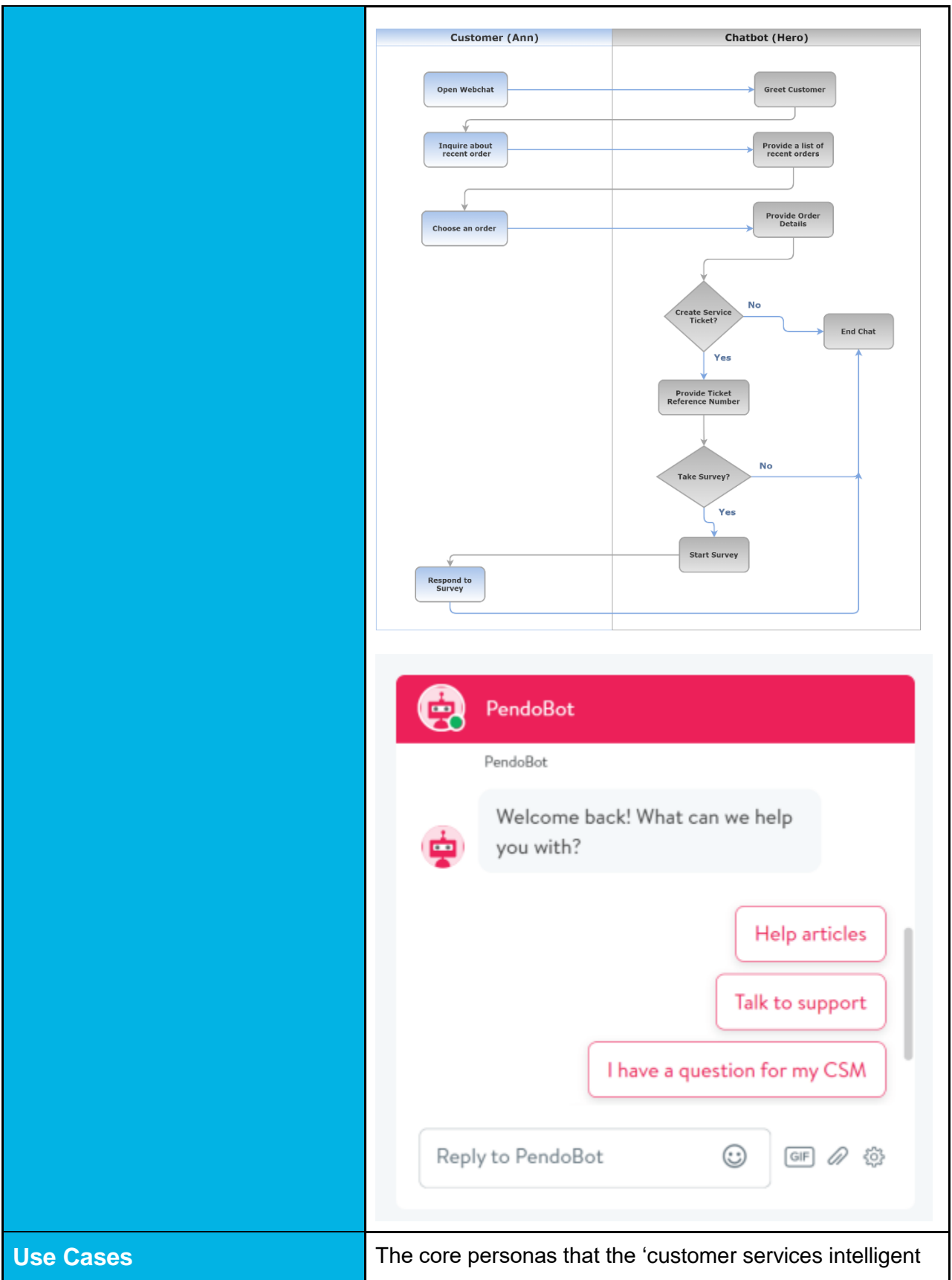
## Model

<p><b>Model Building</b></p> <p>How will you resource building the model that you need? Will you outsource model training and/or hosting to an external platform, or will you build the model using an in-house team, and why?</p>	<p>I would be initially using cloud services provided by IBM Watson Assistant , Amazon Web Services (AWS) or Azure to create a classification model that separates the customers complaints into categories (by labelling them according to the company's experience) for creating a prototype. Once a certain rate of satisfaction is achieved, I would be scaling up the NLP model by providing the entire dataset and creating an actual chatbot reflective to the services level and qualities. Once created, it would be deployed on the customer</p>
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	support platform. Moreover, in case the satisfaction rates decrease in the deployment phase, I would be building a custom NLP model using python and Tensorflow with NLTK (or spaCy and Keras) to achieve the Satisfaction to serving time ratio again.
<b>Evaluating Results</b>  Which model performance metrics are appropriate to measure the success of your model? What level of performance is required?	For ML models, several metrics including accuracy, precision, and recall score can be to measure the model performance. However, in this scenario, I would emphasize on the recall to ensure that the report ticket category is accurate according to the services provided by the company, as it clearly identify the ratio of the services test dataset labels that were categorized correctly id try to keep this measure as high as possible or at least above 98%.

## Minimum Viable Product (MVP)

<b>Design</b>  What does your minimum viable product look like? Include sketches of your product.	As the product is mainly concerned with the classification (or categorization) of customers complaints using ML model into the right service category to be handled by the right department and interact with them, it'll need both a backend system connected to the internal company systems and frontend UI to reflect the company's identity and experience. The workflow and UI can be understood by looking at the figures below:
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<p>What persona are you designing for? Can you describe the major epic-level use cases your product addresses? How will users access this product?</p>	<p>chatbot' would be customer care and customer support department from all types of industries (Governments, Retails, Entertainment, Technology, Transportation Hospitality, and Tourism). Moreover, the chatbot can be used in the customer care platform to cover a sufficient portion of customer complaints.</p>
<p><b>Roll-out</b></p> <p>How will this be adopted? What does the go-to-market plan look like?</p>	<p>The pre-launch phase of the deployment would include the requirement gathering, system integration testing, user acceptance testing, marketing, and deploying the product deployment ready. This would ensure the live product to be aligned with the vision and expectation of the client. Moreover, once pre-launch steps are completed, the product will be launched onto the customer support platforms for active customer care experience which will require consistent data analysis with consistent bug fixes and relevant updates to enhance the performance in the post-launch.</p>

## Post-MVP-Deployment

<p><b>Designing for Longevity</b></p> <p>How might you improve your product in the long-term? How might real-world data be different from the training data? How will your product learn from new data? How might you employ A/B testing to improve your product?</p>	<p>The NLP/ML model designed for the 'customer service Intelligent chatbot' would take the long-term perspective of model relevancy to the company's vision into consideration, by dynamically feeding the newer data (from the in-house historical dataset) on a quarterly or annually basis. This would implement all the updates required to be deployed into the system to staying relevant to the company's vision and maintain system's performance. Moreover, the dynamic feeding of the data can be compared with the previous and current model to deploy the model that performs better.</p>
<p><b>Monitor Bias</b></p> <p>How do you plan to monitor or mitigate unwanted bias in your model?</p>	<p>The mitigation of bias can be managed by providing an annotation list with possible keyword for each service category and relevant tags.</p>

