Capstone Project Proposal

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Business Goals

Project Overview and Goal 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?	Industry Problem: This is an internal project. In Biotech startups there is a combination of Ecommerce(full automated), Ecommerce(semi touch) and high touch sales process. Customer support teams usually comprised of highly paid Phd's in biology who take care of all support questions. Support requests varies greatly from password issues to complex gene sequence design questions. Goal: Goal is to automatically identify biology questions vs general questions like billing, password, ecommerce questions and assign it to appropriate staff. Why ML/AI? ML is good for this case because it's a repetitive text processing job with well defined boundaries. ML/AI will help reduce support cost and can be scaled well when we expand internationally.

	How ML/AI provides value?

	Reduce the response time, improve customer experience and reduce cost.
	   1) Automatically create and assign biology specific tickets for biology staff
	   2) Other tickets to normal support staff
	   3) By doing this, we can increase the number of tickets handled by biology staff
	   4) General questions will be answered quickly instead of waiting in the queue.

Business Case
 	
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.
	Why its important:
	With company goal to move from startup stage to scaling, we need the customer service to keep in pace with increase in sales with a control over support cost.
	
	Recurring Revenue/ Market Share:
	Biology staff will form relationship understanding the customer issues resulting in more orders and new product ideas.
	
	Enough time to introduce new products or upsell products during the support call.
	
	Customer Happiness:
	Improve the customer happiness by improving the response times.
	   1) Biology specific questions are answered quickly and staff is not bothered by trivial questions
	   2) Regular support staff quickly resolve any questions like billing, shipping, data entry, password issues etc.

Application of ML/AI	Precise task to accomplish:

What precise task will you use ML/AI to accomplish? What business outcome or objective will you achieve?	Read the new CRM ticket and classify it appropriate category(Biology/billing/shipping/website issues) Business Outcome: Appropriate support tickets are assigned to correct workflow/staff without someone manually reviewing each ticket and assigning it.

Success Metrics

Success Metrics	
Success Metrics 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.	Business Metric: Average resolution time for Biology and general(billing/website/other) questions. Baseline metrics: We have a baseline metrics we check quarterly for last 2 years.

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 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?
	Data Source:
	  1) Tickets in CRM
	  2) Old support emails
	
	No cost associated with sourcing data. But the data need to be annotated with assigning correct category for the models to learn.
	
	PII/Sensitive Data:
	  1) Address, payment info need to be removed
	Data Availability:
	Yes, ongoing data is available

Data Source
 	
Consider the size and source of your data; what biases are built into the data and how might the data be improved?
	Data Size:
	Support data for last 2 years in CRM
	Support data prior to that in emails.
	
	Bias and Improvements:
	  1) Review and annotate all the input data to remove any annotation bias.
	  2) Make sure we have distribution of training data so that data bias is avoided

Choice of Data Labels
What labels did you decide to add to your data? And why did you decide on these labels versus any other option?
	Labels:
	  1) Biology
	  2) Billing/Shipping
	  3) Website Issues
	  4) Others
	
	Chose these labels because they are the main support question categories as of now. Update as we progress.

Model

Model Building 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?	Model building will be done internally to build AI capability. We see this as a low risk exercise to build AI capability inhouse to move into other areas. Hosting will be done most probably in platforms like google cloud.
Evaluating Results Which model performance metrics are appropriate to measure the success of your model? What level of performance is required?	We will be using F1 score to assess the model. Goal is to achieve 80% accuracy by end of pilot. With human in loop monitoring, our plan is to achieve 95% accuracy over time.

Minimum Viable Product (MVP)

Design What does your minimum viable product look like? Include sketches of your product.	Refer to attached files: Capstone_Architecture.pdf CapStone Workflow.pdf

Use Cases
 	
What persona are you designing for? Can you describe the major epic-level use cases your product addresses? How will users access this product?
	Personas:
	   1) Customer support – Biology
	   2) Customer support – General
	
	Epic level Use Cases:
	-> Automatically classify all incoming support tickets to on the categories(biology, billing/shipping, website issues, others)
	-> After categorizing assign the tickets to correct workflow so that I can be processed.
	-> When tickets assigned are reclassified by support staff then use that data for retraining the model.

Roll-out How will this be adopted? What does the go-to-market plan look like?	Product will be rolled out/GTM in 2 phases: 1) Pilot phase: Pilot phase with just 4 categories/labels and 2 workflows -> Release MVP with 4 categories and 2 workflows -> Pilot is scheduled for 3 months -> Target to achieve F1 Score of 85% by end of pilot -> Monitor and prepare weekly updates

	-> Fallback plan - CS team continue to reclassify for the pilot duration.
	<u>2) Full deployment:</u>
	Get the feedback and add more categories/workflows
	-> Add more categories and workflow to tailor the model for business case and improving ROI
	-> Retrain the model and launch again

Post-MVP-Deployment

Designing for Longevity	Improving product long term:
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?	<u>Improving product long term:</u> 1) Periodically train model with new support ticket data 2) When a new classification/workflow is introduced the adequately gather, annotate training data and train the model. <u>Real world data vs training data:</u> We are using real world data to train, so there is no difference. <u>A/B testing:</u> A/B test the support tickets on multiple

	models to gauge the effectiveness of the model over a period of time(statistically significant time) and deploy the most accurate model. Run A/B tests regularly to keep improving the model.
Monitor Bias How do you plan to monitor or mitigate unwanted bias in your model?	1) Review the F1 score, confusion matrix, classification errors on a bi weekly basis. Use that info to course correct by updating training data/model. 2) Make sure enough examples, edge cases are covered. 3) Use the feedback loop created by reclassification by customer support staff to mitigate bias 4) Add options for graceful fallback.