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 labelling images, how will this help the business?	Theft is an industry problem that is still dealt with. ML/AI advancement has opened the possibility for theft detection. Theft activities can be detected and identified from collecting and labelling video footages and images. Having a more advanced AI-powered surveillance system will not only save human monitoring time but also served as a deterrent against criminals.
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.	According to the National Crime Records Bureau (NCRB), ~80% of the criminal cases are related to theft. And is still on the uprising. Theft prevention can save businesses money, increase public satisfaction, and increase fairness in society.
Application of ML/AI	ML/AI will be used for recognizing images on shoplifting. After feeding many footages, the model can detect an

What precise task will you use ML/AI to accomplish? What business outcome or objective will you achieve?	image that conveys motion. If a motion image is detected, it will check if it is a shoplift act. When successfully captured, it will alert the owners.

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.	We will use **Recall** because we want to detect theft detection even if we are not sure. After the detection, the product owner can easily double-check for themselves whether there is indeed a theft activity. However, we do not want owners to check constantly and realize there is no theft activity. Thus, we need high **Precision** will take false positives into account. Ideally, we want to hit both Precision and Recall above 0.5 consistently. People usually talk about detection accuracy. However, accuracy includes true negatives in the calculation. True negatives should be less prioritized in this case because there is countless motion detectable activity that is not theft. Sitting, walking, observing, jumping etc.

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	Data can be acquired through sites such as Flickr, Google pictures, Kaggle etc. This data should be on an ongoing basis since more data can improve its efficiency. To overcome the data sensitivity issue, we can use data that are already available by the public domain or try to gain permission from companies/authorities for camera captured data.

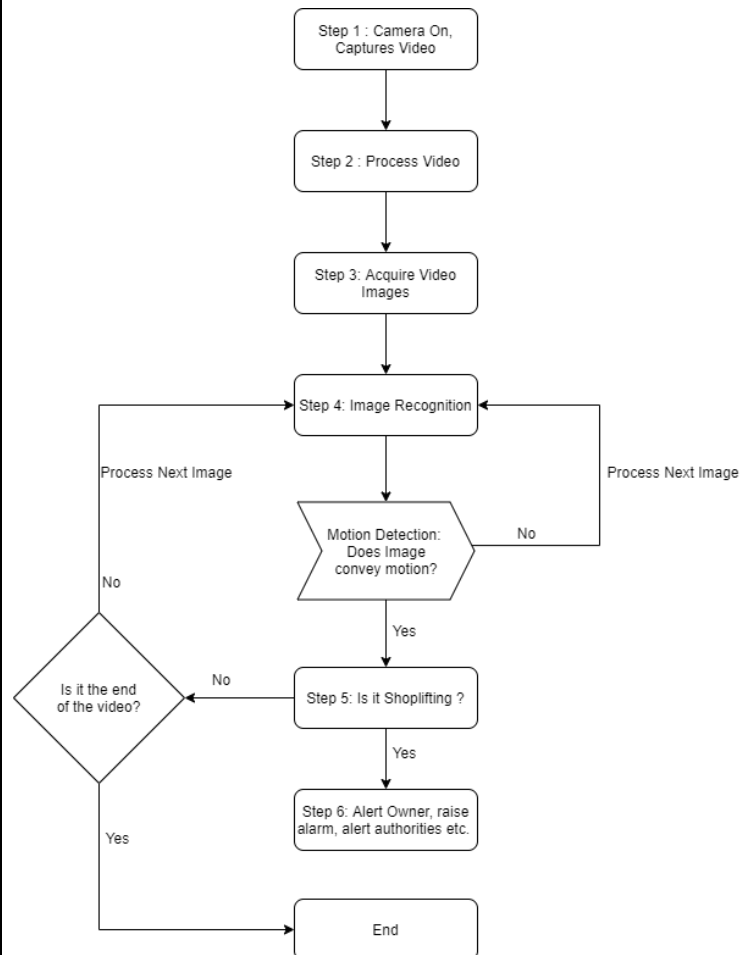|	
of data that will need to be refreshed?	
Data Source Consider the size and source of your data; what biases are built into the data and how might the data be improved?	Since there will be object detection within the application, a common object that appears in footages can lead to biases. For example, hoodies, weapons, masks, baggy trousers are very commonly used during theft activities. To improve the data, we must prioritize and put more weight on motion detection over object detection. Theft activities are movement patterns rather than objects.
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?	Currently, I decided to focus on shoplifting. This Is because it is an ongoing problem in society, but also easier to detect compared to blackmailing. For example, blackmailing requires video and images but also conversation interpretation which leads to more technical demands as NLP.

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?	AutoML Video Intelligence enables training in machine learning models to classify shots and segments in videos. This is ideal for this product in addition to Google's Mass enterprise infrastructure support and low cost.
Evaluating Results Which model performance metrics are appropriate to measure the success of your model? What level of performance is required?	Recall and Precision are vital in this product as explained in the [success metric] section. The product should at least receive an F-1 score of 0.5 since there is a recent AI theft detection system from Vaak that has already reached 80% accuracy. However, in our product, we will be measuring Recall and Precision instead of accuracy.

Minimum Viable Product (MVP)

Design What does your minimum viable product look like? Include sketches of your product.	The ML model will be integrated into a camera. Since the most important function is within the camera itself, below is the methodology flowchart of how it works. Step 1 : Camera On, Captures Video Step 2 : Process Video Step 3: Acquire Video Images Step 4: Image Recognition Process Next Image Process Next Image Motion Detection: Does Image convey motion? No No Yes No Is it the end of the video? Step 5: Is it Shoplifting ? Yes Step 6: Alert Owner, raise alarm, alert authorities etc. Yes End
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?	The goal is to have a camera product that provides theft detection functionalities for business owners. The AI camera can detect theft and alert the business owners to act immediately.
Roll-out How will this be adopted? What does the go-to-market plan look like?	First we build the model and then integrate it into a camera. It will be distributed as a camera brand for surveillance system, which can be sold locally or online.

Post-MVP-Deployment

Designing for Longevity 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?	As more data is gathered. More forms of theft can be integrated into the product ex. burglary or robbery. We could use actors to act on shoplifting footages to train the model. In real-world data, the scenarios are all genuinely committed thefts. New labels can be added as the product develops. For A/B testing, we could test models with only real footages vs acted footages + real footages to compare if acted footages indeed affect the model's performance. If so, we must make the acted footages more realistic.
Monitor Bias How do you plan to monitor or mitigate unwanted bias in your model?	It is common for criminals to wear similar outfits to hide or disguise themselves. For example, hoodies, masks, gloves, long sleeves, wigs etc. To mitigate biases, we must keep in mind to include footages of people wearing these accessories that have not committed theft.