**Tell me about yourself.**

Hello Della, my name is Zheng Yang. I have graduated from NTU Mechanical Engineering with a First class honour in 2019 and will be pursuing my Msc in Industry Engineering from this Aug onwards. My current role is contact engineer and data analyst for my department. My role as a mechanical contact engineer, an equipment owner is to protect the mechanical integrity of equipment by conducting failure analysis and ultimately enhancing the reliability and sustainability of my plants by eliminating bad actors. On top of that, I am also involved in project work to build new equipment where I lead the business team and work with cross functional stakeholder ensure equipment does meet compliance requirement and idea was able to be realized, enhancing process efficiencies and drive company revenues.

As an analyst, I consistently worked with huge amount of data where I analyzed data systems, automating information retrieval and preparing reports to ensure tasks, costs compliance and laws compliance on equipment like pressure vessel to ensure we did perform inspection on register few K pressure vessel in our site as per MOM law. Furthermore, I also have led a team to deliver business intelligence which has helped my department to save up to 50k SGD per month by identifying barriers and spearheaded machine learning project on prediction of remaining thickness of piping which is susceptible to corrosion.

Moving forward I would love to work in a company like Shopee which has a vast amount of growing opportunities. I believe my experience in both analytical and leadership positions will allow me to be a great asset to your team. Once again, thank you for providing me this precious chance to come here and participate in the interview session.

**Why Shopee?**

I always wanted to work in an industry which has a vast amount of growing opportunities. Before covid19, there was a huge amount of growing opportunities in the OnG industry, but things have changed drastically. Covid19 has disrupted businesses, a lot of traditional brick and mortars store had laid off a lot of employees across multiple countries, people having multiple lockdowns from time to time or forced to work from home. The amount of time people spend online has gone up tremendously, the sudden surge in remote work just accelerates digital infrastructure adoption.

Most of the consumers turned to online retailers which has given e-commerce and tech industries a great boost. Coronavirus has accelerated process of digitalization. With the rapid growth in Tech and e-commerce sector, I really want to a part of Shopee to shape the future together.

Moreover, Shopee is the leading e-commerce company in SEA region, and it got some the best minds of the industry, Shopee’s brand name is also great to have on the resume.

Hence when I saw your job posting on LinkedIn, I did not hesitate to apply for it. I believe my technical, problem solving skills that I have picked up along the way and my courage to seek gap for delivering value-adding results to reach company goals.

**Why you choose to study Industrial Engineering**

Why mechanical engineering, because I want to solve real world problems using physics and maths. After working, I realize that I rather like looking processes and systems at a whole, not just one piece. From a overall system perspective, IE can allows me can adopt a systematic approach to improve, innovate and develop integrated real-world systems coupled with modern engineering and IT tools. Morevoer, it allows me to combine technical skills (mechanical engineering) with business acumen which I think it will make me to become a more valuable employee

But with IE, I can use solve real world problems using not only physics and math, but also computer science, economics and business.

1. It opens up a new career path for me (open up more doors)
2. It allows me to combine technical skills (mechanical engineering) with business acumen.
3. Analyze, Innovate, Optimize, Decide
4. I like working with data

**Why PM?**

I want to become a product manager because I enjoy working out with people from different function to understand their pain points and figure out how to solve them and eventually translating that into a project requirement.

Furthermore, as a data driven person I would love to data to make decisions, and I see myself doing this as a PM to improve our products. I led an effort to set up a Tableau dashboard and capture several important metrics to reach goals and gaps of manning hours of contractors. This dashboard help managers to make better decisions by really providing in depth insights of what happening on the ground and the most significant reasons that prevents us to complete the planned tasks. And thru this insights, our management were able to take appropriate actions which results in an average reduction of 20% barrier hours on average for the next 3 months and save up to 50K SGD per month.

**What does PMs do?**

PM is someone who is responsible for that product, a product CEO. PM is someone who needs to continuously interacting with a number of different people, getting maximum collaboration from their engineers, designers they work with. PM is some who is data driven and makes good decision based on data. In summary, PM is a communication hub, a prioritizer, a researcher, a presenter and most importantly they are responsible for the ultimate success of the product.

I believe younger PM are responsible for smaller features within a larger product. Probably spend plenty of time to collect customer feedback and product usage information. This could be either from looking at quantitative metrics, reading survey feedback or interviewing users. Such insights help to validate the direction in which the product is going.

Entry level PMs will often work alongside a mid level PM to extract the right insights from the data and to learn about the strategy of the product. Such collaborative work will allow the entry level PM to understand how to contribute to the team's roadmap, gain alignment across the organization, and become well-versed in the problem space and strategy.

In a mid level PM role, responsibilities for owning the product become much larger. Mid level PMs will launch more features and own broader roadmaps. Mid level product managers will also work across more teams in the company. The mid level position is one that requires deeper product knowledge and collaboration skills.

Mid level PMs will become the go-to person if someone in the company has a question about the product or needs help. They are well-informed and data-driven when making recommendations. They work closely with roles across the organization such as engineering, design, sales, and marketing. These adjacent roles respect the mid level PM for the insights and recommendations he/she brings to the table.

Mid level PMs are aware of what's happening in the space their product competes in. They know what competitors are doing and use market trends to inform product strategy. All of this helps them develop a point of view for their team's roadmap, which they heavily contribute to.

**What do you see yourself in short term/5 years**

In the short term, I hope to work as a Data science related role. As a tech-oriented person, I would like to work on my expertise on Machine Learning and relevant DS skillset to enhance my competency.

I wish I can grow together with a company where I can continue to learn, enhancing my skills and providing positive output for the company. Moreover, hopefully I am able take on expanded technical leadership responsibilities in the future, as these become available.

In 5 years’ time, in vertical terms, I would like to have the opportunity to talking on more responsibilities and mentoring junior product managers as principal/group product managers once I have developed a deep expertise in managing products. In horizontal terms, I believe tools that we are using currently might not be relevant, however the impact of a product manager still stay. That being said, in the next few years, I would like to broaden my product portfolio and entering new markets, while continuing to master a range of new technologies that are applicable to the product.

**Technical Qs**

**Qs to Ask**

1. Why hiring so much
2. Which features this product position would work on
3. Info on what they are building, the markets they target and the clients they target and the clients they see

**What is a product**

Every feature is a product, one PM adverstiment, newsfeed. Always ask clarifying questions during interview

**Qs to Ask**

1. OLAP and OLTP

OLAP is online analytic processing, it is software tool for pulling data from multiple database for analysis purpose. Date warehouse is an example of OLAP. (data warehouse is large collection of business data used to help an organization make decisions). RWUD

OLTP is online transitional processing. It is used for operational purpose for transaction purpose. It is used for maintain the online transaction. (online booking system, read in millisecond)

1. JOIN

Join is a way to combine rows from 2 or more tables together. The type of joins contain inner join, left join, right join, full outer join. (if we didn’t mention, default join is INNER Join)

* (INNER) JOIN: Returns records that have matching values in both tables
* LEFT (OUTER) JOIN: Returns all records from the left table, and the matched records from the right table
* RIGHT (OUTER) JOIN: Returns all records from the right table, and the matched records from the left table
* FULL (OUTER) JOIN: Returns all records when there is a match in either left or right table

**Ways to improve shopee app**

As a frequent online shopper, definitely I have some comments on the app itself. For me, as a customer, I tend to

* 1. Value continuity between sessions on the app
  2. Value comparison between items (same category one)
  3. Goal-oriented when browsing the app for long periods

I love to compare products during my sessions, as of now what I can do is search keywords in the bar, click to view item and go back and check another item again, what I hope is that Shopee allows users to actually compare similar products without moving between product pages . A suggestion will be by long holding onto the product icon, so that the user can select up to six products to be seen on comparison page. This comparison page should organize all the relevant info like price, stock, discount, time to deliver and product parameter. The key here is to enable the users to know what they really need, at a quick glance.

Furthermore, sometime I would like go to search through my recently viewed products as I am goal oriented so we I can do is that seach keywords in the bar and look out the specific product after the search engine come up with results if I did not or forgot to add it to my cart. I wish there is a feature which Enables users to search through their recently viewed products to find that product they were looking for. With this feature, you no longer have to scroll through a mountain of products with no guarantee of finding the product. I will suggest to create a recently viewed page to allow user to perform such actions. For a user scrolling through their past history, it's very easy to lose track of what they were initially searching for. Enabling the user to reorganize their viewing history to find a product, thus reducing any potential frustration in experiencing lethologica. Finding products they were initially interested in discounted gives further incentive to add them to the cart. Thus, this improves the way users experience revisiting products they were once interested in.

Last but not least, since I Value continuity between sessions on the app. I would to have the option to continue where they left off last session (which in this case should be the last seen products). In this scenario, my solution will be add a small window (a prompt) on top of a window which often shows promotion details to avoid unnecessary additional navigation.

That’s my thought on Shopee interface from a user perspective, so what you think?

**Machine Learning Questions**

Start by explaining what’s algorithm about. What is the advantage & disadvantage?

KNN: Compute Euclidean distance between points, a classifier, good for small dataset, easier to explain

Naïve bayes: “Naïve” because the algorithm treats every features is independent to one another, not so accurate, good for large dataset,

Decision tree: Making multiple if else questions based on the scenario, tree node, decision node, leaf, easy to explain, no need to scale

Random forest: Ensembled method of decision tree, contain multiple decision tree where individual tree is slightly different than another one which reduce overfitting by averaging the result since multiple decision trees can cause overfitting. Don’t need to scale data like decision tree, very robust and powerful

SVM: Need to scale data and sensitive to hyperparameter. Kernel trick to promote to high D without needing too much computational resources for linear separation (hyperplane). SVC uses hyperlane to classify class by promoting the current linear inseparable features into higher dimensional.

Gradient boosted decision trees: Another ensembled method, instead of the having multiple decision trees. It build trees in a serial manner which each trees corrects the mistakes of the previous one. which has a slightly higher accuracy than random forest

Job as an analyst:

We have around 40 inspectors and technicians and have around 1000 planned tasks and 500 unplanned tasks per year. With so many tasks in hand, we need a concrete plan to

1. Identify goals to be achieved
2. Capture the best metrics to reach goals
3. To catalog resources
4. Assign responsibilities for controlling and consuming inspection resources.

Talking about overseeing the overall health of your department and how other department perceive our department, there isn’t a better way to represent those without a business intelligence tool. In the beginning, we do track multiple KPIs, but our managers need to have multiple meetings with their respective superiors because the data is so discrete and scattered around.

I have championed opportunity to drive business intelligence application using Tableau to consolidate all the KPI’s excel spreadsheet to Tableau. (I am chemical plant), after setting up the template, I also guide other 2 sites in SG to Tableau and setting up path to my interactive Tableau template to feed in the data accordingly. The teammates where I have does not even have good excel skills let alone skill to do data analysis. I encouraged, very patient, meticulous when doing the coaching and they were able to complete their responsibilities as mine. We were able to complete this project successfully on deadline and which are able to transform data at hand into deeper insights for management to make better decisions.

**CUI IDX**

Background:

The most common damage mechanicsm of my equipments/piping are CUI. Piping are insulated to mainitain process temperature/act as a barrier to prevent water ingression. Current method is strip the insulation, and check the piping condition. Sometimes some of the pipings are high up in the sky, and very often we need to erect scaffold for workers to strip off the insulation and conduct visual inspection. The method is more accurate, but it will cost the company a lot of money for scaffolder erection and resources.

We used risk based inspection to determine the inspection frequency of equipment/piping in our database. Risk based inspection is the process of developing a scheme of inspection based on knowledge of PoF and consequence of failure. When we followed the risk based inspection, the hit rate (findings/# of time we open) is around 25-30%, which means the risk based inspection is way 2 conservative. Over few million SGD per year has been spent on those resources to open up the insulation and building scaffolds. After understanding the background , I realize that ML might be coming in handy to help to predict the remaining thickness of piping/equipment to allow us to relook at inspection frequency for CUI tasks. For RBI, instead of just numerical value, we classified the remaining thickness of respective equipment and piping into several categories, and we will have different strategies to mitigate the risk on respective thickness categories.

**Intent**: To predict the remaining thickness of equipment or piping those are going to leak as per risk based inspection criteria using given features.

**Data Source**: The data source comes from a team of engineers who build the database which contains the relevant information of CUI inspection tasks that we have done for the past 7 or 8 years. The database captures features like year of service, operating temperature, type of insulation, coating type, coating age, presence of heating element(steam tracing, electrical wire) original reading, corrosion rate and min. capture reading.

The data source wasn’t quite neat in the beginning as expectation then vs now is very different and amount of features we capture last time is less than now so data cleaning is inevitable. Some techniques that I have used to prepare the data are, one hot encoding to handle categorical data like type of insulation and coating. For corrosion rate, missing data are replaced with a corrosion rate of that service according to industrial documents. Numerical data are scaled as well to ensure all features are on the same scale. We are facing using of imbalanced dataset as I have said before, we are getting a low percent hit rate on CUI inspection. So around 60 percent of the time, we will find minimum thickness loss. So what I have done is to resample the training set by under sampling the majority class of data. I used a 80:20 train test split to ensure there is no data leakage.

**Performance metrics:**

Accuracy, recall is also important because we dun want to underestimate the consequence which means the predicted wall loss is lesser than actual wall loss. Hence, we want to boost the algorithm result on recall metric on all classes. F-score of multiclass version also to reduce both false positive and negative

**Baseline model**

After sorting out the cleanliness and performance metrics for the data. I proceeded with modelling and I started on working out on my baseline model which can be used for comparison with more complex models. I choose KNN model as my go to model since it is relatively easy to explain to non-technical people and it can provide a relatively good accuracy.

**Model Training**

I begin with basic spot-checking several algorithms like support vector machine, random forest, naïve bayes using cross-validations, followed by selecting the one with the highest value of performance metric which I mentioned just now. After the cross-validation, it always comes down to two or three algorithms which vary only slightly in their performance. For this case, my to-go is ensemble model like random first since they tend to increase prediction accuracy by combining the predictions from multiple models together.

**Model Tuning Process**

I then proceeded with hyperparameter tuning using GridSearchCV and was able to achieve an F1 score equal to 80%. I also tried to undersample the majority class but it didn’t help much in improving performance. What did help was doing some feature reduction and finally my F1 score was around 82%.

Going forward, since I have gone through past inspection data till 2020. Next stage will be running the algorithm over 2021 & 2022 site wide data. If that success, I will wrap up the model in a nice little container in a form of API (interface that let you access and manipulate data in the backend when a user requests the data from the front end).

If this is successful, I am hoping to reduce maintenance cost for CUI inspection by a great amount (up to few hundred’s K !)

**Tableau Project Experience**

Business intelligence is the process of bringing together all types of information a company has in a way that’s relevant to the question.

Background:

From stakeholders perspective, this business intelligence project is to really understand the amount of manpower that looking for barriers that is prohibiting us from achieve full inspection tasks compliance throughout the year.

In the past, if the team is unable to complete planned tasks. We will just do something else instead and never really follow the schedule if needed. We won’t track down what’s going on and what are the barriers that prevent us to complete all the tasks. For instance, when some auditors ask that why we didn’t complete that task which is scheduled for a particular week, we could not answer it and that resulted in a lot of “fat” in job planning part. The inspectors and technicians will be free if the job that is supposed to be done on that week has been put on hold (due to resources constraint, weather, urgent leave). We need record down what they have done if they carry out the job, and how many hours are lost due to break-in, resource constraint. (Lost manhours).

Furthermore, the old way the analyst does is just pull out the all-task compliance in one Excel dashboard without further break down. What I have done is instead making the task compliance a monolith, by using the interactive and granular functions of Tableau, I am able break down the status into unplanned tasks status, planned task status, field completion status, report completion status and etc which provides a more insights to management.

What I have done is I have created a Tableau dashboard which glues tasks compliance and barrier hours together so that people can understand the relationship between manpower, lost manhours, barriers, and our status compliance. This dashboard help managers to make better decisions by really providing in depth insights of what happening on the ground and the most significant reasons that prevents us to complete the planned tasks. And thru this insights, our management were able to take appropriate actions which results in an average reduction of 20% barrier hours on average for the next 3 months and save up to 50K SGD per month.

After the successful implementation of Tableau at my site, I am asked to drive this Tableau applications across all 4 sites in whole SG. To me that is most challenging part, because I have to teach my teammates to perform data cleaning in data source, use Tableau and set up path to my tableau template to feed in the data accordingly. The teammates where I have does not even have good excel skills let alone skill to perform data analysis. I encouraged, very patient, meticulous when doing the coaching and they were able to complete their responsibilities as mine. We were able to complete this project successfully on deadline and we are able to show case our mutual effort in one dashboard.

**Strength**

Even though OnG is an well established industry, innovation is still very important for us to march forward.

S: There is a scenario we need to do radiography for piping sulfidation corrosion (a special kind of corrosion). Radiography is like X-ray but instead of X-ray we use gamma ray as source. Normally this kind of equipment, we cover the piping with film, let it expose to radiation source to get the profile of internal condition of piping. For accessible locations, it is very easy to set up, however we need access like scaffold for piping which has higher altitude 5m 10m. Money and resources are wasted.

T: When I visited vendor workshop, I found one special equipment which inspires me. It is a telescopic pole with camera mounted on top. I came out with an idea that I can buy 2 telescopic pole and mount source on one pole, another with special holder which can hold the film. We can actually save up some dollars for scaffold.

A: I have designed and worked with my team with a welded metal frame to mount these 2 things. It took us several attempts to come out with a design where it is able to hold these equipmets.

R: As a result, our specially designed equipment has been used in field successfully. We are able to save 10k dollar from preventing scaffold erection for this particular task. In our daily operation we need a lot of radiography support and I foresee that we can achieve more cost saving in the near future.

**Weakness**

Well, every coin has two sides, one must always have their own weakness, I was never confident with public speaking-which as you know, can be a hindrance in the workplace. When I realized this was a problem, I took the initiative to become the presenter in several meeting in school and not afraid to voice up during business meeting. As a result, I was able to overcome my fear and since then, I have cohosted an engineering forum for more than 200 people and presented the ML to 50 people in face to face meeting and receive good feedback from the leadership team. Regarding this, I still find public speaking challenging but enjoyable for me now.

**Mistake**

There was a scenario when one of inspection supervisor who is managing different unit went on leave for 2 weeks. Our managed need to find volunteer to carry on his workload, I accepted his ongoing tasks as in I didn’t want to seem like I couldn’t handle extra work without checking out my schedules. When we have break-in tasks (because equipment leak and need manpower to monitor the equipment, I don’t have enough manpower to meet deadlines for planned tasks. I admitted this issue to my manager, we need to get extra manpower from different site. For instance, I will use application to note down my daily, weekly tasks to be done and indicate important project deadlines and where I am in the process at any given time and I am able deliver the results to my supervisor according to what I promised, I will also think carefully and thoroughly before giving any promise.

Text

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Shopee mainly by offering sellers paid advertising services, charging transaction-based fees, and charging for certain value-added services.

Our users enjoy the social nature of Shopee’s platform, where users can follow, rate, play micro-games with one another and easily browse for discovery to enhance their retail experience. We also empower sellers with various tools and support such as livestreaming and other valueadded services for them to better engage with their buyers. We monetize Shopee mainly by offering sellers paid advertising services, charging transaction-based fees, and charging for certain value-added services. We also purchase products from manufacturers and third parties and sell them directly to buyers on our Shopee platform.

Our Sellers Shopee sellers are primarily small and medium businesses, brands, large retailers as well as individuals, who view Shopee as an efficient and reliable way of managing the selling process while maximizing customer needs. On Shopee, each seller has an online storefront on which they list their products, communicate with buyers, and complete transactions. Our Shopee Mall hosts brands and large retailers prominently featuring their distinct logos, and offers a premium shopping experience to a broad base of buyers

Graphical user interface, text, application, email

Description automatically generated

Seller Support and Service by Shopee

We offer strong support to sellers on the Shopee platform through large on-the-ground teams with deep local knowledge. Our local teams also offer fast and localized operational and technological assistance in using business management tools. Moreover, an extensive network of logistics and payment solution providers are integrated into the platform to provide users with a one-stop solution. We also offer sellers integrated payment, logistics, fulfillment, and other value-added services. Under “Service by Shopee,” we offer a range of value-added services to sellers, including inventory management, online store operations, and fulfillment services. Depending on sellers’ needs and preferences, we may help sellers manage inventory and fulfill orders from warehouses leased and operated by us, operate stores on our platform, or purchase products from sellers for reselling on our platform. “Service by Shopee” is currently available to sellers in our Southeast Asia and Taiwan markets. We take the user experience beyond a traditional online marketplace environment, making online shopping truly seamless. We believe that these efforts help to streamline the whole online business operation from store setup to selling, inventory and revenue management, delivery and payment collection for our sellers, empowering them to achieve greater success in their commercial activities.

Marketing and Promotions

We undertake both online and offline marketing efforts to maximize our brand awareness and attract new users. Our online efforts mainly include online advertisements through major web portals, search engines, and social media. Our online advertisements focus on promoting campaigns such as Shopee 9.9 Super Shopping Day, 11.11 Big Sale, and 12.12 Birthday Sale as well as attracting new users by promoting awareness of the convenience, cost effectiveness, and reliability of e-commerce and Shopee. Our offline marketing efforts include display advertisements in locations with high traffic and are carried out by our local teams. Moreover, we conduct targeted promotional campaigns to incentivize buyers and sellers to use our platform. We believe that our investment in marketing and promotions has contributed to our GMV and market share growth, which in turn strengthens our pricing power and enables us to monetize at higher rates

We provide data to Shopee sellers on a real-time basis to enable them to better understand key trends to target and acquire customers. For buyers, we use our data to create a better shopping experience by personalizing search results and shopping recommendations. We also leverage our data to help our logistics partners improve their fulfillment and delivery systems, processes, and resource allocatio