Interviewer- Can you please introduce yourself and the role in your organization?

Interviewee- My name is XXX and I am a senior machine and data scientists at XXX, which is a consultancy company located in Orebro.

Interviewer- Do you consider yourself more like computer engineer or industrial person or more about academic researcher?

Interviewee- I would say fifty fifty. I have been working for industry for only couple of years. Before that I was working in academia for something around ten years.

Interviewer- Your total years of experience in the industry and how long you in your current position?

Interviewee- February will be two years in my current position in my current company and my time in the industry.

Interviewer- Can you please describe your responsibilities in your organization? Like you are developer or architect or product owner, what kind of responsibility?

Interviewee- I'm developing the algorithms for Machine Learning as well as implementing these algorithms. Sometimes I co-ordinate development team as well. And I work with these same people around to company to create proof of concepts and small demos to the potential customers.

Interviewer-. Can you please describe your experience of working on non-functional requirements?

Interviewee- I would say it’s been since I started working with B3 commit. We have to deliver something to our customer. We face with this type of requirements and I will say that in the case of Machine Learning, sometimes the development process is not that really well defined. Sometimes we don’t have very tangible requirements and that is something you have to consider that the customer might not be super familiar with what should they are expecting from this Machine Learning systems. From your experience you have to come with some requirements that will guarantee what the users want to do is achieved by the piece of software that you deliver.

Interviewer-. Do you think non-functional requirements play an important role for success of a software and how?

Interviewee- Absolutely. For example, reliability is one non-functional requirement, and my opinion is that has to do with the accuracy of the Machine Learning system. Accuracy is something that when you are developing a Machine Learning model, something that perhaps without seeing the data, you can't promise out of the top of your head. And what you want to do is assistance, that is accurate enough, something it actually providing is useful predictions.

Interviewer- Do you think about some new non-functional requirement rather used as non-functional requirements in traditional software?

Interviewee- For example, I don’t know how much explainability is part of non-functional requirement. But I could say this is an important requirement. Well, Non-functional requirement that we are some of the times asked by our customers, like we have a model that gives us predictions, but they didn’t say yes but why this will give that output. A person who has a lot of experience in a particular field, this user maybe has an idea about what is going to be the output but this Machine Learning system cause with the totally different output. This person might to say ok, but why I'm getting this output. I will say it’s very important and don't know how much it’s part of non-functional requirement or traditional software.

Interviewer- Do you think there are differences in non-functional requirement between genetic software and Machine Learning enable software?

Interviewee- I would say that you could make a connection between those two. Like for example, the non-functional requirements for Machine Learning enabled software are related to traditional software. I think you can make that type of connection. Out of the top of my head, I can't come up with something specific but as I said before, I think you can make the connection between traditional software and Machine Learning system.

Interviewer- Do you think there are some non-functional requirement which can be more prominent or more important in Machine Learning context which are less in traditional context?

Interviewee- In my opinion, I'm going to go with accuracy, that’s super important for Machine Learning. As well the fact that, you can measure this accuracy in different ways. And for particular problems you will have different matrix to measures accuracy. For me, accuracy plus reliability is the most prominent non-functional requirement in Machine Learning context. Sometimes the customers are not aware of the core importance of accuracy. Non-functional requirement that is very important is maintainability which I think is associated with the retrainability of Machine Learning system. Retrainability is a new a non-functional requirement for Machine Learning system. When to retrain, how to retrain, which data use to retrain those are the requirements those you don’t define in traditional software.

Interviewer- Do you think there are some non-functional requirement which are less important in Machine Learning context which were important in genetic software?

Interviewee- Depending on the problem as well. I would say, some non-functional requirements might not be that important. For example, a portability of the system, you are going to develop a system that is going to run in an embedded system, of course you want something that is portable, of course you want a model that can run by a small micro controller. For example, if you are creating a model that is run on the cloud, portability is not an issue. So, coming back to your question, which non-functional requirement is less important, I will say its depends on application itself.

.Interviewer- Do you think the non-functional requirement for the whole system or just for Machine Learning part or just in data?

Interviewee-To be honest, I just see the non-functional requirements just for the Machine Learning system.

Interviewer- What challenges do you experience for implementing or measuring this non-functional requirement for Machine Learning context?

Interviewee- Depends on the application again I will say, like more than the application I will say the domain field, because if we are not familiar with the domain field, you might not be aware what is more important for the customer. Perhaps according to your experience, you might be favoring some particular requirement that is not as important for you.

Interviewer- Do you measures this non-functional requirement over Machine Learning enable software? If yes, how?

Interviewee- yes. There are some NFRs which are straight forward to measure, like accuracy. You can measure accuracy by simple accuracy matrix, f1 scores, root mean sq*uare* error. The usability of Machine Learning system is a bit tricky to measure, and sometimes you have to come up with this ad hoc matrix to know about it how usable the system. The user usually good way to do it like you have a control deployment of your model. You get yourself a few users that are going to interact with your Machine Learning model. Then you start collecting numbers out of this control deployment and try to measure how useful is this model for this particular set of individuals. I can give you an example maybe, we developed this model for one of our customers. This was a bettering chain. Basically what this people was doing that, without using the machine learning system, we have this super long list of services. They have to review manually. This list is like thousands of items. And Machine Learning system was suggesting which of these items in the list they should focus on. Instead of reviewing thousands of items on average each user was looking at the list of five or very less items those are very important for them. And this was a way to measure the usability of our model. At the end of the project, we could show the management, instead of looking of thousands of items list you have to focus on maybe five, maybe ten items if you use Machine Learning system. It will take to process two or three days without system, and with system it will take maybe one day. You have a gain of reduction of time, like only half of the time you need to spend your business or even less. That’s how you do bring usability aspect of Machine Learning system.

Interviewer- Do you think the measurements over the whole system or just in Machine Learning part or in data?

Interviewee- In Machine Learning part, because at the moment the project we have run in the inner company, has been only focus on the Machine Learning part. We have just started this area like couple of years back. We haven’t developed that full system that has a sub system which is specific to Machine Learning.

Interviewer- So how do you capture this non-functional requirements and their measurements for Machine Learning enable systems?

Interviewee- To be honest at the moment is rather informal. This is not like in traditional software like I have this product definition documents for example. But I have a list of the number of requirements very well sorted, very well defined. Its’ not the case most of the time, more like I want the system is doing this. That could give this type of prediction what can it do for me. Then we come up, we check the data and say this is what we can do for you, this is the base line and performance of the system. We can improve the base line performance. But there is not like a something written.

Interviewer- So what are the challenges you face for measuring these non-functional requirements for Machine Learning?

Interviewee- Sometimes it’s a lack of a documents that exactly present which are these non-functional requirements or the requirement of Machine Learning system should compatible.