UDACITY

Submit a Business Idea

Digital Literacy Project | *Deepak Sharma* | *deepak.sharma.it.1992@gmail.com*

Welcome to the project! We've tried to organize everything here for you so you can easily focus on your project work. Please fill out this document as much as needed to help us better understand your idea and see its value.

EXECUTIVE SUMMARY

Come up with a plausible idea for implementing any of the emerging technologies you've learned about within a business context. Explain briefly why it is important to your role, your department, and your company, and give brief examples.

Intelligent MLOps System(The Idea): This will be an intelligent Machine Learning Operation system which will project and will decrease the downtime of machines. As we know, as connectivity increases many interconnected IOT(Internet of things), virtual and servers are interconnected and generating log data. Analyzing these huge logs and timestamp data is not possible for humans and even some hard coded rules will not be much efficient as with addition of new devices it is not feasible. Since we have access to a huge amount of historical data, the idea is to implement an Intelligent Machine Learning operation system, which will project various metrics such as **MTTR**(mean time to resolve) a ticket, assign a priority to a ticket and classify the incoming alert and convert them to tickets and pass it to their relevant department. This will serve all industries including healthcare, manufacturing, smart cities etc.

Importance: This MLOps system will eliminate the human intervention of assigning the tickets to their relevant department. ***Currently, my department and company have the responsibility to analyze a log alert, then convert it into a ticket request as a text complaint and assign them a priority and forward it to their relevant department, which will solve the ticket either manually or by providing software support.*** It's hard to provide an MTTR(mean time to resolve) a ticket by our department and it depends mainly on the concerned department to provide the time to resolve the ticket and cause many problems with clients as there is not an efficient system. ***Our MLOps system which is trained on text data will first classify the log text coming from the IOT devices into alert, create a ticket, and pass it to the respective department automatically for further action.***
Our MLOps system will also make projections from the historical time series data and identify the future number of tickets that will be generated for upcoming months, weeks or days, this will help our department to invest efficiently in human resources.

Example: A ticket is assigned from hospital A that the smart patient monitoring system we have installed in their hospital has suddenly stopped working. Given the situation, there might be serious consequences if the system is not started at earliest. Our Machine learning model has

identified that there is power failure at the hospital and have sent an alert to the field technician team that the priority is high. Then, our system analyzed the time the IOT devices like the power grid and server stopped sending the logs due to power failure. MLOPs have identified that the power grid switch has stopped giving logs from 12Pm resulting in power loss. This alert is then again passed to field technicians who have now immediate context and can start working on the power grid to resolve the issue.

BUSINESS OPPORTUNITY

Explain the business challenge/opportunity driving your idea and why it is important to address it..

Main idea is that with the increase in connectivity of smart IOTs devices which generates millions of logs per day. It's not possible for humans to analyze these logs manually and find the possible alert or insight from this big data. We need a smart ML operation system(MLOPs) to automate the whole process and provide a good accuracy score on the production system.

There is a big business opportunity here to reduce cost and time of human intervention of analyzing and assigning tickets and directly assign operations tasks to third party service providers who have field technicians and engineers to solve field tickets.

The software issues can be automated and our MLOps system can directly cut the system support engineer and most of them can be resolved by our system. Currently, (SME)Subject matter Expert or analyst is required to analyze the alerts and then assign it to the concerned department. It increases the waiting time and thus increases the MTTR(mean time to resolve) the ticket. This system is not efficient as there are situations where there are human problems like an analyst is on sick leave, connectivity issues etc. This system will standardize and automate the process and will increase the client satisfaction and decrease the cost and service time.

Another opportunity is to discard the false alarm as there are many devices sending logs, these devices send lot's of false alarms and they can be easily detected and discarded by our MLOps system.

Last challenge is to analyze the time series historical data and forecast the future possible tickets that can be generated by different departments. This forecast will help the company to invest smartly in future third party tie ups.

PROJECT DESCRIPTION

Share your project idea while explaining how it will solve for the aforementioned challenge/opportunity.

Project idea is to create an Intelligent Machine learning operation system which will automate the process of assigning the tickets to the concerned department by classifying the Natural Language Text input data. This will be a standalone service, where the client(healthcare, hospital department) will enter their concern. The IOT devices connected at client side will send the log data to the server and the Machine learning model will classify the logs text to their respective pre-defined class and then take a decision whether to generate an alert for field technicians or to discard the alert if it's not fatal. (Say a small software update or a temporary power loss).

Challenge/Opportunity: Analyzing these logs for humans is very difficult as more and more devices have been integrated with the current smart systems and they are generating vast amounts of data. Our system will eliminate the human effort here and will automate the process of alert creation and ticket generation from both human and IOT devices.

Personal Motivation: Personally I feel this project has the potential to save millions for my organisation and we can be leaders in the MLOps industry by implementing the breakthrough machine learning models to solve and automate operations tasks. This tool can also be projected to future clients and will increase our organization value.

USES CASES (OPTIONAL)

Expound various use cases for your project (If possible).

Use Case 1: The forecasting model will help my organisation to predict the total number of expected tickets and plan the association with third party vendors. For example, there may be more tickets in the hospital industry during covid peak and they may expect more tickets. Similarly, during the holiday season, the hospitality industry(hotels) may expect more tickets. Our forecasting model will help our organisation to invest in relevant human resources accordingly.
Use Case 2: A ticket is assigned from hospital A that the smart patient monitoring system we have installed in their hospital has suddenly stopped working. Given the situation, there might be serious consequences if the system is not started at earliest. Our Machine learning model has identified that there is power failure at the hospital and have sent an alert to the field technician team that the priority is high. Then, our system analyzed the time the IOT devices like the power grid and server stopped sending the logs due to power failure. MLOPs have identified that the power grid switch has stopped giving logs from 12Pm resulting in power loss. This alert is then again passed to field technicians who have now immediate context and can start working on the power grid to resolve the issue.
Use Case 3: An alert has been created by a manufacturing company that their one production plant has stopped due to power failure. MLOps classified the alert type and observed that the switch last provided the alert of off state due to power fluctuations, the power was stable after 5 minutes of alert creation and the MLOPs model then changes the status of the alert as false alert

and it was not assigned to technician.

DEPENDENCIES & CONSTRAINTS

List the key and unique dependencies and constraints of your project.

DEPENDENCIES	CONSTRAINTS
1. **Team Building:** Hiring of qualified Data Scientist and Software Engineer teams along with Product managers to handle projects. 2. **Subject Matter Expert:** The engineers may not have expertise in the operation domain. 3. **Model Efficiency:** The machine learning model needs to be deployed after analyzing the different metrics such as Precision and Recall. A model should be trained on a training set and provide good results on testing sets without overfitting. 4. **Data Dependency:** We need to collect and train our machine learning models on good production samples which are representative of the whole population keeping in mind the stratified sampling in which data should contain labels from all classes. 5. **Licence and tools:** Tools and licenses of some sophisticated softwares are not free. 6. **Storage cost:** These logs data will be required to store these logs data in cloud storage. 7. **Fallback Strategy:** In case there are some tickets which are not classified correctly by machine learning model, these can be assigned manually by analysts.	1. **Team Building:** Hiring the right employees can affect the quality of the final product and user experience. 2. **SME:** It's important to have clear and correct communication between the SME and development team. Their expectations should match with each other. 3. **Model performance:** will depend on the data provided to the Machine learning algorithm. If data is not good, the model may not provide good results. 4. **Data Dependency**: A good model should be trained on stratified data and should be tested on unseen test data. Our model should not underfit so that the training and testing accuracy is not low and also should not overfit(good accuracy on training set, bad on testing set). 5. **Licence:** It will increase the project budget, and can result in cost cutting in other departments. 6. **Storage cost** of cloud storage is not cheap but it provides scalability and support. 7. **Fallback Strategy:** The machine learning model should provide good accuracy, and there should be accuracy of more than **80 percent** to make it efficient in production.

BENEFITS & ROI

Write down in brief, what would be the benefit for your company from your project (the return on investment of your project). ROI can include (not limited to) the following:

- → Time savings
- → Direct cost savings
- → More data-driven thinking and decision making
- → Introducing new products/services
- → Automating a process

1. **Time saving:** This will decrease the ticket MTTR ratio for ticket resolution and it will be directly assigned to the relevant department providing correct information resulting in less time to resolve the tickets**. (This can solve days and even weeks for each ticket)**
2. **Direct Cost Saving:** The cost of organisation will decrease significantly as there is no analyst or SME required to analyze the tickets. MLOps will directly assign the ticket to their relevant department. Most software issues are directly resolved by MLOps and it helps to project the future tickets saving organisation to invest smartly on relevant resources. **(This can reduce upto millions in investment)**
3. **Data driven:** The whole system is trained on historical data and machine learning models are trained on this data which makes efficient future predictions.
4. **Introducing new products:** This MLOps is highly scalable as new modules such as graph systems can be independently included in current MLOps which will enhance the system. Adding new IOT devices will only require to increase the server storage size for log data.
5. **Automation:** MLOps automate the whole operations ticket processing system eliminating the human intervention to assign tickets and in many cases discard the false alarm and resolving the software support tickets by itself.

ESTIMATED TIMELINE

Share your estimated timeline before you can see your project's ROI.

1. Creating the First release(v 1.0) of DJango web application for MLOPs (6 month)
    a. Creating the User interface Milestone - 1 month
    b. Creating and training the machine learning models for Forecasting, Ticket Text classification- 2 month
    c. Creating Restful web API for cross platform apps for Mobile platform - 1 month
    d. Integration of business logic and machine learning models with Django web framework - 1 month
    e. 1st UAT release for testing and deployment on test server - 7 days(1 week)
    f. Bug fixes for first UAT release - 7 days(1 week)
    g. Second UAT release and testing - 7 days(1 week)
    h. Bug fixes for second UAT release - 7 days(1 week)
    i. Rollout of MLOps version 1.0 on development server - 3 days
2. Creating Mobile Application for 3rd party technicians (2 month)
    a. Creating UI for Flutter application for both Android and IOS application- 15 days
    b. Writing business login and integrating RESTFul web API - 1 month
    c. UAT testing and deployment on Apple and Google play store - 15 days
3. Training the field staff and internal stall for using the Android and MLOps tool - 1 week