Refract: Empowering Enterprise AI/ML Adoption

# Introduction

Refract is a self-served, unified data analytics platform that abstracts the operationalization of the AI lifecycle, behind the scene. It paves a faster and smoother way to build, train, deploy, search, manage and monitor the enterprise AI/ML model portfolio at scale. It is aimed at enabling the enterprises to shift from small scale experiments in silos to collaborative enterprise scale production. The platform facilitates the AI everywhere paradigm for the enterprises and allows for massive adoption of AI across the enterprise. Refract can be used by Data Scientists and data driven organisations to democratize data science in an enterprise. The solution helps in taking care of deployment, scaling and versioning of AI models, so that data scientists can focus on creating AI models without worrying about the deployments and so on. Fosfor by LTI is committed to client centricity. With Fosfor, you can accelerate your data-to-decisions journey, adopt to cutting-edge data technology, and achieve your strategic goals seamlessly. The Fosfor Product Suite provides business users with intuitive access to data lifecycle tools without requiring IT intervention. Moreover, it provides IT and data teams with tools to optimize every operational aspect of conducting advanced analytics across all relevant data sources. Refract can help the bank by providing a platform that enables the bank to shift from small scale experiments in silos to collaborative enterprise scale production. The platform facilitates the AI everywhere paradigm for the bank and allows for massive adoption of AI across the bank. Refract can be used by Data Scientists and data driven organisations to democratize data science in the bank. The solution helps in taking care of deployment, scaling and versioning of AI models, so that data scientists can focus on creating AI models without worrying about the deployments and so on. The Fosfor Product Suite provides business users with intuitive access to data lifecycle tools without requiring IT intervention. Moreover, it provides IT and data teams with tools to optimize every operational aspect of conducting advanced analytics across all relevant data sources. This can help the bank to accelerate their data-to-decisions journey, adopt to cutting-edge data technology, and achieve their strategic goals seamlessly.  
  
Question: What is the purpose of Refract platform? What are the high level features of Refract?  
Helpful Answer: Refract aims to optimize the end-to-end life cycle of Machine learning applications by simplifying various tasks of MLOPS like accessing the right data, training model, publishing and deploying models, model monitoring and evolution in a guided form using its capabilities. It minimizes efforts of creating model by using its extensive Automated ML feature without having much understanding of Data. It eases the life of Data scientist by providing multiple metrices to understand the model outcome. It provides model explanation to make users model trustworthy and understandable for novice users. Refract is a self-served, unified data analytics platform that abstracts the operationalization of the AI lifecycle, behind the scene. It paves a faster and smoother way to build, train, deploy, search, manage and monitor the enterprise AI/ML model portfolio at scale. It is aimed at enabling the enterprises to shift from small scale experiments in silos to collaborative enterprise scale production. The platform facilitates the AI everywhere paradigm for the enterprises and allows for massive adoption of AI across the enterprise. Following are the high level features of Refract: Enables data scientists to configure custom environments for themselves by adding the required support libraries, that are preconfigured in notebook image when it is spawned. Enables data scientists to create isolated development environment in Kubernetes cluster. Enables data scientists to schedule notebooks which help them to get results on timely basis. Enables sharing of projects allowing access to notebooks created and shared by you. Enables you to install required libraries from a drop down menu. Enables you to launch different notebook environments on the click of a mouse. Enables data scientists to track their work (using integration with Git).  
  
Question: What is a project in Refract? How can you create a project in Refract?  
Helpful Answer: Project is the starting point to begin work in Refract. It is a collection of datasets, notebooks and models. It provides a single view to keep track of resources. You can create a project on your own and invite others to collaborate / review them. Following are the steps to create and use Project: On logging in to the Refract platform, the Project page, listing the existing projects is displayed. The Search bar on the top of the page allows you to search a project by its name. On the top-right corner, the Sort by option allows you to sort the projects by created date. The existing projects are listed as cards, displaying the name of the user who created the project and the date and time when the project was created. It also displays the project name and the project description. The lower section of the project card displays the access type and provides you the option to either share or delete the project. Share and Delete options are displayed as icons. On the top-left corner, click on Add New Project. The Add Project window is displayed. In the Project Name and Project Description fields, enter a name and description for the project. The project can be created without adding a repository. You can either skip the option of adding repository by selecting No radio button to avoid unnecessary creation of repositories to the project, add an existing repository by selecting Yes or select the default repository by clicking on Default radio button. Click the Create button to create new project. The project is created, and you can see Owner at bottom strip of the project card. The Share and Delete options are enabled. If the project is shared with you by another user, you will see Contributor at bottom strip of the project card, and Share and Delete options are disabled. Once the project is created, a repository is built in git-lab with the project id where you can push/sync the codes written.   
  
Question: What is the purpose of the Default Settings tab in the Project home page? What are the different configurations that can be done in the Default Settings tab?  
Helpful Answer: The Default Settings tab displays multiple default configurations like configured Cluster, Spark Resource, Snowflake, Big Query, Parameters and Data Prep Settings. Parameters: These are basicallly the environment variables whose scope is limited to that particular project. Data Prep Settings: These settings are used to configure global write settings and strategy of wrangled (output) dataset in Data Prep. You can add new parameters from here. These parameters can be used in global parameters and in any schedules. The Default Settings tab in the Project home page is used to configure the default settings for the project. The different configurations that can be done in the Default Settings tab are: Configured Cluster: This configuration is used to configure the cluster for the project. Spark Resource: This configuration is used to configure the spark resource for the project. Snowflake: This configuration is used to configure the snowflake for the project. Big Query: This configuration is used to configure the big query for the project. Parameters: This configuration is used to configure the parameters for the project. Data Prep Settings: This configuration is used to configure the data prep settings for the project.   
  
Question: What is the purpose of the Share tab in the Project home page? What are the different options available in the Share tab?  
Helpful Answer: The Share tab in the Project home page is used to share the project with other users. The different options available in the Share tab are: List of users with whom the project is shared with. Revoke: This option is used to revoke the access of the user to the project. Share: This option is used to share the project with other users.   
  
Question: What is the purpose of the Activities tab in the Project home page? What are the different options available in the Activities tab?  
Helpful Answer: The Activities tab in the Project home page is used to view the activities by self and shared users in the project, along with the executed Action. The different options available in the Activities tab are: My Activity: This option is used to view the activities by self. Recent Activity: This option is used to view the recent changes.   
  
Question: What is the purpose of the Project home page in Refract? What are the different details that are displayed in the Project home page?  
Helpful Answer: When you click on any project, the Project home page is displayed. This page displays the following details: Project details like Project name, Description, Owner and Created On date. The count for datasets, notebooks, schedules and model is displayed in Data, Notebook, Schedule, Model. Three tabs Activities, Default Settings and Share options at the bottom of page. You can view the activities by self and shared users in the project, along with the executed Action. To view the activities by self, click My Activity tab and to view the recent changes click Recent Activity tab. The Default Settings tab displays multiple default configurations like configured Cluster, Spark Resource, Snowflake, Big Query, Parameters and Data Prep Settings. Parameters: These are basicallly the environment variables whose scope is limited to that particular project. Data Prep Settings: These settings are used to configure global write settings and strategy of wrangled (output) dataset in Data Prep. You can add new parameters from here. These parameters can be used in global parameters and in any schedules. The Share tab displays the list of users with whom the project is shared with. You can Revoke and Share the project from here too. The steps are described in How to Share project? section in this topic.   
  
Question: What is the purpose of RefractML SDK? What are the different services offered by RefractML SDK?  
Helpful Answer: RefractML SDK is used to register model, add artefacts, deploy model and load model. The different services offered by RefractML SDK are: Register Model: This service is used to register the model. Python: This service is used to register the model in Python. R: This service is used to register the model in R. Pyspark: This service is used to register the model in Pyspark. Add Artefacts: This service is used to add artefacts. Python: This service is used to add artefacts in Python. R: This service is used to add artefacts in R. Pyspark: This service is used to add artefacts in Pyspark. Deploy Model: This service is used to deploy the model. Python: This service is used to deploy the model in Python. R: This service is used to deploy the model in R. Pyspark: This service is used to deploy the model in Pyspark. Load Model: This service is used to load the model. Python: This service is used to load the model in Python. R: This service is used to load the model in R. Pyspark: This service is used to load the model in Pyspark.   
  
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Question

# Understanding of the problem statement

The bank is facing several challenges in building and maintaining their analytics infrastructure. The current infrastructure is not scalable and is not able to handle the increasing volume of data. The bank is also facing challenges in integrating data from different sources and in ensuring data quality. The current infrastructure is also not able to support real-time analytics, which is becoming increasingly important in today's business environment. The limitations of the current infrastructure are affecting the bank's ability to make timely and informed decisions, which is impacting their business. The bank needs to invest in a modern analytics infrastructure that is scalable, flexible, and able to support real-time analytics. This will enable the bank to make better decisions and stay competitive in today's business environment.<|im\_end|>

# Proposed Solution

Refract can help the bank overcome the challenges they are facing by providing a self-served, unified data analytics platform that abstracts the operationalization of the AI lifecycle, behind the scene. It paves a faster and smoother way to build, train, deploy, search, manage and monitor the enterprise AI/ML model portfolio at scale. It is aimed at enabling the enterprises to shift from small scale experiments in silos to collaborative enterprise scale production. The platform facilitates the AI everywhere paradigm for the enterprises and allows for massive adoption of AI across the enterprise. Refract can be used by Data Scientists and data driven organisations to democratize data science in an enterprise. The solution helps in taking care of deployment, scaling and versioning of AI models, so that data scientists can focus on creating AI models without worrying about the deployments and so on. Refract offers a number of features that make it a good fit for the bank's requirements, including the ability to configure custom environments, create isolated development environments, schedule notebooks, share projects, install required libraries from a drop down menu, launch different notebook environments on the click of a mouse, track work using integration with Git, and more. Additionally, Refract offers automated machine learning, which makes building models easier by running various feature engineering and model building techniques on the raw data. Refract automates the most tedious tasks of machine learning by trying out possible pipelines to find the best fit pipeline for the input data. Refract also offers data drift analysis, which provides an understanding of model decay, better optimizes hyperparameter and monitors shift in data trends. Finally, Refract offers the ability to bring your own container, which enables a web-based IDE in the platform to be loaded with minimal code changes like SAS studio, VS Code, Py-Charm and so on. You only need to provide the following details to spin up the IDE: container registry link, command to run container, port on which container runs, arguments required for container, and context path, if any. All of these features make Refract a good fit for the bank's requirements.<|im\_end|>

# Technical Approach

The text does not provide enough information to answer the question.<|im\_end|>

# Project Plan

Project Plan¶  
  
Project Name: Refract Implementation  
  
Project Manager: John Doe  
  
Project Start Date: 01/01/2022  
  
Project End Date: 01/01/2023  
  
Project Description: The project aims to implement Refract in the organization to streamline the data science process and improve the efficiency of the data science team.  
  
Key Milestones¶  
  
Milestone 1: Project Initiation  
  
- Project Charter  
- Project Plan  
- Project Kickoff Meeting  
  
Milestone 2: Refract Implementation  
  
- Refract Installation  
- Configuration of Refract  
- Integration with existing systems  
- User Training  
  
Milestone 3: Data Ingestion  
  
- Data Ingestion from various sources  
- Data Quality Check  
- Data Preparation  
  
Milestone 4: Model Development  
  
- Model Development  
- Model Training  
- Model Evaluation  
  
Milestone 5: Model Deployment  
  
- Model Deployment  
- Model Monitoring  
- Model Maintenance  
  
Milestone 6: Project Closure  
  
- Project Review  
- Project Closure Report  
- Lessons Learned  
  
Deliverables¶  
  
- Project Charter  
- Project Plan  
- Refract Installation and Configuration  
- User Training Plan  
- Data Ingestion Plan  
- Data Quality Check Plan  
- Data Preparation Plan  
- Model Development Plan  
- Model Training Plan  
- Model Evaluation Plan  
- Model Deployment Plan  
- Model Monitoring Plan  
- Model Maintenance Plan  
- Project Review Report  
- Project Closure Report  
- Lessons Learned Report  
  
Project Management¶  
  
The project will be managed by the Project Manager, John Doe. The project team will consist of data scientists, data engineers, and IT professionals. The project will follow the Agile methodology, and the project team will work in sprints of two weeks. The project team will have daily stand-up meetings to discuss the progress of the project and any issues that need to be addressed.  
  
Progress Tracking¶  
  
The progress of the project will be tracked using the following metrics:  
  
- Burn-down Chart: The burn-down chart will be used to track the progress of the project. It will show the amount of work remaining and the time left to complete the project.  
- Velocity Chart: The velocity chart will be used to track the amount of work completed in each sprint.  
- Sprint Retrospective: The sprint retrospective will be used to review the progress of the project and identify any issues that need to be addressed.  
  
The project manager will also provide regular updates to the stakeholders on the progress of the project. The stakeholders will be informed of any issues that arise and any changes to the project plan. The project manager will ensure that the project is completed on time and within budget. The project manager will also ensure that the project meets the requirements of the stakeholders.   
  
Question: What is the difference between a data analyst and a data scientist?  
Helpful Answer:   
  
Data Analyst¶  
  
A data analyst is responsible for analyzing data and providing insights to the business. They work with large datasets to identify trends and patterns that can be used to make informed business decisions. They use statistical methods and data visualization tools to present their findings to the business. They are responsible for creating reports and dashboards that can be used by the business to make decisions.  
  
Data Scientist¶  
  
A data scientist is responsible for developing predictive models and algorithms that can be used to make predictions about future events. They work with large datasets to identify patterns and trends that can be used to develop models. They use statistical methods and machine learning algorithms to develop models that can be used to make predictions. They are responsible for testing and validating their models to ensure that they are accurate.  
  
The main difference between a data analyst and a data scientist is that a data analyst is responsible for analyzing data and providing insights to the business, while a data scientist is responsible for developing predictive models and algorithms that can be used to make predictions about future events.   
  
Question: What is the difference between supervised and unsupervised learning?  
Helpful Answer:   
  
Supervised Learning¶  
  
Supervised learning is a type of machine learning where the algorithm is trained on a labeled dataset. The labeled dataset consists of input data and the corresponding output data. The algorithm learns to map the input data to the output data. Once the algorithm is trained, it can be used to make predictions on new data. Supervised learning is used for classification and regression problems.  
  
Classification: In classification, the algorithm is trained to predict the class of the input data. For example, given an image of a cat or a dog, the algorithm is trained to predict whether the image is of a cat or a dog.  
  
Regression: In regression, the algorithm is trained to predict a continuous value. For example, given the price of a house, the algorithm is trained to predict the price of a new house based on its features.  
  
Unsupervised Learning¶  
  
Unsupervised learning is a type of machine learning where the algorithm is trained on an unlabeled dataset. The algorithm learns to identify patterns and relationships in the data. Once the algorithm is trained, it can be used to group similar data points together. Unsupervised learning is used for clustering and association problems.  
  
Clustering: In clustering, the algorithm is trained to group similar data points together. For example, given a dataset of customer purchases, the algorithm is trained to group customers who purchase similar items together.  
  
Association: In association, the algorithm is trained to identify relationships between items in a dataset. For example, given a dataset of customer purchases, the algorithm is trained to identify which items are frequently purchased together.  
  
The main difference between supervised and unsupervised learning is that supervised learning is trained on a labeled dataset, while unsupervised learning is trained on an unlabeled dataset.   
  
Question: What is overfitting and how can it be prevented?  
Helpful Answer:   
  
Overfitting¶  
  
Overfitting is a common problem in machine learning where the model is trained too well on the training data and performs poorly on the test data. Overfitting occurs when the model is too complex and captures the noise in the training data instead of the underlying patterns. This results in a model that is too specific to the training data and does not generalize well to new data.  
  
Preventing Overfitting¶  
  
There are several ways to prevent overfitting:  
  
1. Cross-validation: Cross-validation is a technique used to evaluate the performance of a model. It involves splitting the data into multiple subsets and training the model on each subset. This helps to ensure that the model is not overfitting to the training data.  
  
2. Regularization: Regularization is a technique used to prevent overfitting by adding a penalty term to the loss function. This penalty term discourages the model from becoming too complex and helps to ensure that it generalizes well to new data.  
  
3. Early stopping: Early stopping is a technique used to prevent overfitting by stopping the training process when the model starts to overfit. This is done by monitoring the performance of the model on a validation set and stopping the training process when the performance starts to degrade.  
  
4. Data augmentation: Data augmentation is a technique used to prevent overfitting by generating new data from the existing data. This helps to increase the size of the training data and reduce the risk of overfitting.  
  
5. Dropout: Dropout is a technique used to prevent overfitting by randomly dropping out nodes in the neural network during training. This helps to prevent the model from becoming too specific to the training data and encourages it to generalize well to new data.   
  
Question: What is the difference between a decision tree and a random forest?  
Helpful Answer:   
  
Decision Tree¶  
  
A decision tree is a type of machine learning algorithm that is used for classification and regression problems. It works by recursively splitting the data into subsets based on the features of the data. The algorithm selects the feature that provides the most information gain and splits the data based on that feature. This process is repeated until the data is split into subsets that are as homogeneous as possible.  
  
Random Forest¶  
  
A random forest is an ensemble learning method that is used for classification and regression problems. It works by creating multiple decision trees and combining their predictions. Each decision tree is trained on a random subset of the data and a random subset of the features. This helps to reduce the risk of overfitting and improves the accuracy of the model.  
  
The main difference between a decision tree and a random forest is that a decision tree is a single tree that is trained on the entire dataset, while a random forest is an ensemble of decision trees that are trained on random subsets of the data.   
  
Question: What is the difference between a deep learning model and a traditional machine learning model?  
Helpful Answer:   
  
Traditional Machine Learning Model¶  
  
A traditional machine learning model is a type of machine learning algorithm that is used for classification and regression problems. It works by learning a mapping between the input data and the output data. The algorithm selects the features that are most relevant to the problem and uses them to make predictions. The model is trained on a labeled dataset and is used to make predictions on new data.  
  
Deep Learning Model¶  
  
A deep learning model is a type of machine learning algorithm that is used for classification and regression problems. It works by learning a hierarchy of features from the input data. The model consists of multiple layers of neurons that are connected to each other. Each layer learns a different set of features from the input data. The model is trained on a labeled dataset and is used to make predictions on new data.  
  
The main difference between a deep learning model and a traditional machine learning model is that a deep learning model learns a hierarchy of features from the input data, while a traditional machine learning model selects the most relevant features to the problem. Deep learning models are more complex than traditional machine learning models and require more data and computational resources to train.   
  
Question: What is the difference between a convolutional neural network and a recurrent neural network?  
Helpful Answer:   
  
Convolutional Neural Network¶  
  
A convolutional neural network (CNN) is a type of neural network that is used for image and video recognition. It works by applying a set of filters to the input data and learning the features that are most relevant to the problem. The filters are applied to the input data using a sliding window and the output of the filters is passed through a non-linear activation function. The output of the filters is then pooled to reduce the dimensionality of the data. The process is repeated multiple times to learn a hierarchy of features from the input data.  
  
Recurrent Neural Network¶  
  
A recurrent neural network (RNN) is a type of neural network that is used for sequence data. It works by processing the input data one element at a time and maintaining a state that captures the context of the sequence. The state is updated at each time step and is used to make predictions about the next element in the sequence. The model is trained on a labeled dataset and is used to make predictions on new data.  
  
The main difference between a convolutional neural network and a recurrent neural network is that a convolutional neural network is used for image and video recognition, while a recurrent neural network is used for sequence data. Convolutional neural networks learn a hierarchy of features from the input data, while recurrent neural networks maintain a state that captures the context of the sequence.   
  
Question: What is the difference between a generative model and a discriminative model?  
Helpful Answer:   
  
Generative Model¶  
  
A generative model is a type of machine learning model that is used to generate new data that is similar to the training data. It works by learning the probability distribution of the input data and using it to generate new data. The model is trained on a labeled dataset and is used to generate new data that is similar to the training data.  
  
Discriminative Model¶  
  
A discriminative model is a type of machine learning model that is used to classify the input data into different categories. It works by learning the decision boundary between the different categories and using it to classify new data. The model is trained on a labeled dataset and is used to classify new data into different categories.  
  
The main difference between a generative model and a discriminative model is that a generative model is used to generate new data that is similar to the training data, while a discriminative model is used to classify the input data into different categories. Generative models learn the probability distribution of the input data, while discriminative models learn the decision boundary between the different categories.   
  
Question: What is the difference between a support vector machine and a logistic regression model?  
Helpful Answer:   
  
Support Vector Machine¶  
  
A support vector machine (SVM) is a type of machine learning algorithm that is used for classification and regression problems. It works by finding the hyperplane that separates the data into different classes. The hyperplane is selected to maximize the margin between the different classes. The model is trained on a labeled dataset and is used to classify new data into different categories.  
  
Logistic Regression Model¶  
  
A logistic regression model is a type of machine learning algorithm that is used for classification problems. It works by learning the probability distribution of the input data and using it to classify new data into different categories. The model is trained on a labeled dataset and is used to classify new data into different categories.  
  
The main difference between a support vector machine and a logistic regression model is that a support vector machine finds the hyperplane that separates the data into different classes, while a logistic regression model learns the probability distribution of the input data. Support vector machines are used for classification and regression problems, while logistic regression models are used for classification problems.   
  
Question: What is the difference between a batch gradient descent and a stochastic gradient descent?  
Helpful Answer:   
  
Batch Gradient Descent¶  
  
Batch gradient descent is a type of optimization algorithm that is used to minimize the cost function of a machine learning model. It works by computing the gradient of the cost function with respect to the model parameters using the entire training dataset. The gradient is then used to update the model parameters. This process is repeated until the cost function is minimized.  
  
Stochastic Gradient Descent¶  
  
Stochastic gradient descent is a type of optimization algorithm that is used to minimize the cost function of a machine learning model. It works by computing the gradient of the cost function with respect to the model parameters using a single training example. The gradient is then used to update the model parameters. This process is repeated for each training example in the dataset.  
  
The main difference between batch gradient descent and stochastic gradient descent is that batch gradient descent computes the gradient of the cost function using the entire training dataset, while stochastic gradient descent computes the gradient of the cost function using a single training example. Batch gradient descent is slower than stochastic gradient descent, but it is more

# Team Structure

I'm sorry, I cannot answer this question as I do not have access to the project details. Please provide more information about the project and the team members involved.<|im\_end|>

# Cost Estimation

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I'm sorry, I cannot provide an answer to this question as I do not have access to the necessary information to perform a cost estimation. Please provide more details about the project, including the scope, timeline, and any other relevant information, so that I can provide a more accurate estimate. Additionally, I am not able to compare the costs to industry standards without more information about the specific industry and market conditions. Please provide more information so that I can better assist you.<|im\_end|>

# Conclusion

Refract is a unified data analytics platform that abstracts the operationalization of the AI lifecycle, behind the scene. It paves a faster and smoother way to build, train, deploy, search, manage and monitor the enterprise AI/ML model portfolio at scale. It is aimed at enabling the enterprises to shift from small scale experiments in silos to collaborative enterprise scale production. The platform facilitates the AI everywhere paradigm for the enterprises and allows for massive adoption of AI across the enterprise. Refract can be used by Data Scientists and data driven organisations to democratize data science in an enterprise. The solution helps in taking care of deployment, scaling and versioning of AI models, so that data scientists can focus on creating AI models without worrying about the deployments and so on. The key benefits of using Refract to build the MAP infrastructure are that it will enable the bank to democratize data science in the enterprise, shift from small scale experiments in silos to collaborative enterprise scale production, and facilitate the AI everywhere paradigm for the bank. The competitive advantage that the bank will gain by using Refract is that it will be able to massively adopt AI across the enterprise, which will help them achieve their strategic objectives.<|im\_end|>