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Projects

- **Classification**
  https://github.com/asok-mirror/Real_Time_Fraud_Detection_System_MLOps
  - **Ensemble**: Used ensemble techniques to detect fraudulent transactions in real time.
  - **Airflow Pipelines (dataops & mlops)**: Created Data pipeline that prepares the data-set for modelling, then triggers the mlops pipeline and serves the model for serving if its efficient than the previous model
  - **Feature Store**: Used Feast based store as single point of truth for training and prediction flows. Integrated the incremental data refresh to the online store in the dataops pipeline.
  - **Hyperparameter Optimization**: Used Optuna for hyperparameter optimization, captured the study details in each trials using MLFlow and persisted the best study trials and prams as json.
  - **Testing**: Used Great Expectations to valid the data set on statistical front and created checkpoints to validate it during every data refresh through dataops pipeline. Incorporated Locust to simulate the production traffic.
  - **Web**: Exposed the serving model using FastAPI along with metrics end point and performed api schema validation using Pydantic.
  - **Monitoring & Alert System**: Developed Prometheus based solution for continuous model monitoring and triggers alert if model accuracy decreases over time. Wrote custom Grafana dashboard for real time monitoring of various metrics.
  - **Model Decay**: Used alibi-detect and picked the reference planes and then used it for outlier and drift detection. Explored the the A/B testing through iter8 and deployed the solution using Kubernetes.
- **Clustering**
  https://github.com/asok-mirror/Customer_Data_Segmentation_MLOps_DVC
  - **KMeans**: Used KMeans to cluster the customer shopping pattern and performed hyper-parameter tuning to select the optimal cluster using Elbow method & Silhouette score.
  - **Data Pipelines, WorkFlow & Versioning**: Developed stages to capture, process, train & evaluate and log best model, which in turn run as an automated workflow via DVC.
  - **ML Experiments**: Created Db & artifacts store to capture the model runs with various hyper-parameters in MLFlow and then developed best model serving pipeline to persist the experiments outcome and serve it to model registry.
  - **Web**: Developed flask based python application to serve the front end to predict the new data cluster.
  - **Container & Cloud**: Created docker compose to serve the MLflow experiments and the web as docker images and then developed CI-CD workflows to deploy them to Azure container instances.
- **Regression**
  https://github.com/asok-mirror/Car_Price_Prediction_Regression
  - **Gradient Boost**: Applied ensemble based GradientBoosting Regressor to predict the car price based on the features.
  - **Data Preprocessing & Encoding**: Used label based encoding for categorical features and filled the null values with mean using sklearn's Pipelines for effective data transformation before model fit.
  - **Model Search & Hyperparameter optimization**: Constructed model params json and applied it to the sklearn's RandomizedSearchCV to find the best model and parameters.
  - **Model Evaluation**: Wrote querying logic to pickle the best model from the ML Experiments based on the adjusted R^2 metrics.
  - **Web & Cloud**: Pickled the model, developed user interface for new prediction and deployed the model to Azure app service using github actions.

Programming Skills

- **Languages**: Python 3x, JavaScript, TypeScript, HTML, SCSS, SQL, N0SQL, C#, Core Java.
- **Technologies**: Sklearn, Tensorflow 2, Keras, ONNX, Optuna, MLflow, Feast, AirFlow, Azure, AWS, Docker, Kubernetes, GraphQL, MongoDB, PyTest, Typer, Seaborn, DVC, Great Expectations, flake8, Black, Alibi-detect, iter8, Pydantic, prometheus, Grafana, Mkdocs, GitHub Actions, KFServing, Locust.
- **Web Framework**: FastAPI, Flask, Streamlit, React, Angular JS, ASP.Net MVC.

Experience

- **Provincial Health Services Authority** — Vancouver, BC
  Senior Programmer — *May 2020 - Present*
  - Created various multi-threaded Data-Sync services (strategy pattern) for back order application workflows in .Net.
  - Designed the react boilerplate application that has a generic API layer, Reduce & multi-document architecture.
  - Implemented JWL based authentication for GraphQL API's.
  - Developed multiple generic React hooks components. (Grid, Layouts, Lists, Dynamic Forms, and Controls)
  - Written Unit test for UI components (Jest & Enzyme) and Business Layer. (MOQ & XUnit)
  - Worked on various Power BI Reports and SQL Scripting.
  - Actively participated in design discussion and peer code review.

- **Snipp Interactive** — Vancouver, BC
  Full Stack Developer — *Sep 2018 - Sep 2019*
  - Created a rewards dashboard using MVC, repository pattern (generic), and UnitOfWork in an N-tiered architecture.
  - Develop front-end components using HTML5, CSS3, Bootstrap and AngularJS.
  - Leveraged parallel programming for file processing and MMS queue using producer & consumer pattern that reduces the job execution time by 60%.

- **Cognizant** — Chennai, IN
  Associate — *Aug 2011 and Dec 2016*
  - Implemented AGILE development methodology and provided estimates, and participated in weekly grooming meetings, daily & weekly status report to the client on progress of the tasks.
  - Written a load balancing logic to call the web service to request for criminal history.
  - Participated in various Client meetings with the team and the Project manager to discuss improvements /amendments in the development of the section.
  - Developed a standalone SSN Encryption/Decryption utility to assist the support team.
  - Constructed the generic file-based logging mechanism using log4net.
  - Developed an SSIS package to refresh the prod data in a test environment to ease our support activities.
  - Created several POC's and Design documents for R & D activities.
  - Involved in application development using C#, SQL Database, LINQ, WCF, Entity Framework and Web API.
  - Developed a JQGrid based complex dashboard with a subgrid that supports CRUD operations.
  - Developed a fail-over mechanism for the Informix server to eliminate windows registries.
  - Created a common architecture to remediate the group of applications that resulted in 50% increased productivity.

Education

- **Dalhousie University** — Halifax, NS
  Master of Science in Applied Computer Science; GPA: 3.84 — *2017 – 2018*

- **Anna University** — Chennai, India
  Bachelor of Engineering in Mechatronics; CGPA: (8.88/10.0) — *2007 – 2011*