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MACHINE LEARNING OPERATIONS MATURITY MODEL REPORT

January 2023

Aurora Dynamics

Welcome!

About Plain Concepts

Plain Concepts is a global IT professional services company where **our enthusiasm for technology** drives us towards finding the best solutions for our customers.

We build **comprehensive and innovative solutions along with our customers** in their transformation processes using the **latest technology**.

We design **data-driven, cloud-native applications** enhanced with disruptive solutions, including **AI and eXtended Reality**.

We develop **customized projects working side-by-side** with our customers, **without outsourcing** and always **committed to agile values and quality software.**

Our doors are wide open to people from **every country, and every culture**. It keeps things fresh, exciting and allows us to have the **best talent in the world**.

Plain Concepts is **Microsoft Gold Partner, Microsoft AI Partner, Microsoft Mixed Reality Partner** in USA and Europe, and has been recognized as Best Place to Work for two consecutive years.

We currently have over 450 employees, reaching a milestone in the technology sector by having 10 professionals recognized as **Microsoft MVPs** and more than a dozen certifications at the business level.

Table of contents

Introduction

The purpose of this report is to evaluate the current state of Aurora Dynamics's machine learning (ML) operations and to provide recommendations for improving their MLOps maturity.

This report will focus on the following areas: collaboration and communication, model development and deployment, and monitoring and maintenance.

Aurora Dynamics is a fictitious company name that was created for the purpose of this report. It has no relation to any real-world companies that may have the same or similar name. This name was selected as an example and should not be confused with any existing companies or organizations. The purpose of this report is to provide information and analysis on a specific topic and the use of a fictitious company name is a common practice in such reports to avoid any confusion or association with any real-world entities.

This report serves as a preliminary assessment of the current state of Aurora Dynamics's MLOps maturity. It provides an overview of the key areas of collaboration and communication, model development and deployment, and monitoring and maintenance, and highlights areas for improvement. However, for a more detailed and comprehensive assessment of the organization's MLOps maturity, a more in-depth study is required.

This may involve conducting interviews with key stakeholders, analyzing data and metrics, and observing current processes and practices in action. The information gathered from this more extensive study will be used to create a more detailed report that provides a more accurate and complete picture of the organization's MLOps maturity.

Executive Summary

The findings of the report indicate that Aurora Dynamics currently lacks established processes and tools for collaboration and communication between the data science and IT teams. This lack of communication and collaboration can lead to delays in the deployment of ML models and can also result in a lack of trust in the models being deployed. Recommendations include establishing regular meetings between the data science and IT teams and implementing a shared tool, such as a project management platform or a chat tool, to facilitate communication and collaboration.

In terms of model development and deployment, the report found that Aurora Dynamics does not currently have any established processes in place. This can lead to inconsistencies in the development and deployment process and can also result in models not being deployed in a timely manner. Recommendations include implementing a model development and deployment pipeline and using automation tools, such as Jenkins or Travis CI, to automate the deployment process.

Lastly, the report highlights that Aurora Dynamics does not have any processes in place for monitoring and maintaining deployed models. This can lead to models becoming outdated and not performing as well as they could. Recommendations include implementing monitoring and maintenance processes to ensure that deployed models are performing well and are updated in a timely manner.

Overall, the report recommends that Aurora Dynamics takes action to improve their MLOps maturity by implementing processes and tools for collaboration and communication, model development and deployment, and monitoring and maintenance. By doing so, they will be able to

improve the performance and reliability of their ML models and ensure they meet the needs of the business or organization.

MLOps Maturity Model

The MLOps maturity model is a framework for evaluating and improving the processes and practices used in the deployment and management of machine learning models. It defines different levels of maturity that organizations can strive to achieve as they develop and refine their MLOps pipelines. The following are the different levels of the MLOps maturity model:

- **Level 1: Ad-hoc:** At this level, organizations have little to no formal processes in place for managing their ML models. Model development and deployment are done on an ad-hoc basis, and there is little to no collaboration or communication between the data science and IT teams.

- **Level 2: Repeatable:** At this level, organizations have begun to establish some basic processes for managing their ML models. These processes may include basic version control for models and some level of testing and validation. However, there is still little collaboration or communication between the data science and IT teams.

- **Level 3: Defined:** At this level, organizations have well-defined processes in place for managing their ML models. These processes include clear roles and responsibilities, as well as tools and technologies for automating the model development and deployment pipeline. Collaboration and communication between the data science and IT teams is also starting to improve.

- **Level 4: Managed:** At this level, organizations have fully integrated their MLOps pipeline into their overall IT operations. Model performance is continuously monitored and models are updated and optimized in a timely manner. There is a strong culture of collaboration and communication between the data science and IT teams.

- **Level 5: Optimized:** At this level, organizations have fully optimized their MLOps pipeline and are continuously looking for ways to improve it. They are able to quickly and efficiently deploy new models, and have implemented advanced monitoring and maintenance processes to ensure the performance and reliability of their models.

It is important to note that the levels of maturity defined in the MLOps maturity model are not fixed and organizations can move up and down the levels depending on their current state and the steps they take to improve their MLOps pipeline. Additionally, the specific criteria and characteristics of each level may vary depending on the specifics of the organization and the requirements of their use case.

Level	Description	Key Features
1	Ad-hoc	No formal processes in place Model development and deployment is done on an ad-hoc basis Little to no collaboration or communication between data science and IT teams

2	Repeatable	Basic processes in place for managing ML models Basic version control and testing in place Little collaboration or communication between data science and IT teams
3	Defined	Well-defined processes in place for managing ML models Clear roles and responsibilities Tools and technologies in place for automating the model development and deployment pipeline Improved collaboration and communication between data science and IT teams
4	Managed	MLOps pipeline fully integrated into overall IT operations Model performance is continuously monitored Models are updated and optimized in a timely manner Strong culture of collaboration and communication between data science and IT teams
5	Optimized	MLOps pipeline fully optimized Able to quickly and efficiently deploy new models Advanced monitoring and maintenance processes in place Continuously looking for ways to improve the pipeline

Our MLOps Consulting Workflow

The MLOps consulting workflow is a process that helps organizations improve the maturity of their MLOps pipeline. The workflow is divided into four main stages: Initial Assessment, Strategy Development, Implementation, and Optimization.

Initial Assessment: This stage involves conducting an initial assessment of the organization's current MLOps practices and identifying areas for improvement. This may involve conducting interviews with key stakeholders, analyzing data and metrics, and observing current processes and practices in action. The goal of this stage is to gain a thorough understanding of the organization's current MLOps maturity and to identify areas that need to be addressed.

Strategy Development: Once the initial assessment is complete, the next step is to develop a strategy for improving the organization's MLOps maturity. This may include defining goals and objectives, identifying key areas to focus on, and outlining a plan for achieving these goals. The strategy should also take into account the organization's unique challenges and constraints and should align with the organization's overall business objectives.

Implementation: Once the strategy is developed, the next step is to implement the changes and improvements outlined in the strategy. This may involve deploying new tools and technologies, re-organizing teams and roles, or putting new processes and practices in place. The goal of this stage is to put the strategy into action and to begin seeing improvements in the organization's MLOps maturity.

Optimization: The final stage of the MLOps consulting workflow is optimization. This involves continuously monitoring and measuring the performance of the organization's MLOps pipeline, and making adjustments and improvements as necessary. This may include fine-tuning the deployment pipeline, improving model performance, or implementing new monitoring and maintenance processes. The goal of this stage is to ensure that the organization's MLOps pipeline is operating at its maximum potential and that it is meeting the organization's business objectives.

It is important to note that the MLOps consulting workflow is an iterative process, and organizations may need to go through the stages multiple times in order to achieve their desired level of MLOps maturity. Additionally, the specific steps and activities within each stage may vary depending on the specific needs and requirements of the organization.

Collaboration and Communication

Effective collaboration and communication are essential for successful MLOps. In this section of the MLOps maturity model report, we will examine the key elements of collaboration and communication within an MLOps workflow, including cross-functional teams, tools and processes for information sharing, and strategies for addressing communication barriers. We will also explore best practices for fostering a culture of collaboration and communication within an organization, and how these practices can contribute to the overall maturity and success of an MLOps program.

Currently, Aurora Dynamics has no established processes or tools in place for collaboration and communication between the data science and IT teams. This lack of communication and collaboration can lead to delays in the deployment of ML models and can also result in a lack of trust in the models being deployed.

Recommendations

Establish regular meetings between the data science and IT teams to improve communication and collaboration.

Implement a shared tool, such as a project management platform or a chat tool, to facilitate communication and collaboration.

Model Development and Deployment

The Model Development and Deployment section of the MLOps maturity model focuses on the processes and practices used to build, test, and deploy machine learning models in a production environment. This stage of the MLOps pipeline is critical for ensuring the accuracy, reliability, and performance of the models, as well as their ability to meet the needs of the business or organization. In this section, we will examine the key elements of model development and deployment, including the tools and technologies used, the roles and responsibilities of the team members involved, and the best practices and standards that should be followed.
Aurora Dynamics does not currently have any established processes for model development and deployment. This can lead to inconsistencies in the development and deployment process and can also result in models not being deployed in a timely manner.

Recommendations

Implement a model development and deployment pipeline to ensure consistency and efficiency in the process.

Use automation tools, such as Jenkins or Travis CI, to automate the deployment process.

Monitoring and Maintenance

Monitoring and maintenance are crucial components of a successful MLOps pipeline. The ability to monitor the performance of deployed models in production environments, and quickly address any issues, is critical for ensuring the reliability and performance of the models. This section of the report will explore the various approaches and best practices for monitoring and maintaining ML models in production and will provide guidance on how to effectively implement these strategies in your own organization.

Currently, Aurora Dynamics does not have any processes in place for monitoring and maintaining deployed models. This can lead to models becoming outdated and not performing as well as they could.

Recommendations

Implement monitoring and maintenance processes to ensure that deployed models are performing well and are updated as needed.

Use monitoring tools, such as Prometheus or Grafana, to monitor the performance of deployed models.

Conclusion

Aurora Dynamics is currently at Level 1 of MLOps maturity.

To improve their MLOps maturity, Aurora Dynamics should establish regular meetings between the data science and IT teams, implement a shared tool for communication and collaboration, implement a model development and deployment pipeline, automate the deployment process, establish monitoring and maintenance processes, and use monitoring tools to monitor the performance of deployed models.

With these improvements in place, Aurora Dynamics will be well on their way to improving their MLOps maturity.

MLOps Maturity Model Report

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