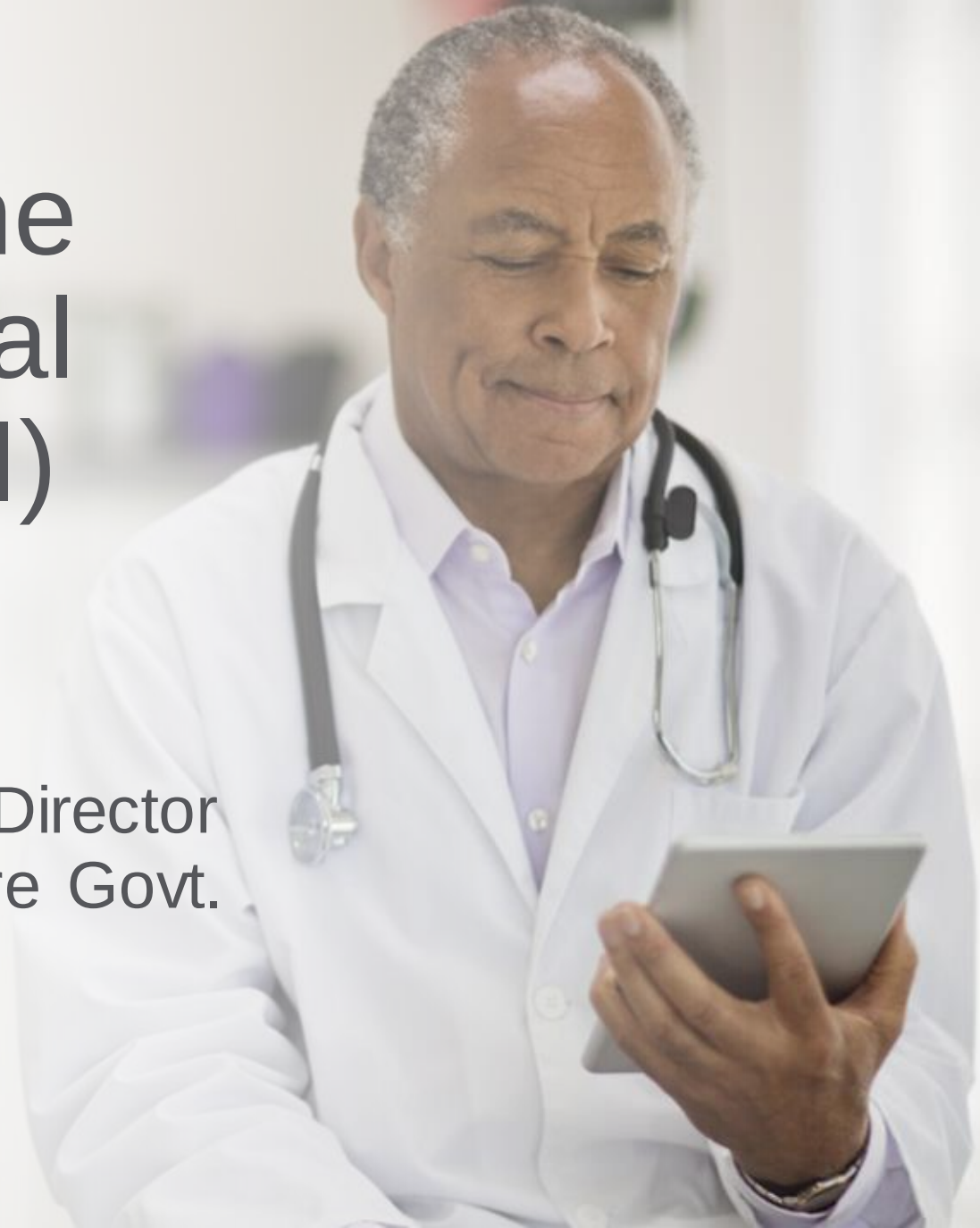


Architecture data systems for machine learning and artificial intelligence (ML / AI)

Lynn Almoró; VP, Chief Architect,
UnitedHealthcare Platforms

Devi Kyanam, MS, MBA; Senior Director
of Data Science, UnitedHealthcare Govt.
Program Marketing

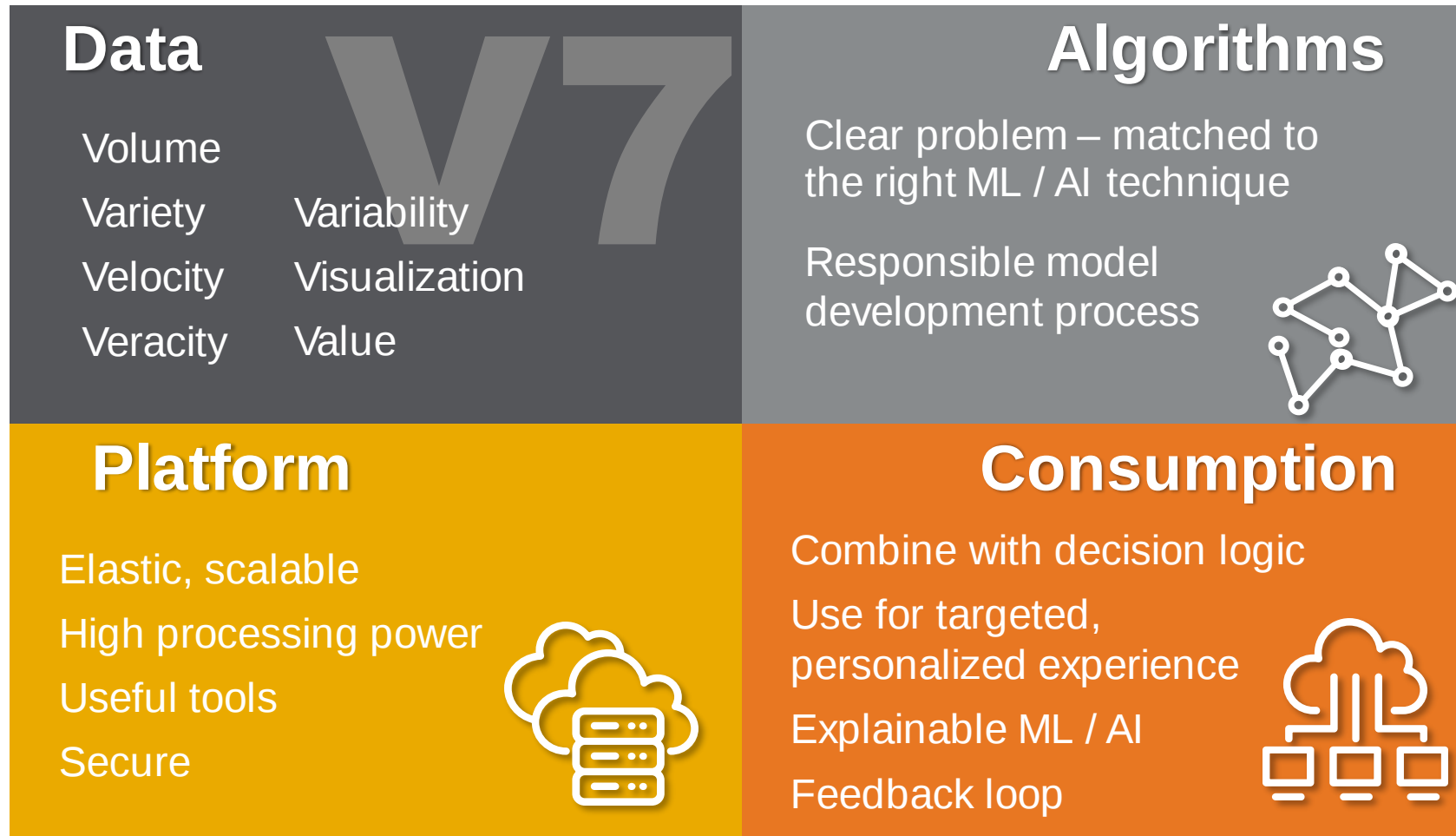


Disclosures

Financial Disclosures:

- Devi Kyanam - None
- Lynn Almore - None

Four pillars for successful ML / AI enablement



Data

No data = no analytics – no ML – no AI

Big – Huge Data

Volume – lots, and lots, and lots of data

Variety – different types of data

Velocity – speed data is generated; freshness

Veracity – accurate and trusted

Variability – changes in the meaning of data

Visualization – readable and accessible

Value – interpret to realize benefit

Other essential data characteristics:

Longitudinal Data

Data that goes back in history long enough to contain many cycles of “seasons,” to see patterns and outliers / extremes

Special Circumstances Data

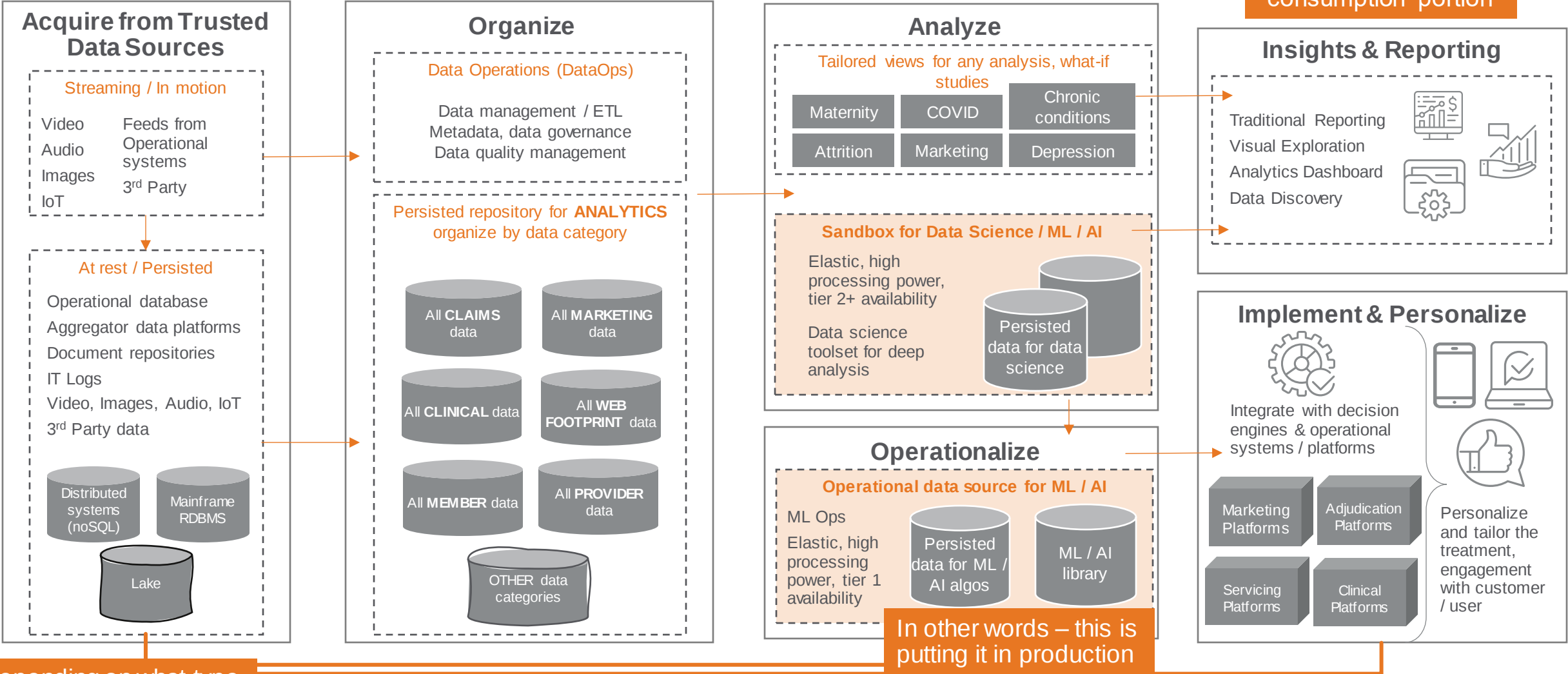
Data that occurs rarely and is non-cyclical

Examples:

- Pandemic data
- Economic recession data
- Volcanic eruption data
- Snow in summer

Platform(s) ecosystem

Will be covered in the “consumption” portion



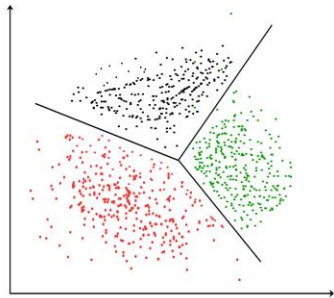
Depending on what type of data is coming in

In other words – this is putting it in production

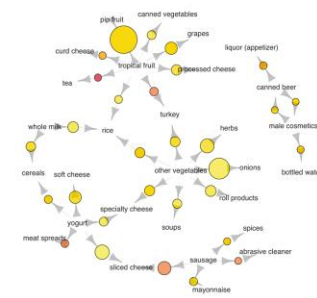
Algorithms

Define the problem correctly with a clear business goal, and a plan to implement and measure results before building AI/ML algorithms. You'll need robust data processing systems (compute, storage, and memory) and programming skills (R, Python, Spark, et cetera).

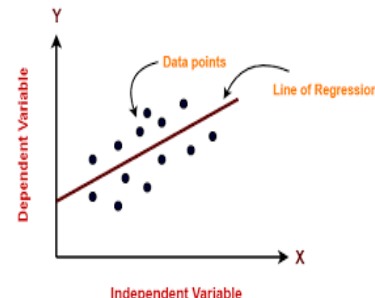
Types of Machine Learning Algorithms



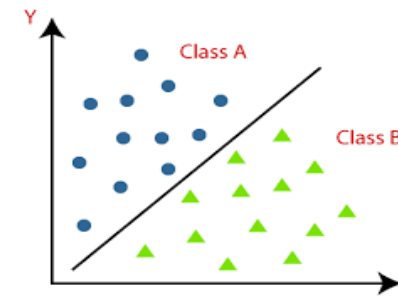
Clustering



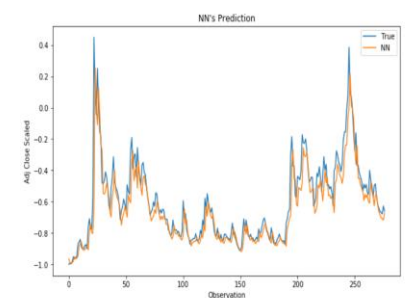
Associations



Regression



Classification



Forecasting

Considerations:

- ensure there is no unintended bias in the data, sample, and technique
- individual privacy, security, and confidentiality must be protected
- handle sensitive features properly

Steps in machine learning model development

Building a viable and reliable machine learning model takes patience, domain knowledge, and perseverance. The main steps include accessing the data, preparing the data, building a model, and applying the model.

Steps in Model Development



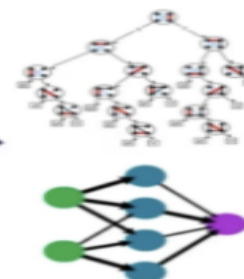
Access Data



Feature Engineering



Exploration & Selection



Model Building



Validation & Scoring



Publish & Apply

Considerations:

- monitor model performance / accuracy and rebuild models as needed periodically
- accuracy measures such as F1 score, Precision, Recall, AUC / ROC curves can be used
- include business success metrics such as KPIs (Key Performance Indicators) in evaluation

Consumption

Used to further analyze the business problem, recommend next best action, integrate into operational workflow, and provide personalized experience through proper data transfer channels.

