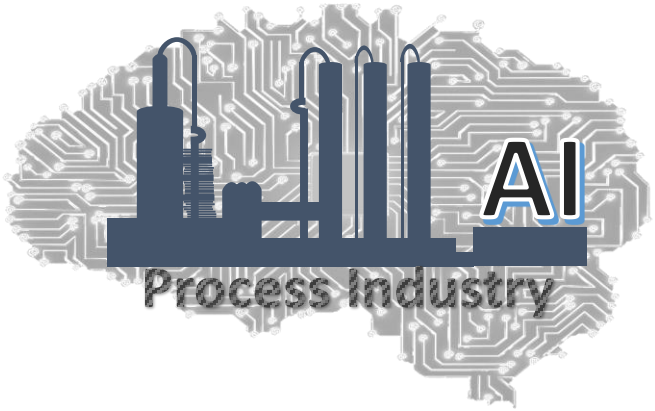
Statistical Techniques for Monitoring Industrial Processes

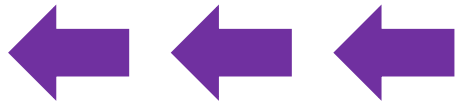


Lecture : Taking SPM Solutions to End-Users

Module : Deploying SPM Solutions

Topics Covered

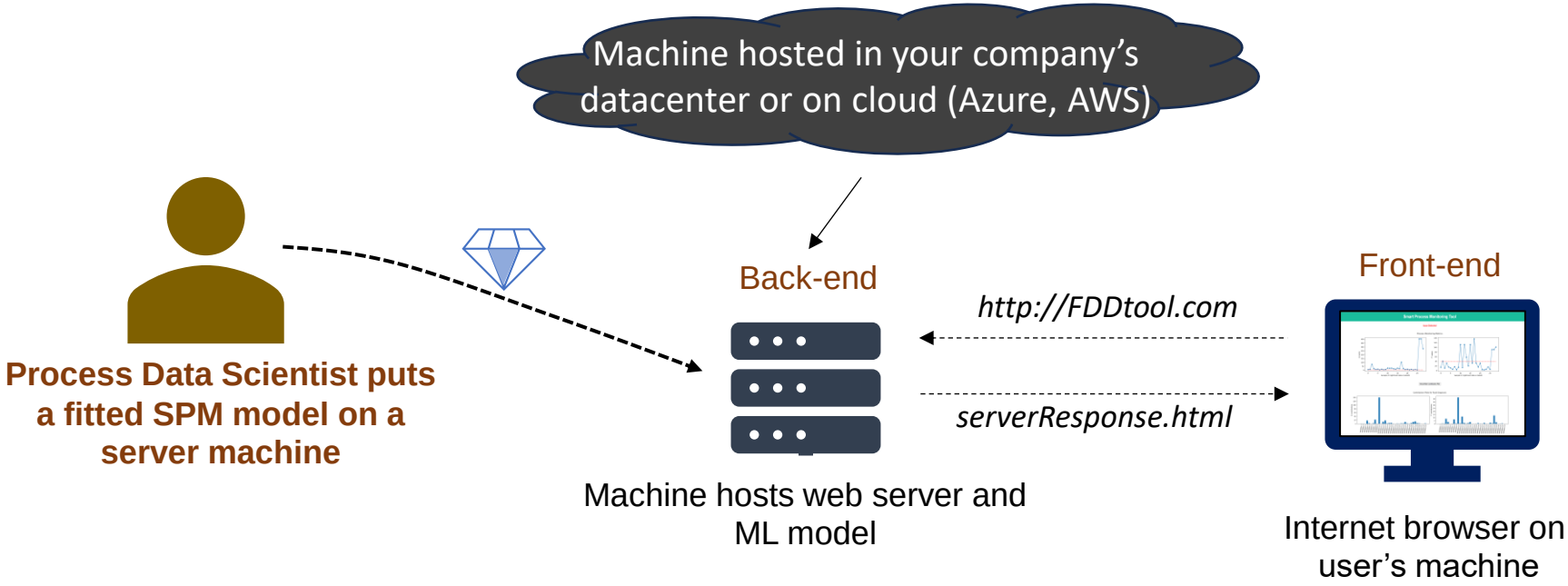
- ❑ Introduction to Statistical Process Monitoring (SPM)
- ❑ Python Installation and basics (optional)
- ❑ Univariate SPM
  - ➢ **Shewhart Charts**
  - ➢ **CUSUM Charts**
  - ➢ **EWMA Charts**
- ❑ Multivariate SPM
  - ➢ Fault detection using **Principal Component Analysis** (PCA)
  - ➢ Fault detection using **Partial Least Squares** (PLS) regression
  - ➢ Fault diagnosis using PCA/PLS contribution charts
  - ➢ Strategies for handling nonlinear, dynamic, multimode systems
- ❑ Deploying SPM solutions



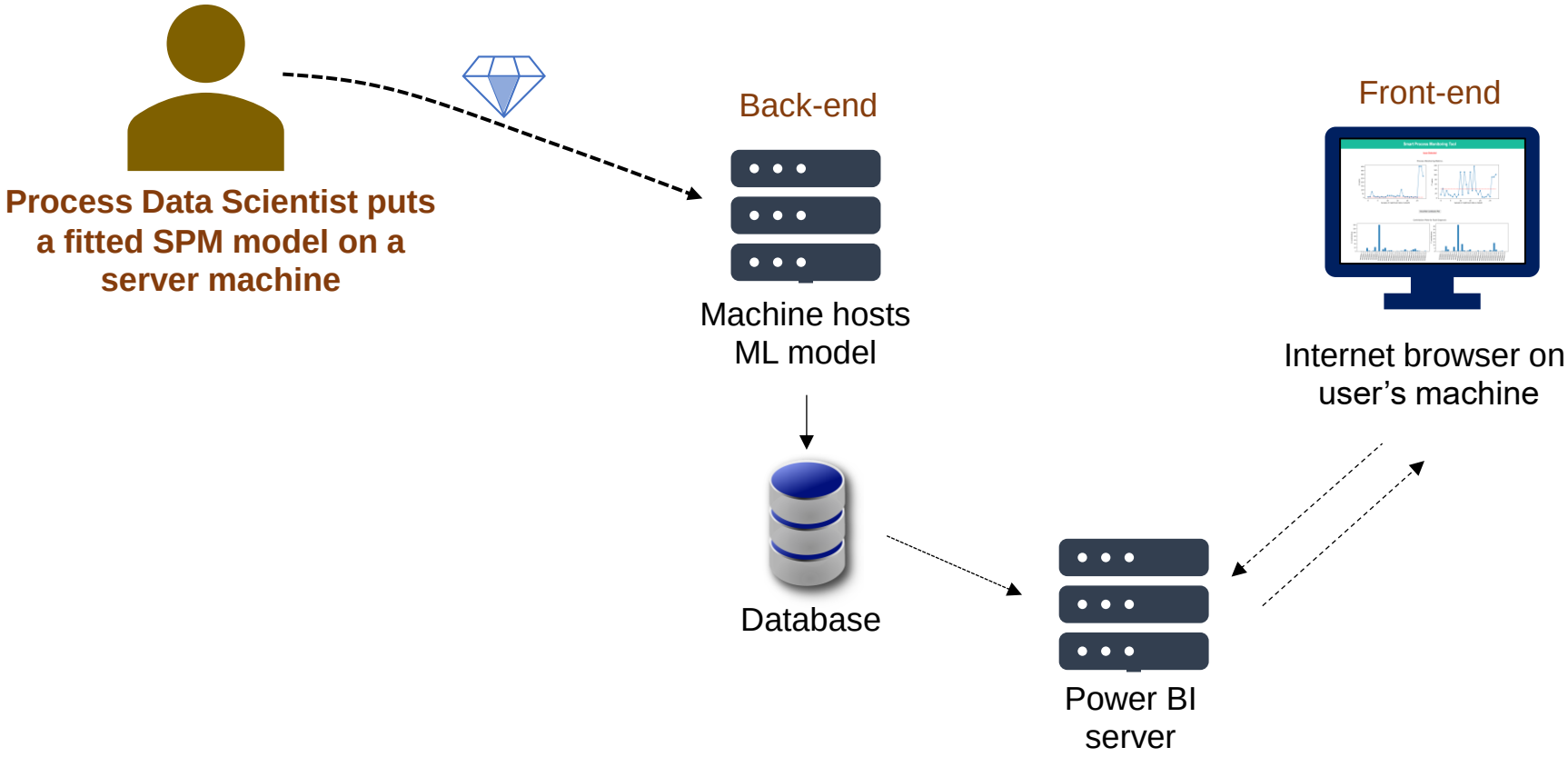
Bringing SPM Tool's Output to Plant Personnel

Picture generated using Dell-E 3 with prompt "A data scientist showing his ML tool's results to a plant operator"

A Practical Web-based Solution



A Practical Web-based Solution



Our Process Monitoring Web App

Let's first build a simple 'Hello World' web app

From ‘Hello World’ App to SPM Web App

SPM Web App should do the following:

- Fetch latest plant data
- Analyze the fetched plant data using a pre-trained PCA-SPM model
- Collect results and images from the SPM model
- Generate the HTML response to send back to the client browser

Statistical Techniques for Monitoring Industrial Processes

Next Lecture : Extensions of Classical PCA and PLS

Module : Course Wrap-up