Data Analytics with MATLAB

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Case Study: Day-Ahead Load Forecasting

Goal:

- Implement a tool for easy and accurate computation of day-ahead system load forecast

Requirements:

- Acquire and clean data from multiple sources
- Accurate predictive model
- Easily deploy to production environment
Challenges with Data Analytics

- Aggregating data from multiple sources
- Cleaning data
- Choosing a model
- Moving to production
Challenges with Data Analytics

✔ Aggregating data from multiple sources

✔ Cleaning data

- Choosing a model
- Moving to production
Machine Learning
Characteristics and Examples

- **Characteristics**
  - Too many variables
  - System too complex to know the governing equation (e.g., black-box modeling)

- **Examples**
  - Pattern recognition (*speech, images*)
  - Financial algorithms (*credit scoring, algo trading*)
  - Energy forecasting (*load, price*)
  - Biology (*tumor detection, drug discovery*)
Challenges with Data Analytics

✔ Aggregating data from multiple sources

✔ Cleaning data

✔ Choosing a model

- Moving to production
Deployment Highlights

- Royalty-free deployment
- Point-and-click workflow
- Unified process for desktop and server apps
Deploying Applications with MATLAB

1. MATLAB Application
2. MATLAB Compiler
3. MATLAB Compiler RunTime (MCR)

MATLAB Desktop
End-User Machine

Toolboxes
Deployed Analytics
MATLAB Production Server

Web Application Server
- Apache Tomcat
- Web Server/Webservice

MATLAB Production Server
- Request Broker
- CTF

MATLAB Desktop
- Train in MATLAB
- Predictive Models
- Weather Data
- Energy Data
Key Takeaways

- Data preparation can be a big job; leverage built-in MATLAB tools and spend more time on the analysis

- Rapidly iterate through different predictive models, and find the one that’s best for your application

- Leverage parallel computing to scale-up your analysis to large datasets

- Eliminate the need to recode by deploying your MATLAB algorithms into production