FORTIVE

Machine Learning & Procurement

Summer Internship Overview

- Fortive Corporation
- 09.27.18

- Joe Barry – Data Scientist Intern

- Procurement Systems

About Me

FORTIVE

- B.A. Economics – University of Southern California
- M.S. Data Science – Southern Methodist University
    - Summa Cum Laude (4.0 GPA)
- Capstone Project Publication December 2018
    - Neural Networks & Computer Vision
- Hobbies: Tennis & Snowboarding

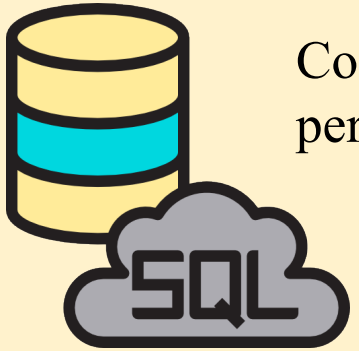
Presentation Outline

FORTIVE

- Solution Development
- Project Workflow
- Neural Network Explanation
- Application of Neural Networks

Solution Development

FORTIVE

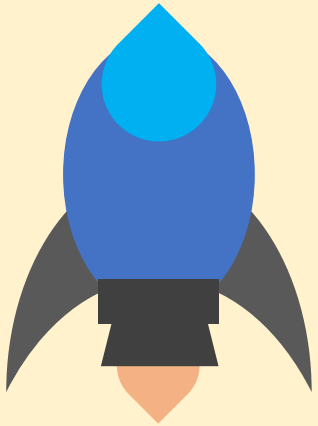


Collect pertinent data

Build neural network using R

Integrate with team's SQL stored procedures

Consult with Subject Matter Experts to tune & optimize



Operational in SQL Server

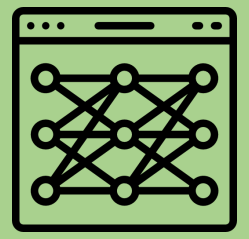
Solutions Integrated with Team's Ecosystem

Prepare

01

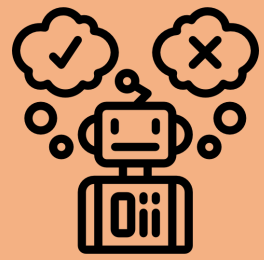
Train

02



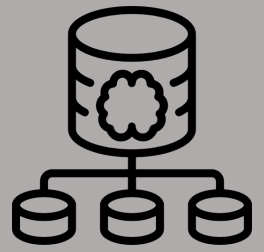
Validate

03



Deploy

04



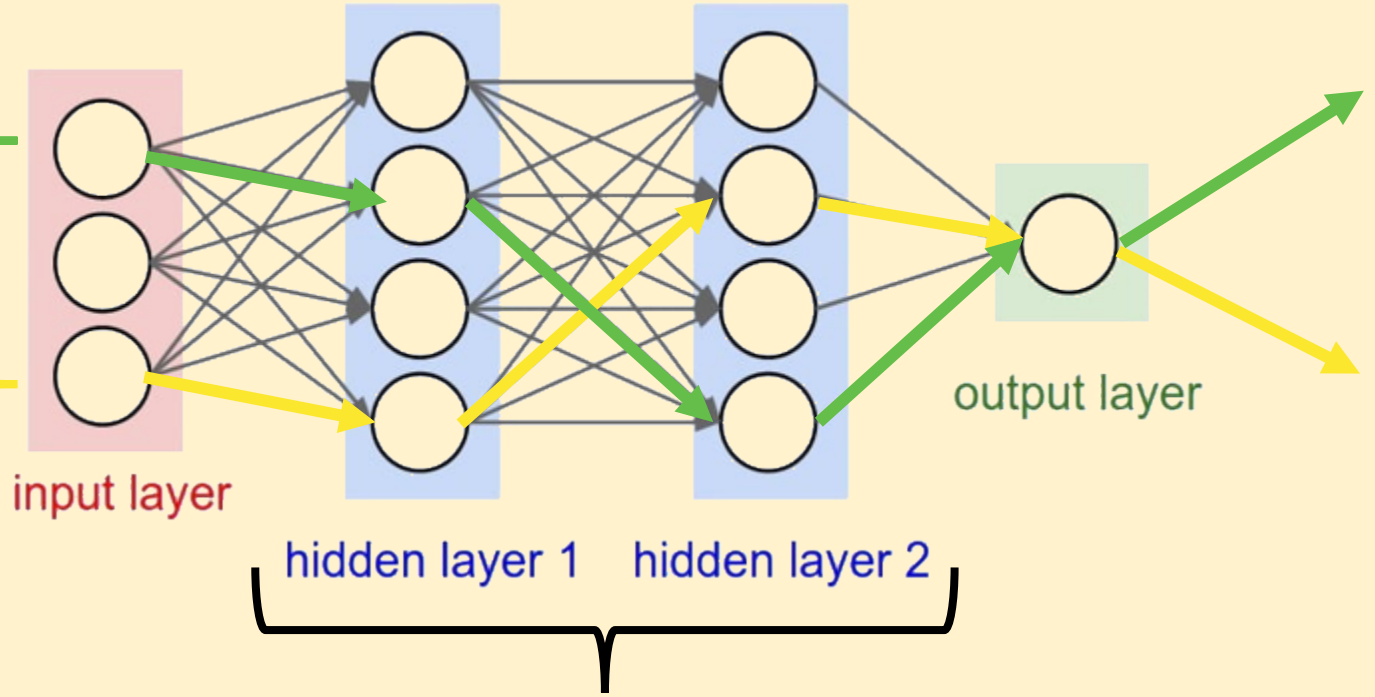
FORTIVE

Neural Network Explanation

FORTIVE

"100724-190,BANANA PLUG MINIATURE MOD. M/F 755007-003"

"FLUKE-718EX 100,I.S. PRESSURE CALIBRATOR 100 PSIG"



Commodity Code

39121400

41113600

100 Hidden Layers

Correct Pathways are Reinforced

Supplier Commodity Codes

Problem

0.5M L12 transactions missing commodity codes

$658M L12 direct spend unallocated

Missing out on potential savings

Supplier Commodity Codes

Data Background

FORTIVE

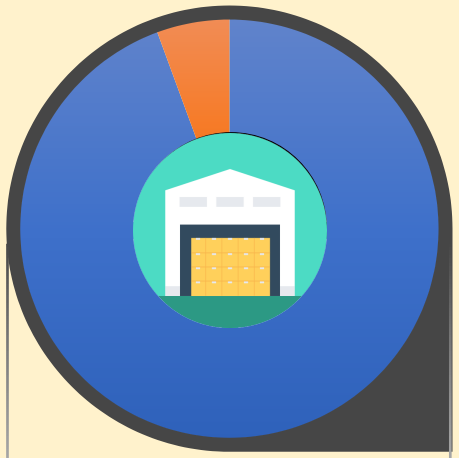
Datasets:	Training	Test
# Rows:	6,528,292	1,632,076
# Codes:	630	

Largest Dataset Personally Analyzed

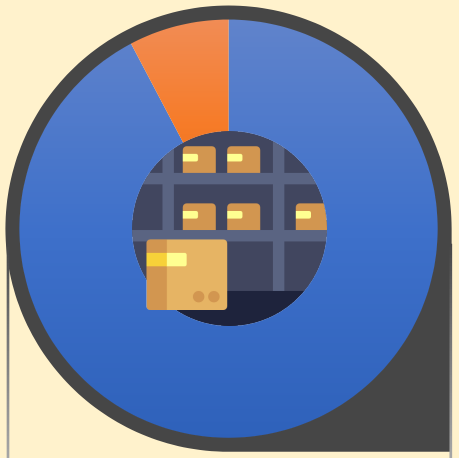
Supplier Commodity Codes

Results by Commodity Hierarchy

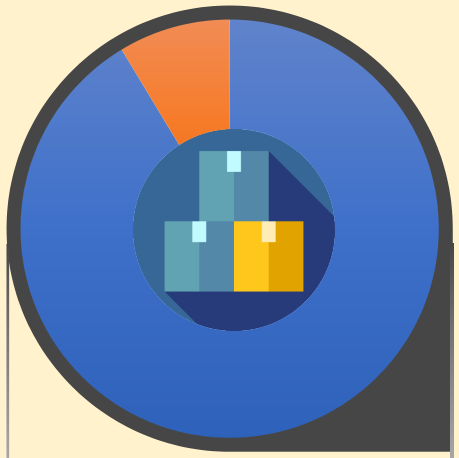
FORTIVE



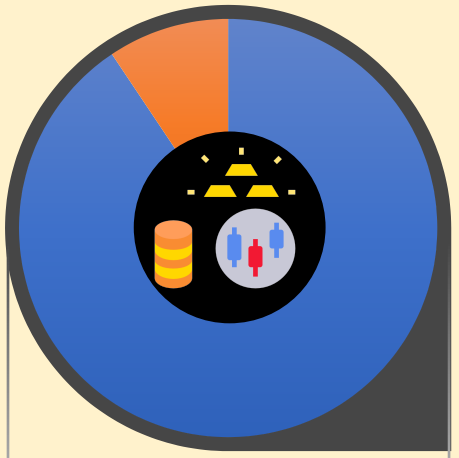
94.40%
Category



92.28%
Family



91.36%
Class



90.36%
Commodity

Validated on 1.6 Million Test Observations

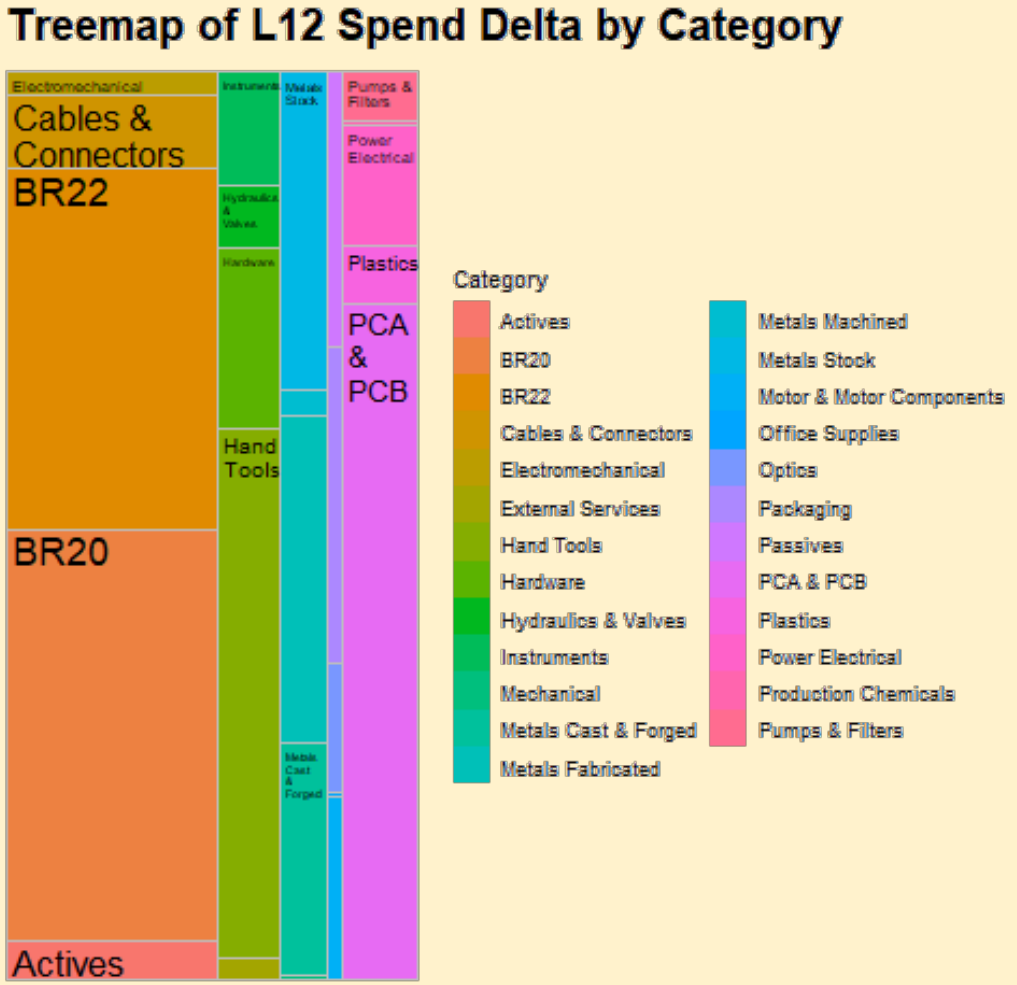
Supplier Commodity Codes

Business Impact

External Services, Instruments, & Metal Stocks

Supplier Commodity Codes

Business Impact



BR22: $158M of L12 Spend Still Unknown

Supplier DUNS Codes

Problem

1.5M L12 transactions without supplier codes

$927M L12 spend blind spot

Missing Out on Full Leveragability with Suppliers

Supplier DUNS Codes

Data Background

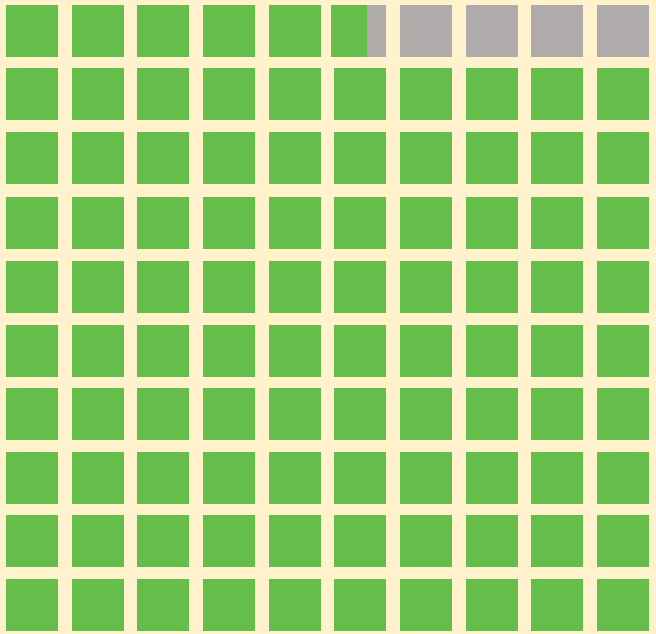
FORTIVE

Datasets:	Training	Test
# Rows:	5,531,472	1,382,869
# Codes:	8,242	

Longest Model Training Time of 2.5 Days

Supplier DUNS Codes

Results & Business Impact



Accuracy: 95.70%

$927M Increase

Supplier Level

L12 Spend Visibility

Model Validated on 1.3 Million Test Observations

General Ledger Commodities

Problem

2.2M L12 transactions without GL Commodity

$2.3B L12 spend blind spot

Missing out on potential savings

General Ledger Commodities

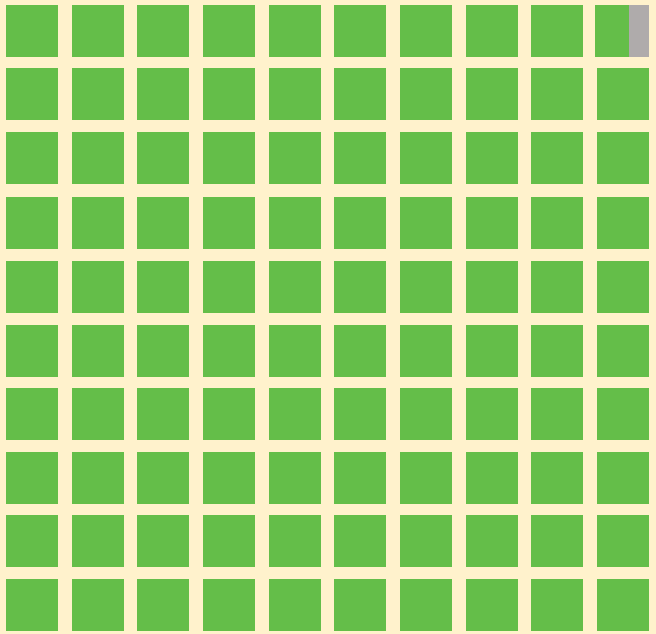
Data Background

Datasets:	Training	Test
# Rows:	1,826,912	456,729
# Codes:	21	

Fastest of the Three Models to Train

General Ledger Commodities

Results & Business Impact



Accuracy: 99.63%

$2.3B Increase

L12 Indirect

Spend Visibility

Model Validated on 0.5 Million Test Observations

Key Takeaways

Overall Increase in Spend Visibility

Supplier Commodity	Supplier DUNS	GL Commodity
$658 Million	$927 Million	$2.3 Billion

Total Spend Visibility Increase: $3.89 Billion

Next Steps

Forecast Supplier Spend per OpCo

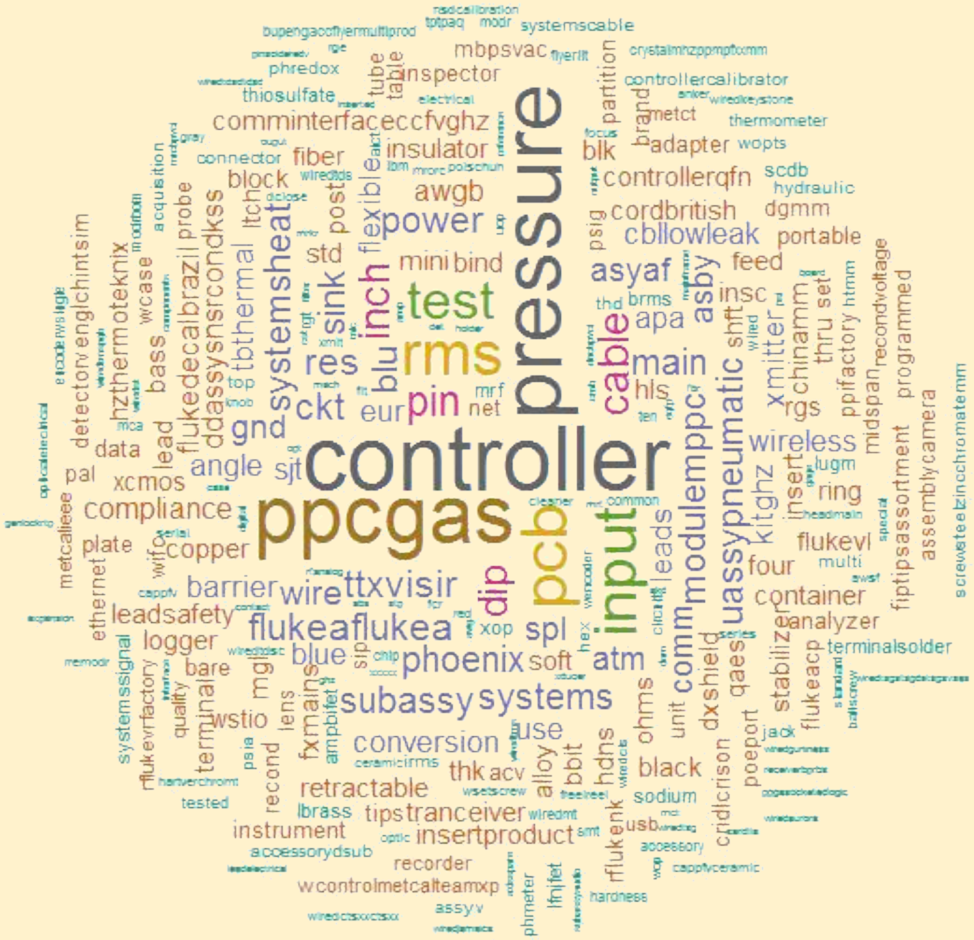
FORTIVE

- Neural Network Regression Model
- Prototype results:
  - 89% Accuracy
  - Training Data: Jan 2016 – April 2018
  - Test Data: May 2018 – Present

Neural Networks can Solve Regression Problems too

Questions?

FORTIVE



Thank You for the Great Learning Opportunity