The Art of the Practical: Making Al Real Tara Holland

SAS Ottawa



My Past Relationship with Al





SAS in Government

Analytics-driven Decisions for Effective Government

Government was the first SAS use case and customer Government is our second-largest industry footprint SAS is used by **650+** Government Departments, Ministries, Offices, and Agencies in **134 countries** around the world



The Art of the Practical: Making Al Real

Level Set on Understanding of AI

Examples & Key Consideration

Implementing AI: Practical Approaches





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Level Set on Understanding of AI



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Artificial intelligence in the real world is making an impact. We spoke with a few of the top AI thought leaders.



Evolution of Artificial Intelligence





What Artificial Intelligence is NOT

- Auto-magic
- A crystal ball
- Intelligent, autonomous robots
- Self-creating/correcting models
- "Out-of-the-box" everything
- Artificial general intelligence



Believe in Humans⁴

Together the possibilities are exponential



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Artificial Intelligence is the science of training systems to emulate human tasks through Learning and Automation



#ROAD2AI



Patterns



Recognize Objects





Diagnostics, diagnosis & patient outcome prediction

Sas

Social determinants of health

Predictive Power

Treatment assessment

Electronic health record history

) Radiology image sync

Complexity





Examples & Key Consideration



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Practical AI: Examples



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What's Your Business?















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Bring the problem to AI, not the other way around

Economic growth Migration Terrorism and security threats Demographics Escalating benefits costs Health care delivery Housing/homelessness

Education Unemployment Inflation Income disparities More demanding citizens Social and political change Climate change, sustainability









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Implementing AI: Practical Approaches



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Implementing Pragmatic Al Built on a foundation of analytics



Build better models.

Be more productive.

Embrace all users.

Operationalize your results.



Build Better Models

Use all algorithms



Data Manipulation

In-Memory Data Manipulation Frequency / Crosstab Data Transpose Variable Binning Variable Cardinality Analysis Variable Summary Sampling and Partitioning Missing Value Imputation Variable Selection Model Assessment SQL



Statistics

Cox Proportional Hazards Decision Trees Design Matrix General Additive Models Generalized Linear Models K-means and K-modes Clustering Linear Regression Logistic Regression Nonlinear Regression Ordinary Least Squares Regression Partial Least Squares Regression Pearson Correlation Principal Component Analysis Quantile Regression Shewhart Control Chart Analysis



Machine Learning

Bayesian Networks Boolean Rules Factorization Machines Frequent Item Set Mining Gradient Boosting K Nearest Neighbor Market Basket Analysis **Moving Windows PCA** Network Analytics/Community Detection Neural Networks Random Forest **Robust PCA** Support Vector Data Description Support Vector Machines Text Mining Variable Clustering



Deep Learning

Deep Forward Neural Networks (DNNs) Convolutional Neural Networks (CNNs) Recurrent Neural Networks(RNNs) Autoencoders for neural networks Image processing extensions Augment image action Convert image table action Match images action 2D/3D image visualization



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Be More Productive Advanced Algorithms require Prototyping



AI Workbench & Templates

- Share best practices
- Collaboration between users
- Integrate multiple coding languages
- Run model tournaments & prototypes







Embrace All Users Support your entire Al pipeline.

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Operationalize AI Embed AI in applications



Move from model ...

... to application

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		Info: Your House Type: Detached Postal Code (M2N1S1): Approximate Square Footage: 2800 Number of Bedrooms: 1
	Vale Vale	Number of Washrooms: 1 Number of Parking Spaces: 18500 Check out my house proof

... with deployment capabilities.





Best Practice Takeaways



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Making Al Real: Best Practices

1. Start small and grow



- Al doesn't need to be big bang
- You're likely doing it today
- Manage your expectations
- Create agility in processes and systems



Making Al Real: Best Practices

Start small and grow Focus on the problem



- Bring the problem to AI, not the other way around
- Don't lead with technology
- Al needs to be deployed to matter



Making AI Real: Best Practices

Start small and grow
 Focus on the problem
 Connect to analytics



- Analytics and AI are connected
- Mature your current analytics programs and strategy
- Don't do Al in isolation



Making AI Real: Best Practices

Start small and grow
 Focus on the problem
 Connect to analytics
 Create Trust in Al



- Ethics and training are critical for success
- Don't use black box technology
- Strive for interpretable AI



Making Al Real: Best Practices

Start small and grow
 Focus on the problem
 Connect to analytics
 Create Trust in Al
 Believe in Humans



- Use AI to augment human experience
- Monitor results and be prepared to adapt
- Create transparency from the start



Believe in Humans⁴

Together the possibilities are exponential



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