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Predictive Analytics in an hour: a no-nonsense quick guide

Jarlath Quinn – Analytics Consultant

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Just waiting for all attendees to join…

Predictive Analytics in an hour: a no-nonsense quick guide

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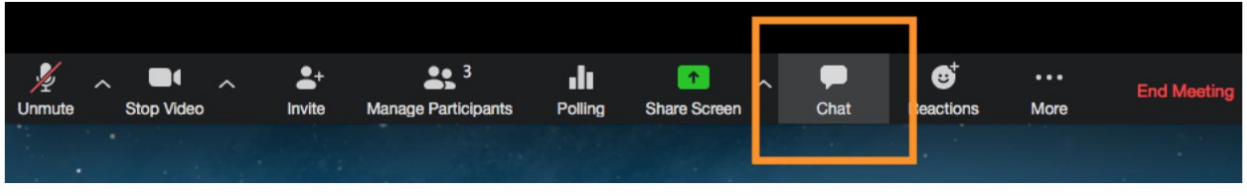
FAQ's

- Is this session being recorded? Yes
- Can I get a copy of the slides? Yes, we'll email links to download materials after the session has ended.
- Can we arrange a re-run for colleagues? Yes, just ask us.
- How can I ask questions? All lines are muted so please use the chat panel – if we run out of time we will follow up with you.



- Premier accredited partner to IBM, Predictive Solutions and DataRobot specialising in advanced analytics & big data technologies
- Work with open source technologies (R, Python, Spark etc.)
- Team each has 15 to 30 years of experience working in the advanced and predictive analytics industry

- Deep experience of applied advanced analytics applications across sectors
  - Retail
  - Gaming
  - Utilities
  - Insurance
  - Telecommunications
  - Media
  - FMCG

Wanted: More types of machine learning

Now that we're big into machine learning in the cloud, perhaps we should start thinking about how to do it better

Artificial Intelligence can diagnos... just two minutes

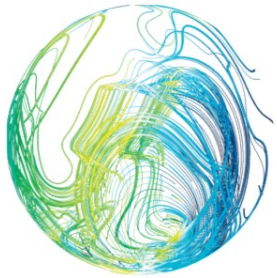
Sacked by an algorithm: Managing the future

Why Adversarial Machine Learning Is the Next Big Th... onal Security

Amazon uses data crunching skills

Deloitte.

Machine learning: things are getting intense



'Deep learning' – the hot topic in AI

Experts in the field are in demand and future managers would do well to grasp the concept

© Getty

You may have noticed, there's a lot of interest in Machine Learning and AI these days...

Computer learns to detect skin cancer more accurately than d...

Artificial intelligence machine found 95% ... compared to 86.6% for dermatologists

Harvard Business Review

EDUCATION

The Chairman Ensuring Every... Has a Basic Un... of Machine Lea... Including Him

Forbes CommunityVoice Connecting expert communities to the Forbes audience. What is This?

2,401 views | Nov 21, 2018, 07:15am

Health Data Meets Artificial Intelligence And Machine Learning

Forbes Technology Council

Morris Panner CommunityVoice

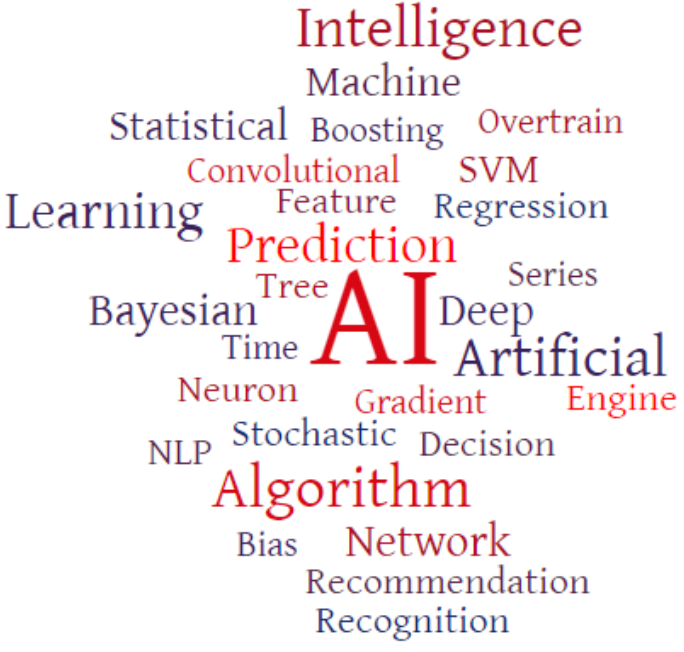
Forbes Technology Council CommunityVoice

Data Scientist:

The Sexiest Job of the 21st Century

Machine-learning system could aid critical decisions in sepsis care

Model predicts whether ER patients suffering from sepsis urgently need a change in therapy.



What we talk about when we talk about AI and Machine Learning

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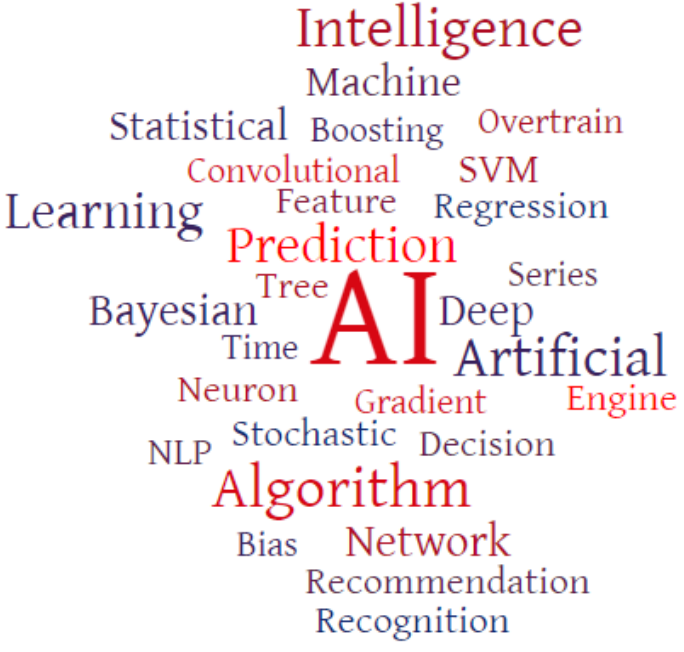

= **Predictive Analytics?**

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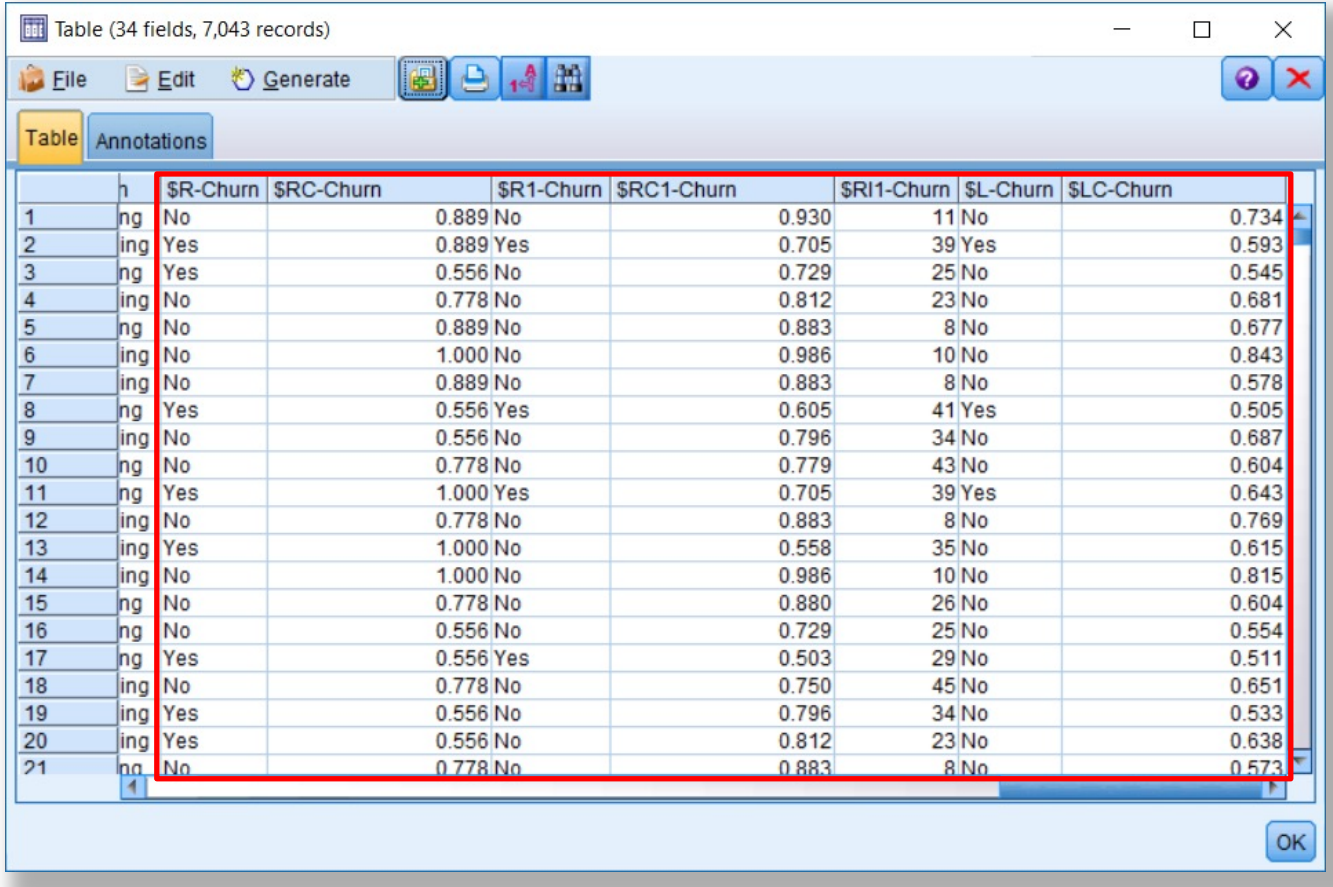
"**Predictive analytics** encompasses a variety of statistical techniques from data mining, predictive modelling, and machine learning, that analyze current and historical facts to make predictions about future or otherwise unknown events."

"Predictive analytics encompasses a variety of statistical techniques from predictive modeling, machine learning, and data mining that analyze current and historical facts to make predictions about future or otherwise unknown events."

What do these approaches all have in common?



	h	$R-Churn	$RC-Churn	$R1-Churn	$RC1-Churn	$RI1-Churn	$L-Churn	$LC-Churn
1	ng	No	0.889	No	0.930	11	No	0.734
2	ing	Yes	0.889	Yes	0.705	39	Yes	0.593
3	ng	Yes	0.556	No	0.729	25	No	0.545
4	ing	No	0.778	No	0.812	23	No	0.681
5	ng	No	0.889	No	0.883	8	No	0.677
6	ing	No	1.000	No	0.986	10	No	0.843
7	ing	No	0.889	No	0.883	8	No	0.578
8	ng	Yes	0.556	Yes	0.605	41	Yes	0.505
9	ing	No	0.556	No	0.796	34	No	0.687
10	ng	No	0.778	No	0.779	43	No	0.604
11	ng	Yes	1.000	Yes	0.705	39	Yes	0.643
12	ing	No	0.778	No	0.883	8	No	0.769
13	ing	Yes	1.000	No	0.558	35	No	0.615
14	ing	No	1.000	No	0.986	10	No	0.815
15	ng	No	0.778	No	0.880	26	No	0.604
16	ng	No	0.556	No	0.729	25	No	0.554
17	ng	Yes	0.556	Yes	0.503	29	No	0.511
18	ing	No	0.778	No	0.750	45	No	0.651
19	ing	Yes	0.556	No	0.796	34	No	0.533
20	ing	Yes	0.556	No	0.812	23	No	0.638
21	ng	No	0.778	No	0.883	8	No	0.573

They generate new data

What do we mean when we talk about 'Predictive Analytics'?

- Ironically, it's not *always* about prediction *per se*
- But Predictive Analytics can always *create new data*
- These data take the form of estimates, probabilities, forecasts, recommendations, propensity scores, classifications or likelihood values
- The acid test of an analytical model is how accurate these new data are
- The usefulness of an analytical *application* depends on the *decisions* we take as a result of these new data

Predictive Analytics is <u>not</u>…

- A super-charged version of analytics that is designed to reveal hidden secrets
- An insight platform that will tell you “what to do next…now”
- An approach for calculating the optimal outcomes
- A data visualisation discipline

Typical Predictive Analytics Applications

- Predictive Modelling
  - Marketing Response
  - Subscriber Retention
  - Cross-Sell/Up-Sell
  - Patient Outcomes/Readmission
  - Asset Failure/Alarms Management
  - Fraud Detection
  - Loyalty Modelling
- Other Applications
  - Cluster Analysis
  - Anomaly Detection
  - Association Analysis
  - Forecasting
  - Text Analytics
  - Video/Voice Analytics
  - Optimisation

How is Predictive Analytics applied?

- **Retail**
  - Promotions, Basket Analysis, Store Clustering, Forecasting
- **Financial**
  - Credit Scoring, Fraud, Mortgage Retention, Product Cross-sell
- **Communications and Media**
  - Retaining Subscribers, Feedback Mining, Turf Analysis
- **Insurance**
  - Satisfaction Modelling, Retention, Fraud, Claim Risk
- **Utilities**
  - Customer Profitability, Problem Resolution, Predictive Maintenance

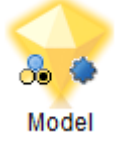
How is Predictive Analytics applied?

- **Tax**
  - Non-compliance, Fraud, Service Quality
- **Charities**
  - Campaign Response, Supporter Segmentation, Legacy Giving
- **Education**
  - Retention, Acquisition, Student Performance
- **Healthcare**
  - Patient Readmission, Patient Safety, Delay Analysis
- **Police/Security**
  - Crime Prediction, Satisfaction Modelling, Anomaly Detection

At the heart of predictive applications is a model

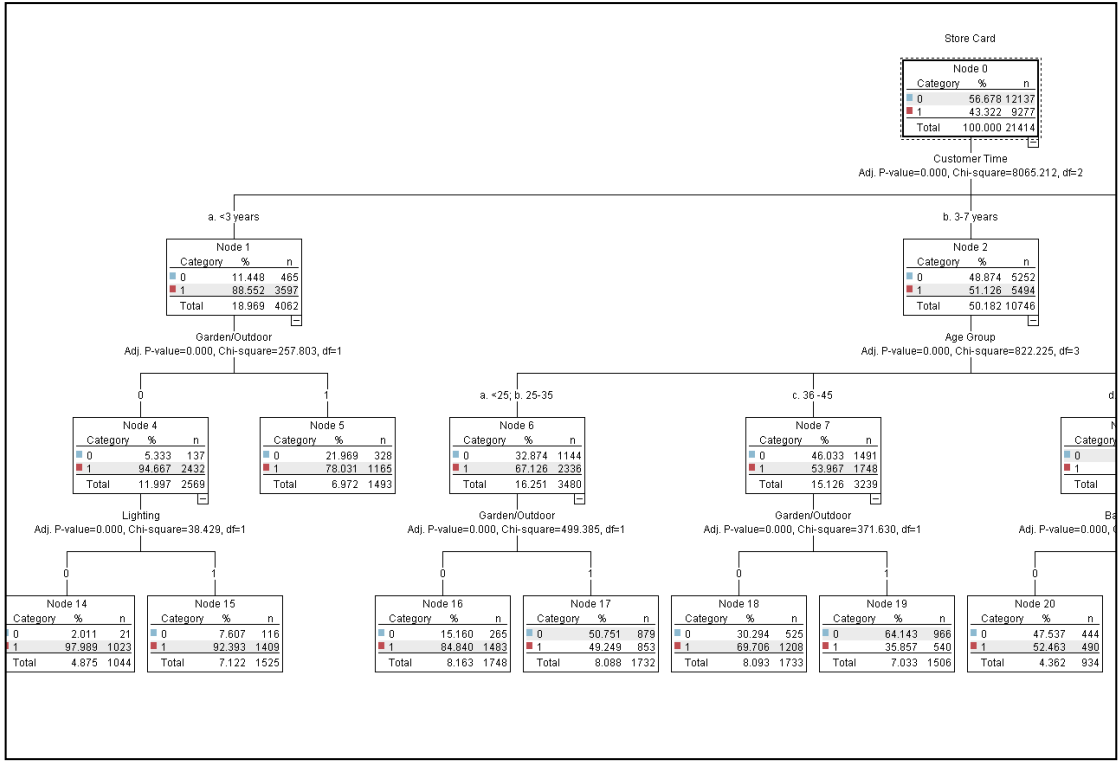
- Predictive Analytics uses historical data from many people/incidents
- Age, Gender, Average Spend, Product Category, Region, Tenure etc.
- With known outcomes/results
- Responded, upgraded, defaulted, recommended, cancelled, donated, failed, renewed etc.
- To build a reusable model

=



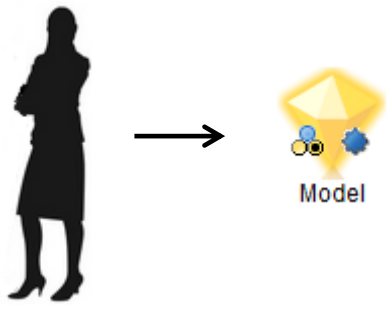
At the heart of Predictive Analytics is the model

- The resultant model is a *pattern or formula* that can be examined and tested
- Moreover, it can be treated as a *physical object*
- Or an important asset that can be deployed in a wide variety of ways before being archived



At the heart of Predictive Analytics is the model

- We can take new data from individuals or incidents…
- Age, gender, average spend, sentiment, tenure, time since last visit
- Using a model based on the same information…
- Generate probability values, likelihood scores and estimates
- In other words…..predictions



32% CHANCE OF CANCELLATION

Predicted Lifetime Value = £938

0.13 probability of defaulting

Estimated NPS = 6

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At the heart of Predictive Analytics is the model

- We can then deploy the predictions through multiple channels to make better decisions

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Demo: Association Modelling

What do we offer Anna?

- 31 years old
- Estimated income > £28K
- On average spends £26
- Usually pays with credit card
- Not eligible for discount offer
- In the last 6 weeks bought these items

What is the next most relevant product to offer her?

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What have we learned?

What do we (Smart Vision) talk about when we're discussing a prospective Predictive Analytics application?

1. Why do they want to do this?
2. What will it take to make it work?
3. What does 'good' look like?
4. How will we know it worked?

What do we <u>not</u> talk about when we're discussing a prospective Predictive Analytics application?

1. Algorithms

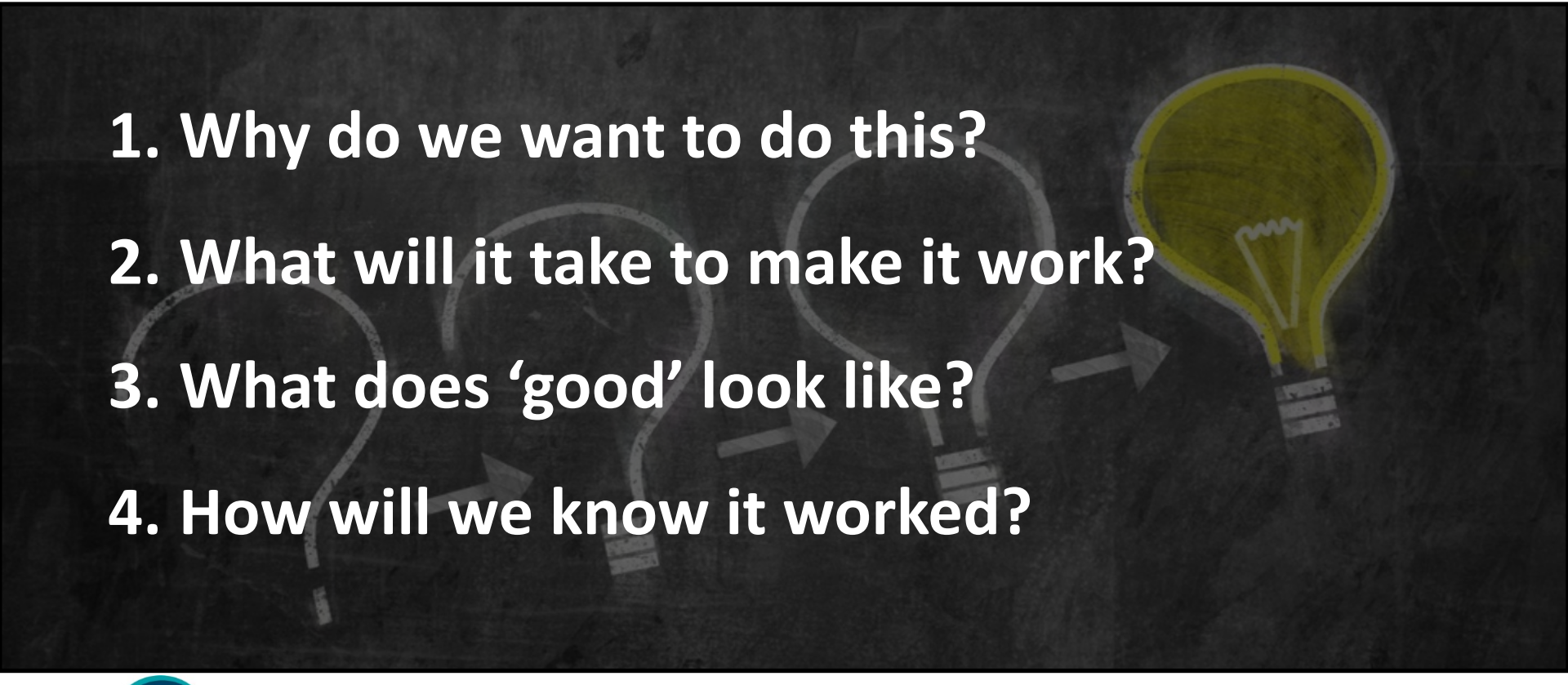
All the gear no idea

- Even big companies make the mistake of thinking that Predictive Analytics/AI is all about having more resources:
  - A new data science team
  - A cloud-based AI platform
  - The right kind of data storage/procession architecture

In collaboration with

- A 2020 report by **MIT Sloan** in collaboration with **BCG** confirmed what many industry insiders have known for years:
  - *only a small minority of companies manage to make their initial AI projects succeed*.
- Based on global survey of more than 3,000 managers and scholars in 29 industries, the authors discovered that ***a mere 11%*** of organisations saw significant financial benefits from their AI programmes.
- The report states AI challenges are not solved by "having the right data, technology, and talent, organized around a corporate strategy"
- Rather they require "large-scale organizational shifts in mindsets".

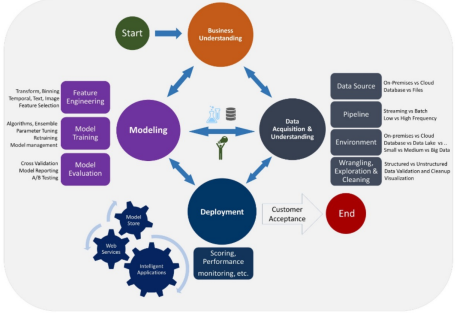
Start with a project…



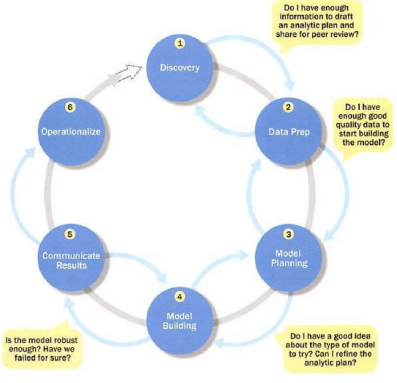
1. Why do we want to do this?
2. What will it take to make it work?
3. What does ‘good’ look like?
4. How will we know it worked?

There are a number of methodologies dedicated to advanced analytics

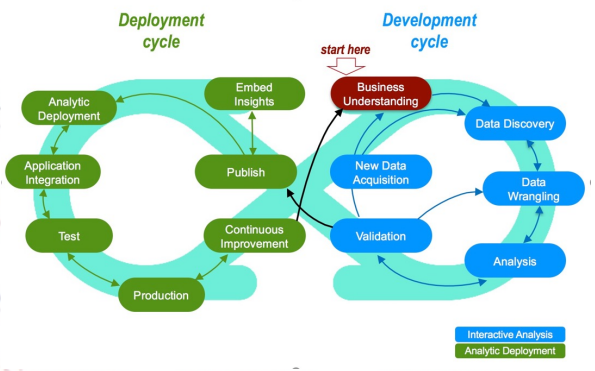
- Microsoft's Team Data Science Process (TDSP)

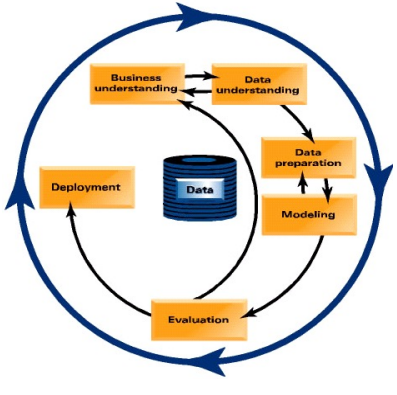


- EMC's Data Analytics Lifecycle



IBM's Analytics Solution Unified Method (ASUM-DM)





- Cross-Industry Standard Process for Data Mining (CRISP-DM)

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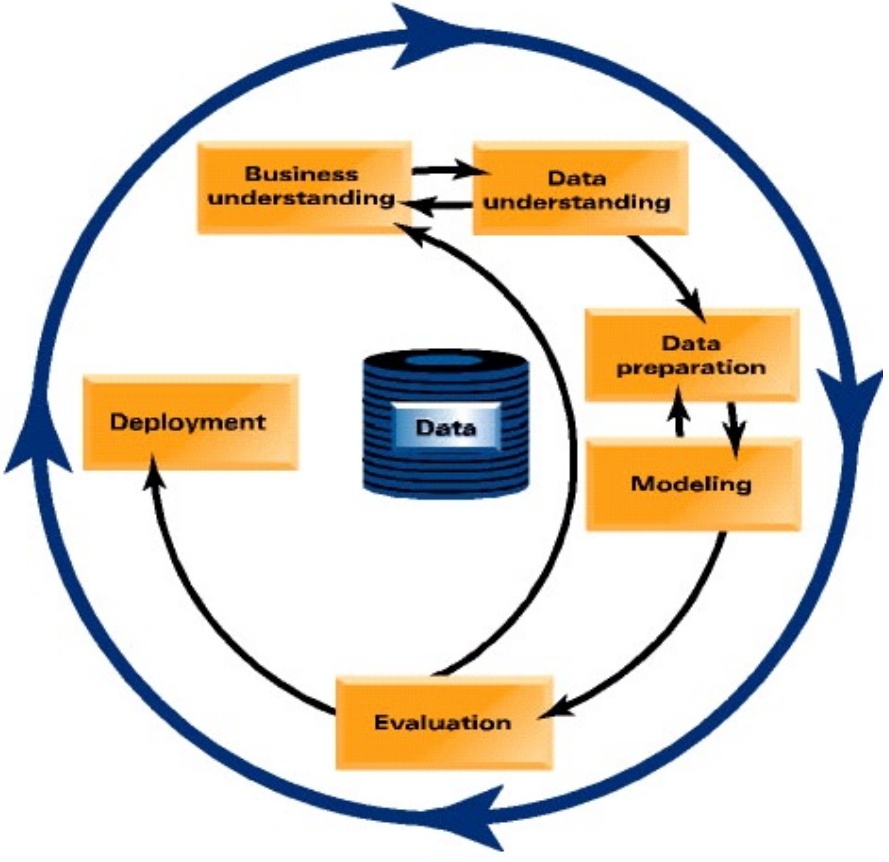
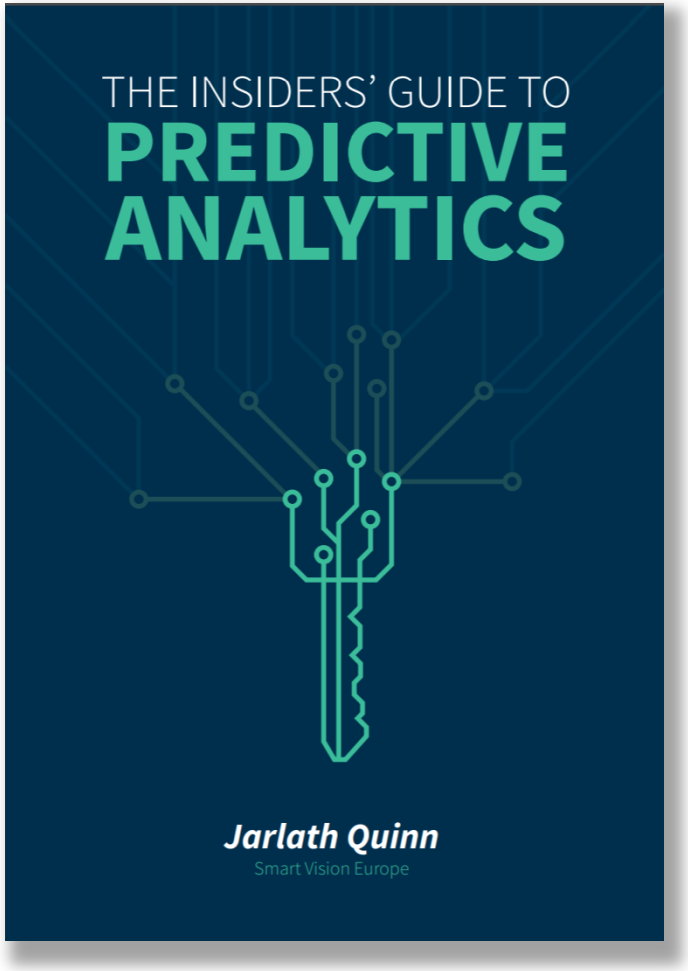
Think of them as route maps to successful deployment…

- CRISP-DM: Cross-Industry Standard Process for Data Mining
- Each application can be developed and progressed through a series of key phases
- http://crisp-dm.eu/



Download our new e-book for free



The insider's guide to predictive analytics

£0.00

- 1 + Add to basket

Category: books

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Working with Smart Vision Europe

- **Consulting Services**

Project Support

Purchase 1-2 days of consultancy time to have an expert work alongside you on your own project

Analytics Advice

Give us 3-5 days to investigate your data & analytical strategy and we'll present our recommendations re: improvements & alternatives

Analytical Deep-Dive

Let us explore your data landscape to test hypotheses, identify problem areas, find key outcome drivers or develop new applications

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- **Sourcing Software**
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  - Assist with selection, pilot, implementation & support of analytical tools
  - http://www.sv-europe.com/buy-spss-online/
- **Training**
  - Formal classroom/virtual training
  - Custom course development
  - Informal ‘bite-size’ training split over time
- **Advice and Support**
  - ‘No strings attached’ technical and business advice relating to analytics
  - Tracked technical support services around the IBM SPSS product line

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Thank you