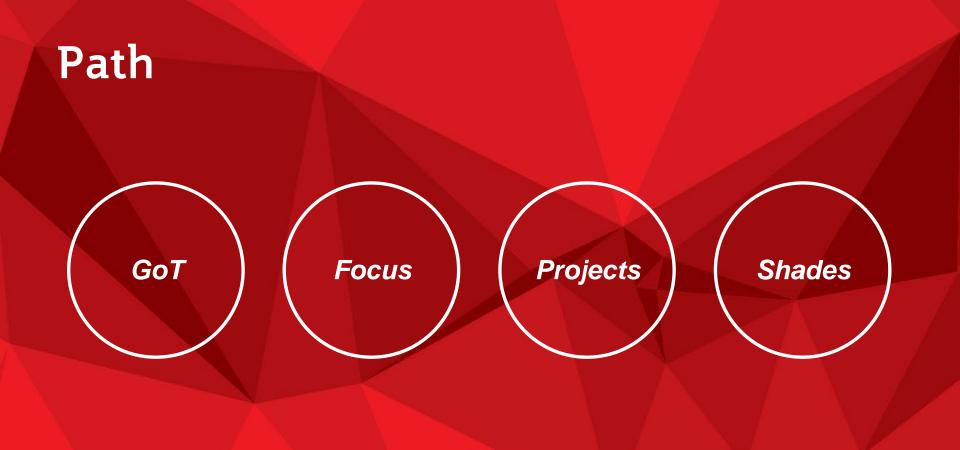


AdvAna and the Guru

Presented by CLANCY BIRRELL Advanced Analytics Manager, Office of Planning Services

The future's so bright I gotta wear shades





Glossary of terms

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· Not increased with the property line and And in case of the subscription of the subscri

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AdvAna – ADVanced ANAlytics



Descriptive:

Just the facts



Predictive:

Predict the future based on the past

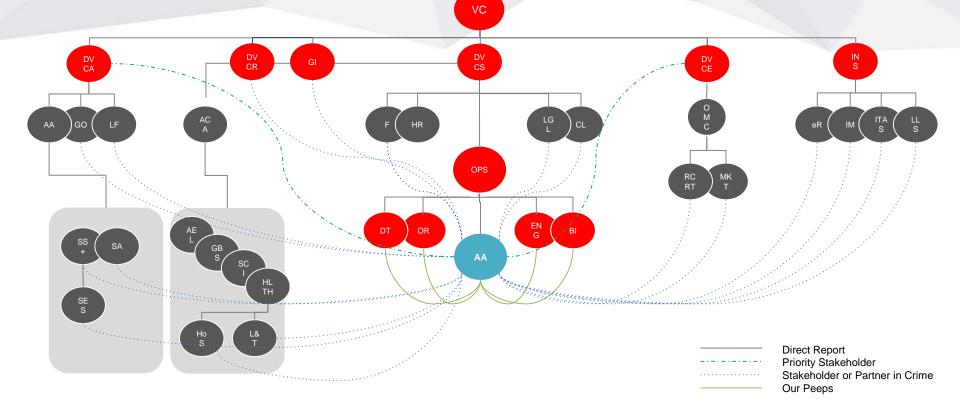


Prescriptive:

What happens if I push this shiny red button?



The world according to...



A word on Guru's

The gurus I have met personally, as well as those whose careers and teachings I have studied at a distance, range from crooks who could be quickly dismissed to teachers who were brilliant but flawed, to those who, while still human, seemed to possess so much compassion and clarity of mind that they were nearly flawless ... Sam Harris: Waking Up



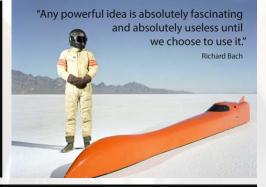
Therefore ~



Those who ignore Statistics are condemned to reinvent it.

— Bradley Efron —

AZQUOTES





"Without data you're just another person with an opinion."

> - W. Edwards Deming, Data Scientist



All models are wrong, but some are useful.

— George E. P. Box —

AZQUOTES

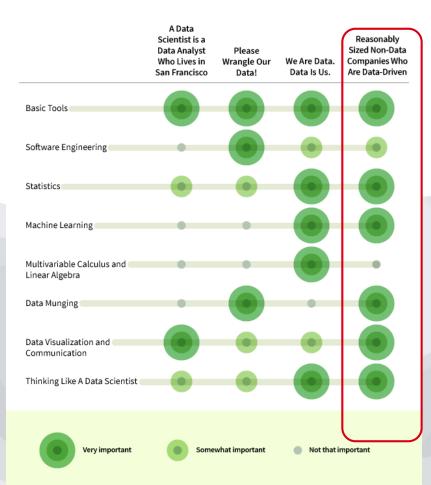


Applied statistics vs. data science





Accenture LLP [US] | https://www.accenture.com/us-en/blogs/blogs-the-difference-between-data-science-and-statistics





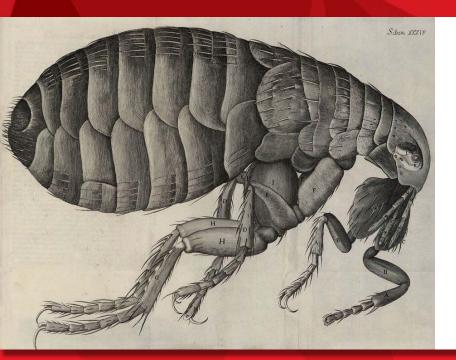
Applied statistics vs. data science

- Standard practice
- Accepted methods
- Pre built data
- Groomed data
- Simple data sources
- Pre built point and click tools
- Running fixed and well designed experiments
- Statistical inference
- German Engineering Style Rigour
- Long form reporting of results
- Usually single domain application
- Develop statistical analyses

- No standards
- Anything that works
- Data munging
- Messy all types of data
- Many sources
- Code slinging & data carpentry
- Experimenting any which way you can
- Some statistical inference but more focus on ROI and business results
- As required rigour
- Short form results, business style strategic summaries and agile results
- Cross domain
- Develop data products



Aaargh parasites!



- We don't exist without data!
- Low quality data = low quality analytics
- Limited access to data = limited analytics
- If the data don't exist we don't analyse it



But above all ~ It all starts with a well formulated question.





Student lifecycle











Recruitment

Application

Enrolment

1st Year

2nd Year



Office of Planning Services

Student **Lifetime Value Optimisation** Advan

STRATEGY ANALYSIS

Promotability Staff Retention Prediction HR Analytics

> **Funding Sensitivity Analysis Enterprise Retention Risk Research Project Expected Cost**

Recruitment

Demand Forecasting **Demand Analysis Demographic Mix Marketing Automation Uptake Prediction** Market Share **Campaign Optimisation**

Further Study Prediction Further Study Forecasting **Alumni Contribution Prediction** Industry Engagement Analytics Salary Prediction **Employment Prediction Time to Complete**

a

Intervention Efficacy **Program Transfer Rates Survey Analytics Student Engagement Metrics Comment Text Mining** Retention Risk **GPA** Prediction Studies

Admissions Demographic Mix **Behavioral Segmentation** Enrolment Optimization **Conversion Analysis Demand Forecasting Quality Analysis Comment Text Mining**

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Enrolment

Program Quality Monitoring **Program Demand Forecasting Course Demand Forecasting** Booking & Course Registration

Analytics Server

Enterprise Visual Analysis Tool

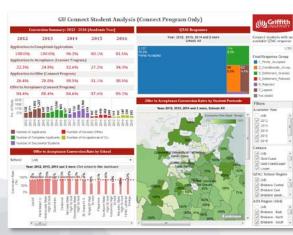
Student 360°

Data Lake

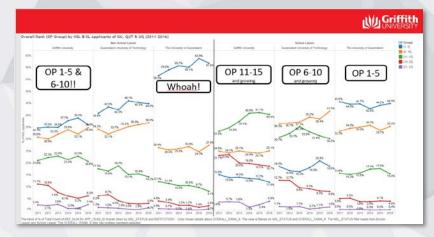




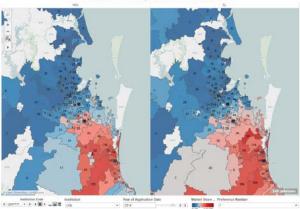
Recruitment



Student Academic Results (OP and OP Reprinstent)							Student Academic Results and Major Offer Round Catoff							Breat Chineses	1	
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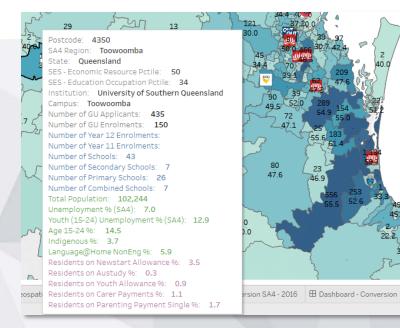


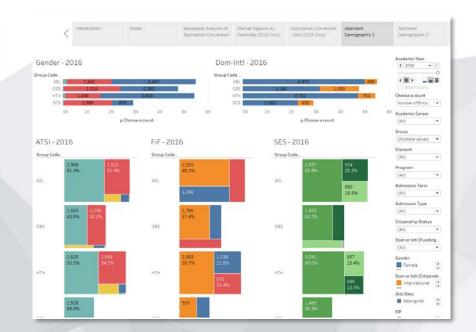
MAP: % of Post Code Per Institution by NSL Status - GRIFFITH UNIVERSITY, 2016





Application + Enrolment

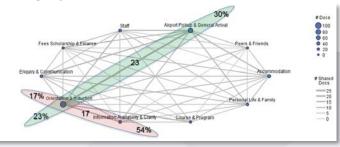




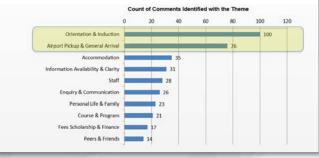


Application + Enrolment

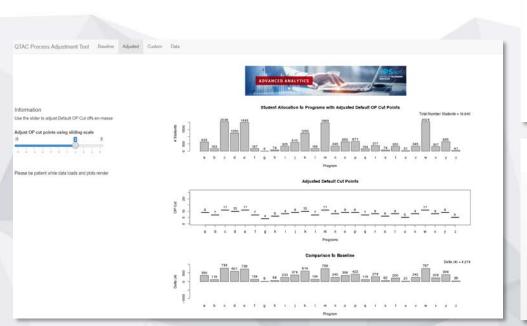
Category Web (Co-occurrence of Themes)



Top 10 Key Themes

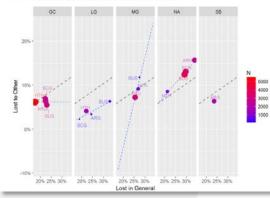




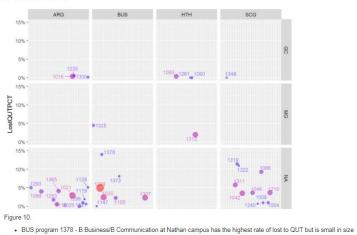


During studies

Q: What is the relationship between general loss of students vs lost to another institution?

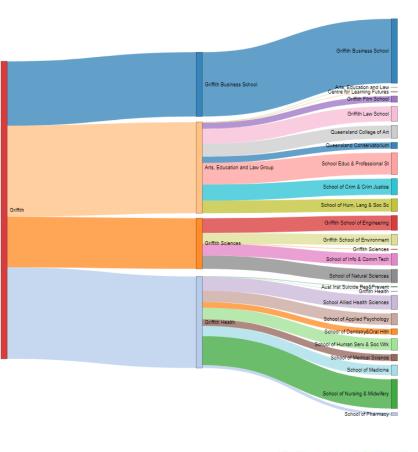


Prefer QUT



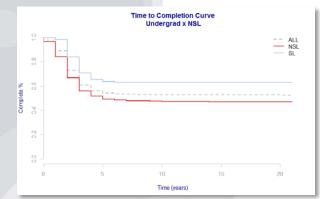
SCG at Nathan campus seem to reflect a higher rate of lost with QUT preferences than other groups or campuses

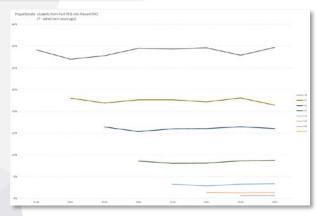




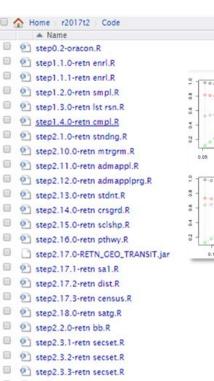




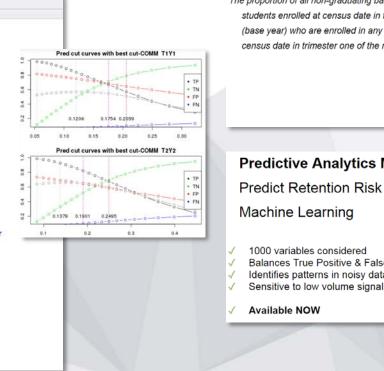




Retention



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Bachelor Degree Retention

The proportion of all non-graduating bachelor degree students enrolled at census date in trimester one of a year (base year) who are enrolled in any Griffith program at the census date in trimester one of the next year.



Target: To exceed the national average for student retention by 2017



Retention

Codding Law July **Actually Underliner** Owner Science intent of Names & Stated

RALSE B Criminalogy & Criminatore

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Academic Group	Academic School	Min %	Average % +	Median %	Mex %	N Students #
Arts. Education and Law Group	School of Hum, Lang & Soc Sc.	2.72%	2573%	23.87%	85.16%	45
Arts. Education and Law Group	School of Chim & Chim Justice	2.53%	22,73%	20.16%	65.50%	635
Criffith Health	School of Applied Psychology	3.50%	21.29%	15,06%	60.10%	
Driffeh Sciences	Griffen School of Environment	2.45%	20.27%	1E 85%	71.00%	433
Criffith Sciences	School of Info & Comm Tech	2.33%	20.08%	18.20%	63.44%	35
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1 2 3 4	<pre>#f(!require(glmnet))(install.packages('glmnet'));require(glmnet) if(!require(doMC))(install.packages('doMC'));require(doMC) registerDoMC(cores=15)</pre>	
	######################################	
	s <- Svs.time()	
	<pre>modCOMM1 <- cv.glmnet(y=yCOMM1,x = mmCOMM, alpha=1,family='binomial',parallel=T, nfolds=30,type.measure='auc')</pre>	
	ModelMetrics::auc(yCOMM1, predict(modCOMM1, mmCOMM, type='response',s='lambda.1se'))	
11	Sys.time() - s	
12		
	s <- Sys.time()	
	<pre>modCOMM2 <- cv.glmnet(y=yCOMM2,x = mmCOMM, alpha=1,family='binomial',parallel=T, nfolds=30,type.measure='auc')</pre>	
	ModelMetrics::auc(yCOMM2, predict(modCOMM2, mmCOMM, type='response',s='lambda.1se'))	
	Sys.time() - s	
17		

	# get preds	
	<pre>ptest1 <- predict(modCONM1,mmCONM,type='response',s='lambda.1se')</pre>	
21	<pre>ptest2 <- predict(modCOMM2,mmCOMM, type='response',s='lambda.lse')</pre>	
22		
25	<pre>(p_actual = prop.table(table(yCOMM1))[2]) actual <- vCOMM1</pre>	
	results <- data.frame('actual'=actual, 'pred'=ptest1, 'pred class' = ptest1>=p actual)	
	names(results) <- c('actual', 'pred', 'pred', 'prec class')	
	table(results[,1], results[,3])	
	####	
29	# View ROCS	
	source('./Modelling/UGRD/ROCPLOTTER.R')	
31		
	par(mfrow=c(1,2))	
	ROCPLOTTER(yCOMM1, ptest1, 'ROC T1Y1 Commencing')	
	ROCPLOTTER(yCOMM2, ptest2, 'ROC T2Y2 Commencing')	
35	<pre>par(mfrow=c(1,1))</pre>	

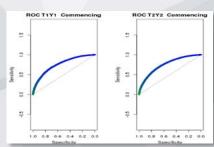
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Analytics server



...about those

shades



Employability

Possibilities:

- Statistical Learning
- Machine Learning Predictions
- Cluster Segmentation
- Support operational intervention testing

What is it?

Measured by Employability Rate

Graduate Outcome Survey

4 Months from Graduation Date

Factors

- 1) Graduates who are full time employed
- 2) Graduates who are available to be full time employed

Under the assumption:

Number of graduates in Full Time Employment Number of graduates in **Available** for Full Time Employment

71.2 62.6

Full time Employed %

comparative measure that represents graduate *population* Employability Rate

Levers

Results are influenced by a few things, some of which are

Population Employability Rates differ per FoE, and

- Griffith FoE mix is different for both
- 1) Responders
- 2) Full Time Employed

These two things are not equal and have different impacts

Employment rate in QLD, Brisbane & Gold Coast Vs. other states and capital cities

Work readiness of our graduates



graduate outcomes



Enterprise data visualisation

b

There'll be no one to stop us this time.

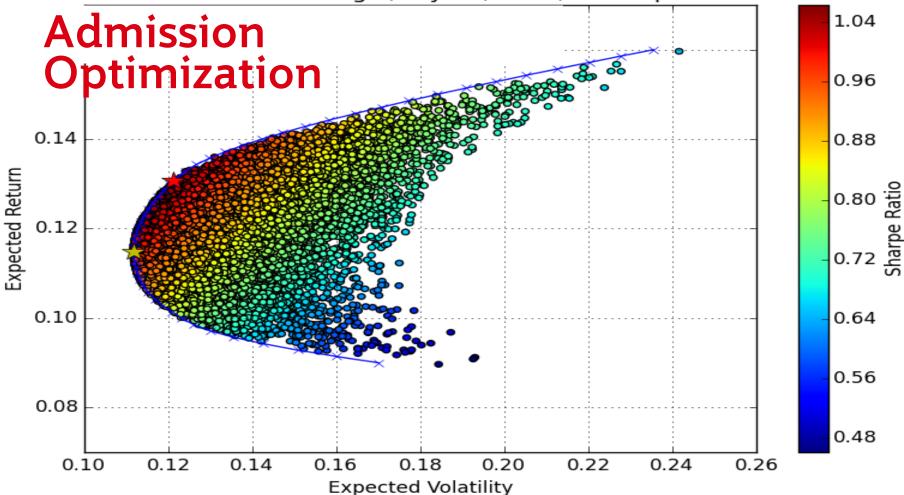


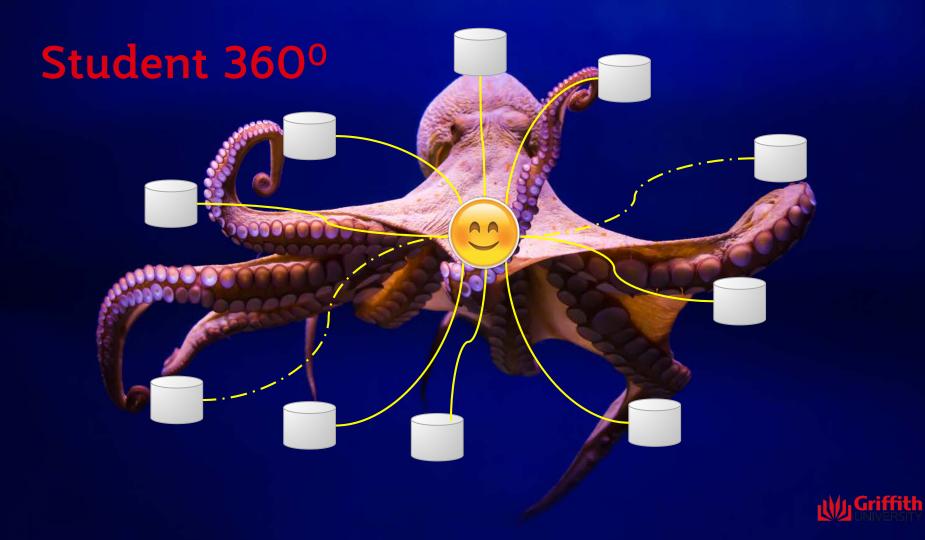
Data Lake



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Success measures

GPA prediction

PGRD Conversion Probability

RSCH Conversion Probability

Research Success Predictions:

- Publications,
- Time to Complete,
- Grant \$'s





Student Lifetime Value

Research Project Expected Cost



HR Analytics

Promotability

Retention: Pre and Post Hire

Future Salary

Fraud



So much to do...



What is the path, past, present, future of analytics nirvana at griffith

Where Clancy takes us through the hopes, tears, fears and findings from the OPS Advanced Analytics team with examples of real life products, projects and future possibilities.

Clancy is an Applied Statistician/Data Scientist. He has experience in all data analytics paradigms and extensive data mining experience. He has qualifications in mathematics, statistics, machine learning and data science.

You'll get a taste of the practical every day application of advanced analytics @ Griffith as well as some dreamy stuff that we'd like to be doing in the future.

What is Data Science, What is Descriptive, Predictive & Prescriptive Analytics?

Is deep learning or big data on our dance card?

What about AI?

What are the questions at Griffith that Analytics can help answer, the big and the not so big?

Office of Planning Services





THANK YOU



CLANCY BIRRELL Advanced Analytics Manager, Office of Planning Services

+61 7 3735 8073 | clancy.birrell@griffith.edu.au