Estimating success of (own) and competitor's new products with pre-release buzz

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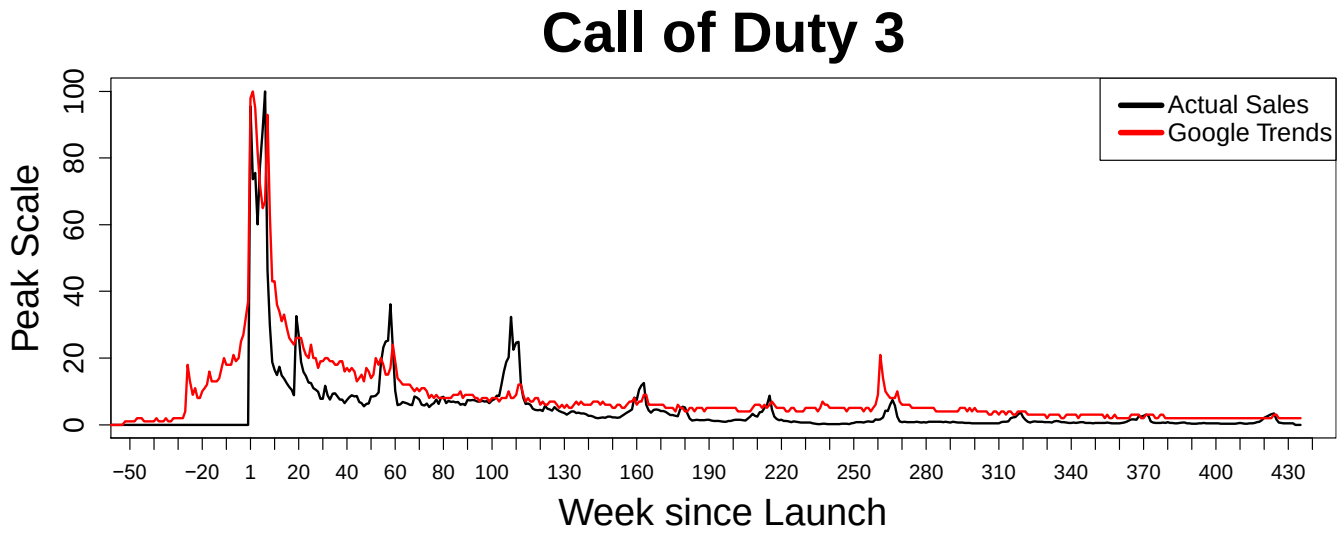
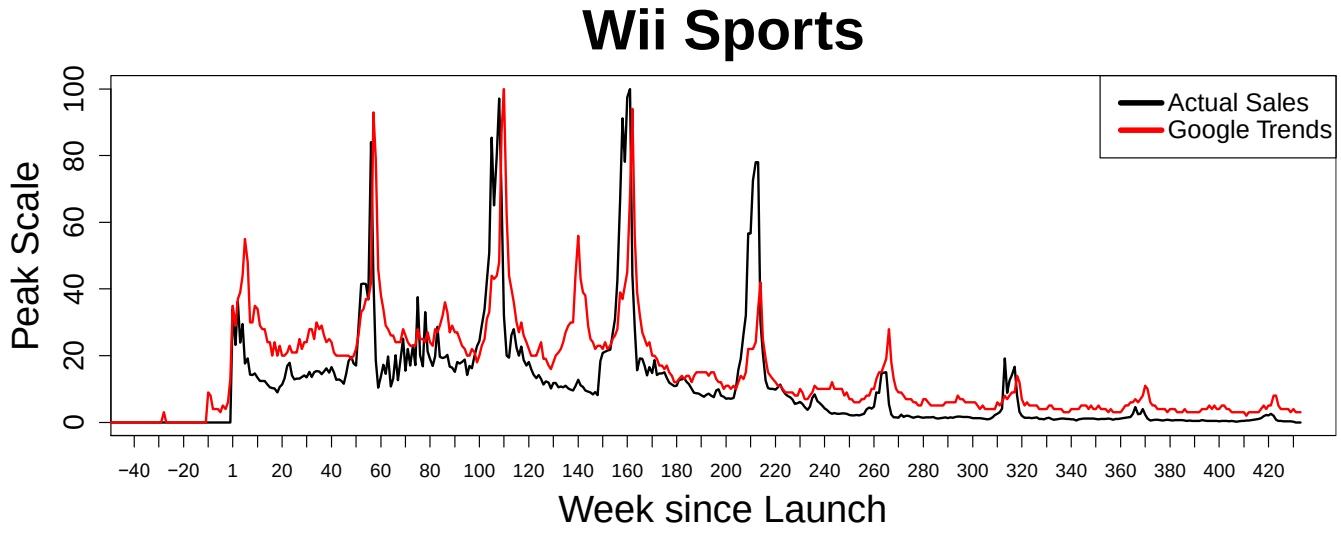
Do you know your competitor?

… they might know you already!

Google Trends data vs actual sales





→ Search traffic information available public!

Do you know your competitor?

User-generated information about competitor products can provide vital information to your business (e.g. He et al. 2015; Kim et al. 2016)

- Studies that include competitor intelligence from user-generated content only descriptive

One important event is the introduction of a own or competitor new product

- pre-launch forecasting challenging (Goodwin et al. 2014)
- Research suggests pre-release buzz (PRB) to be helpful

→ Interesting for competitor intelligence?

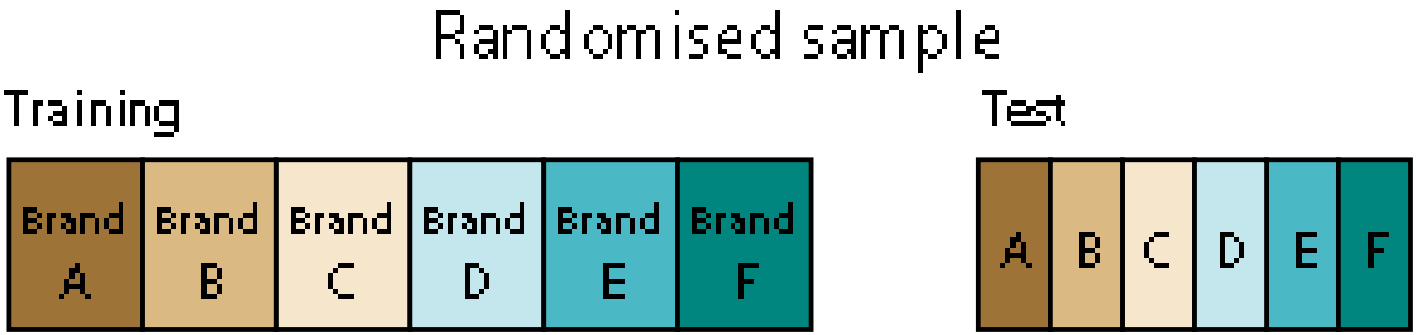
Forecasting with pre-release buzz

Study	Target variable	online source*	Measure	Brand variable	Intra-brand estimation	hold-out sample	Horizon†
Liu (2006)	Box office sales	FOM	Vol.; Val.			-	1 w
Dhar and Chang (2009)	Music album sales	BLG	Vol.			-	3 w
Foutz and Jank (2010)	Box office sales	VSX	-	x		x-brands	1 w
Asur and Huberman (2010)	Box office sales	TWR	Vol.; Val.			-	1 d
Wang et al. (2010)	Box office sales	FOM	Vol.			x-brands	2 w
Hann et al. (2011)	Music album sales	P2P	-			x-brands	1 w
Mülbacher et al. (2011)	Ski sales	FOM	Vol.; Val.			-	1 y
Kulkarni et al. (2012)	Box office sales	GTD	Vol.			x-brands	1 w
Onishi and Manchanda (2012)	Box office sales	BLG	Vol.; Val.	x		x-brands	1 d
	Cell phone service	BLG	Vol.; Val.	x		x-brands	1 d
Tian et al. (2014)	Box office sales	BAU	Vol.			x-brands	1 d
Xiong and Bharadwaj (2014)	Video game sales	BLG; FOM; GTD	Vol.			x-brands	3 w
Craig et al. (2015)	Box office sales	FOM	Vol.			-	1 w
Gelper et al. (2015)	Box office sales	TWR	Vol.; Val.			x-brands	1 d
Kim et al. (2015)	Box office sales	BLG	Vol.			x-brands	1 w
Ding et al. (2017)	Box office sales	FBK	Vol.			-	1 w
Divakaran et al. (2017)	Box office sales	BLG	Vol.			x-brands	1 w
Kim and Hanssens (2017)	Box office sales	GTD; BLG	Vol.; Vol.			x-brands	1 w
Schaer et al. (2019)	Video game sales	GTD	Vol.		x	i-brand	52 w
This study	Video game sales	GTD	Vol.	x	x	competitor	52 w

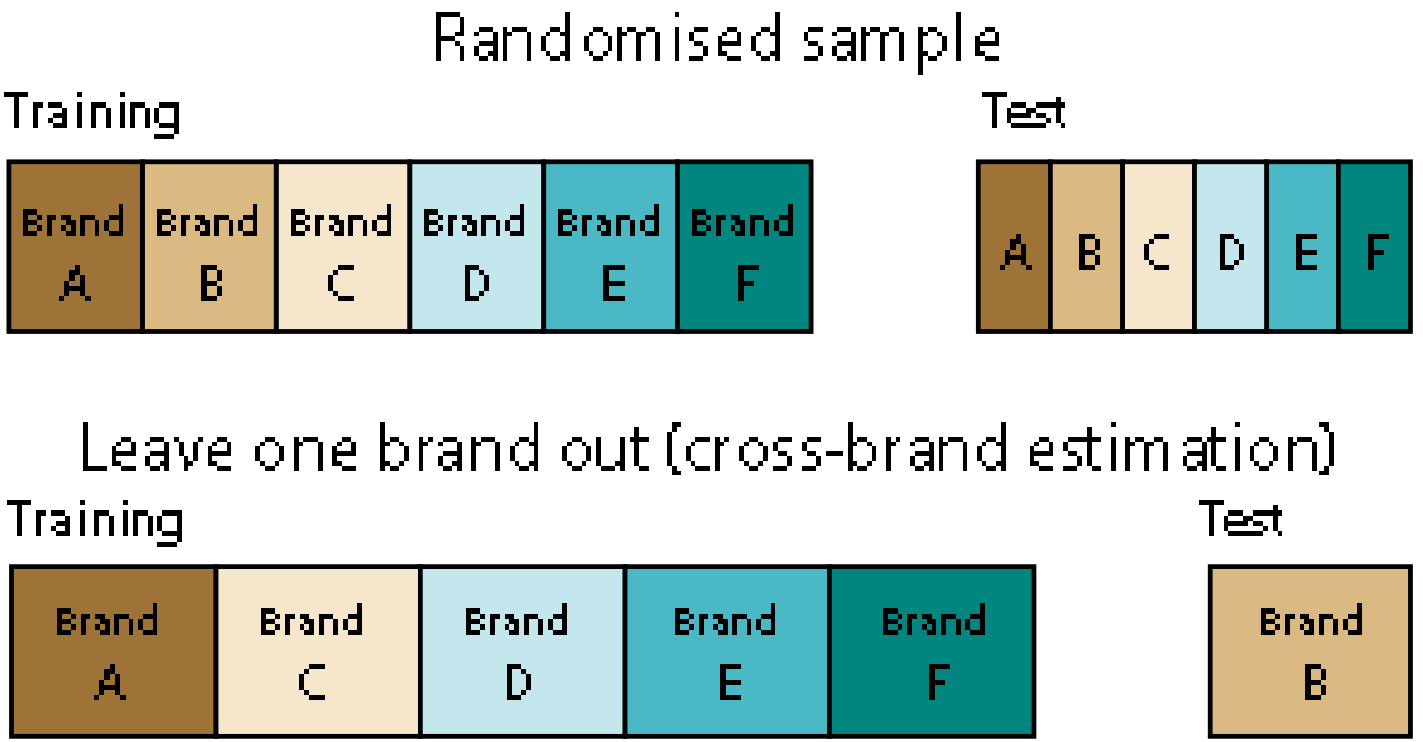
* BAU = Baidu, BLG = Blog, FBK = Facebook, FOM = Forum, GTD = Google Trends, P2P = Peer-to-Peer Network, TWR = Twitter, VSX = Virtual Stock Exchange;

† d = days, w = weeks, m = months, y = year.

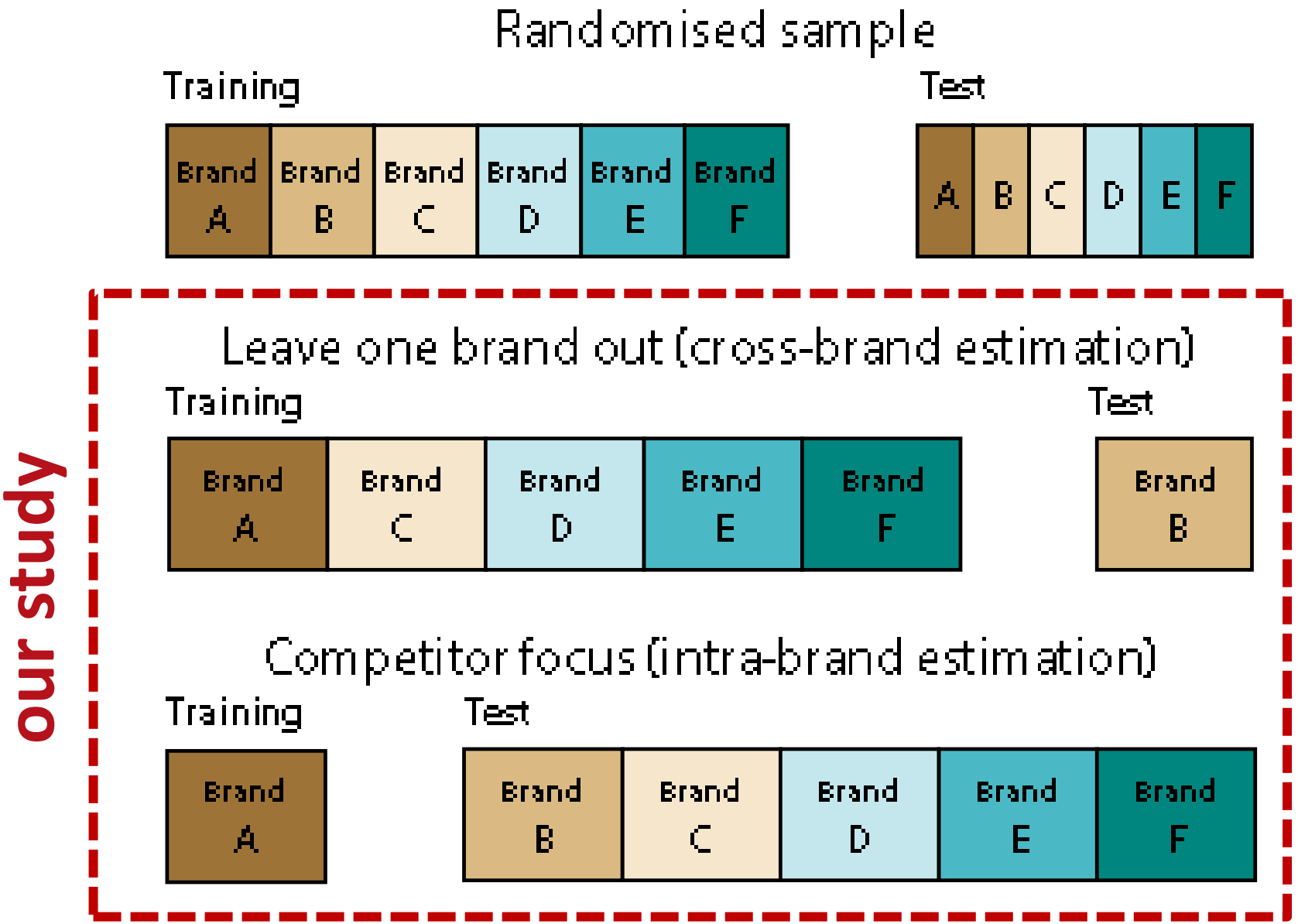
Different ways of splitting sample



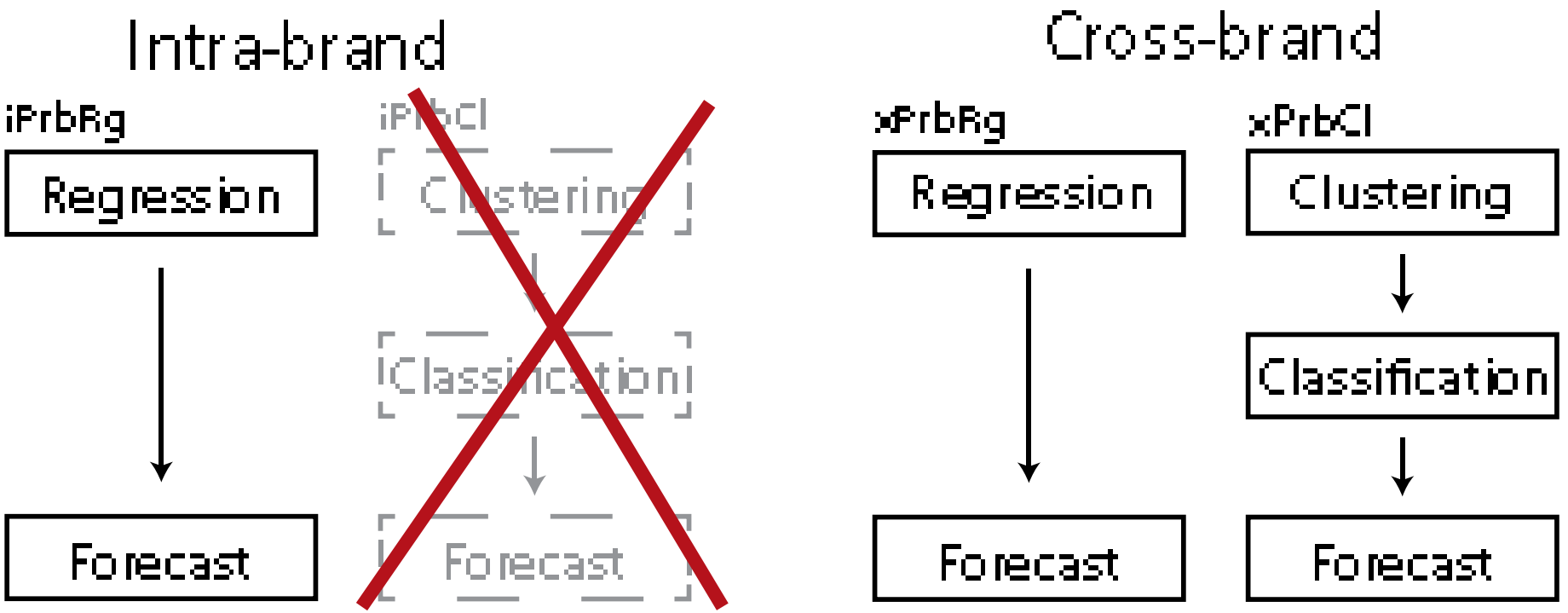
Different ways of splitting sample



Different ways of splitting sample



Possible ways to generate forecasts



Does Pre-release buzz add predictive value on estimating the product of competitor products?

Empirical evaluation

Dataset

- Global physical video game sales of 240 popular video games from VGChartz consisting of 23 publishers

Training & testing		Testing only	
Publisher	# Games	Publisher	# Games
Capcom	16	Level 5	1
Nintendo	18	Codemasters	2
Ubisoft	30	Bethesda Softworks	3
Electronic Arts	61	Eidos Interactive	1
Take-Two Interactive	24	Square Enix	1
Activision	23	Valve	1
Microsoft Game Studios	13	Spike	2
Sega	8	Konami Digital Entertainment	6
Sony	7	MTV Games	1
THQ	14	Deep Silver	1
		Namco Bandai Games	2
		From Software	1
		WB Games	4

- Re-scaled weekly Google Trends data
  - Topic search on game title

Features overview

	Prediction models			
	Regression		Clustering	
Features class	Prb	Pct	Classifier	Clustering
PRB features				
Volume	x	-	x	x
Buzz start	x	-	x	x
Trend	x	-	x	x
Bass par.	x	-	x	x
PCA	x	-	x	x
Product features				
Sales	-	-	-	x
Adoption	-	-	-	x
Gompertz par.	-	-	-	x
Reviews	-	-	-	x
Release November	x	x	x	x
Genre	x	x	x	x
# Sequel	x	x	x	x

we consider PRB from 1 to 26 weeks prior to release

Model estimation and benchmarking

Regression (Rg)	Clustering (Cl)
Cross-validated Random Forest	Gower dissimilarity measure
Point forecasts	K-Medoids clustering (PAM)
	CV Random Forest classification
	Forecasts from cluster centroids

Benchmarks for intra-brand (i) and cross-brand (x)

- Product features only (iPctRg & xPctRg)
- Median of sample sales (iSlsMd & xSlsMd)

Geometric Relative Absolute Error (GMRAE) against iPctRG

$$\mathrm{GMRAE}_{i,h} = \sqrt[n]{\prod_{i=1}^{n}\left(\frac{\mathrm{AE}_{i,r}}{\mathrm{AE}_{i,b}}\right)},$$

$$\mathrm{AE}_{i,h} = \left|\hat{y}_{i,t+h} - y_{i,t+h}\right|,$$

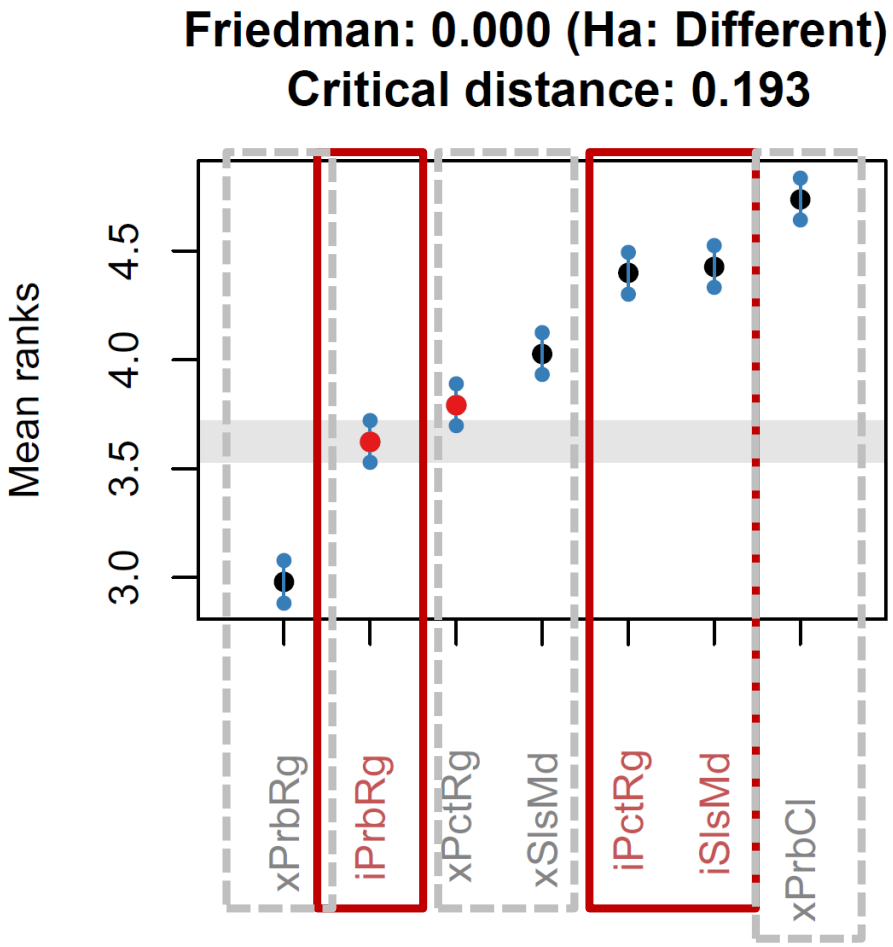
- ✓ Direct comparison against benchmark
- ✓ Scale independent
- ✓ Relatively robust against outliers

Performance against intra-brand benchmark (iPct)

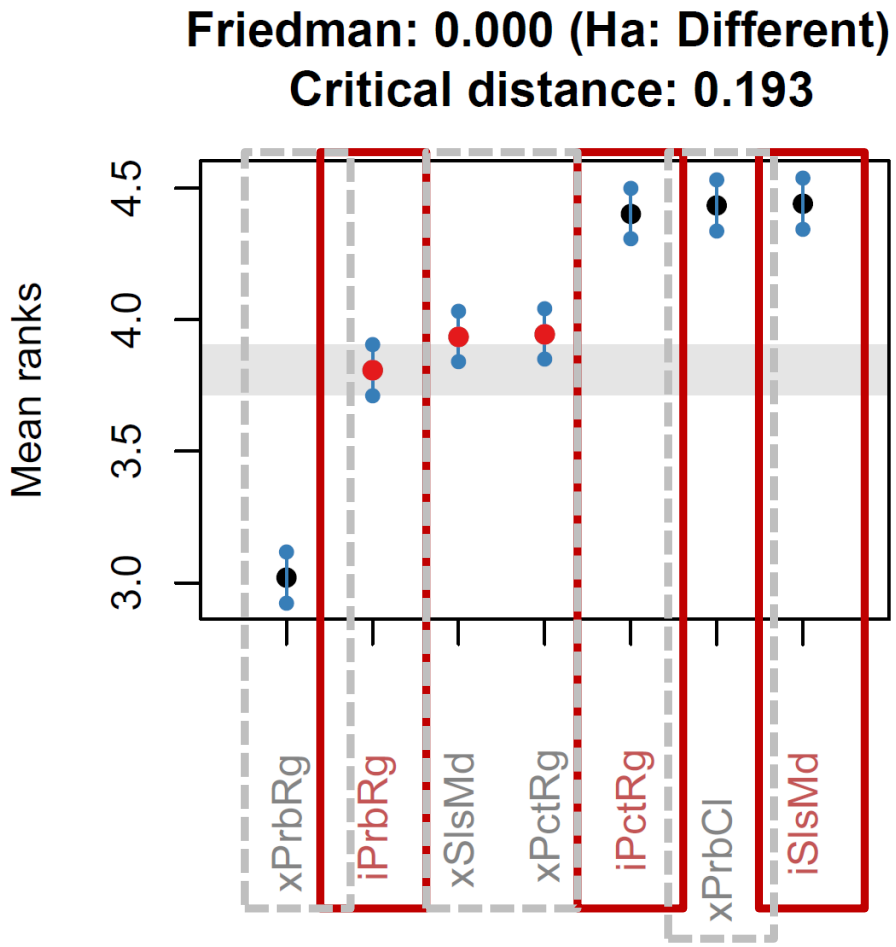
Modeltype			Forecast horizon	
s	d	e	First Week (FW)	End-of-Life (EoL)
i	Prb	Rg	**0.766**	**0.810**
i	Pct	Rg	1.000	1.000
i	Sls	Md	1.083	1.026
x	Prb	Rg	**0.562**	**0.567**
x	Prb	Cl	1.474	1.056
x	Pct	Rg	0.830	0.884
x	Sls	Md	0.931	0.869

[s] i = intra-brand, x = cross-brands
[d] Prb = PRB feat., Pct = Product feat., Sls = Sales only
[e] Rg = Regression, Cl = Clustering, Md = Median

Friedman Nemenyi test



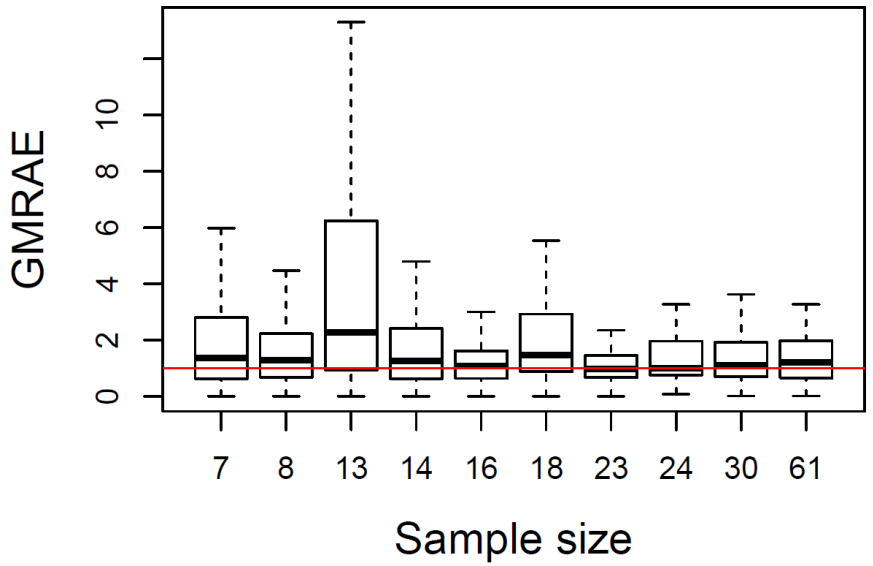
(a) First week sales



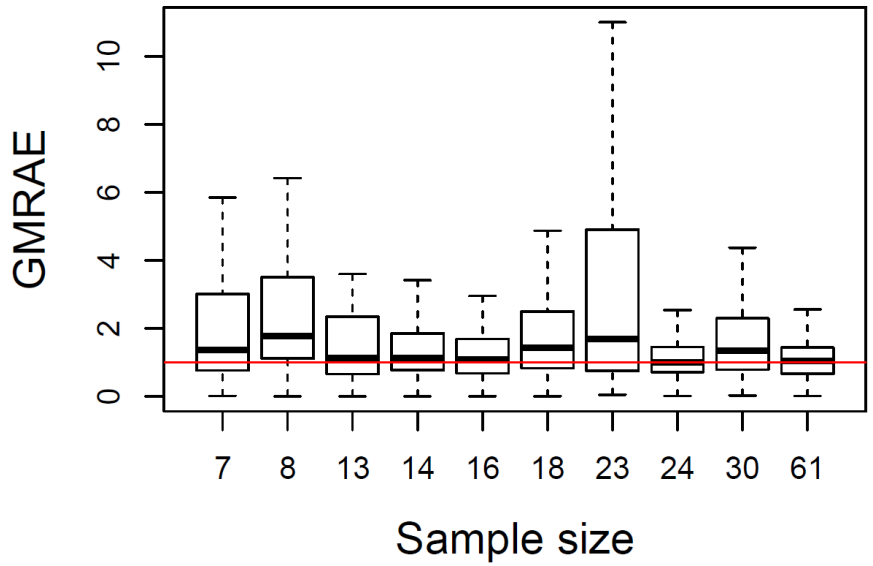
(b) End-of-life sales

→ competitor PRB significantly improves over any internal source

Sample size impact (against xPrbRg)



(a) First week sales



(b) End-of-life sales

→ No direct impact of sample size visible if compared against Prb with cross- brands (full sample)

Conclusion

Competitor PRB signals add value:

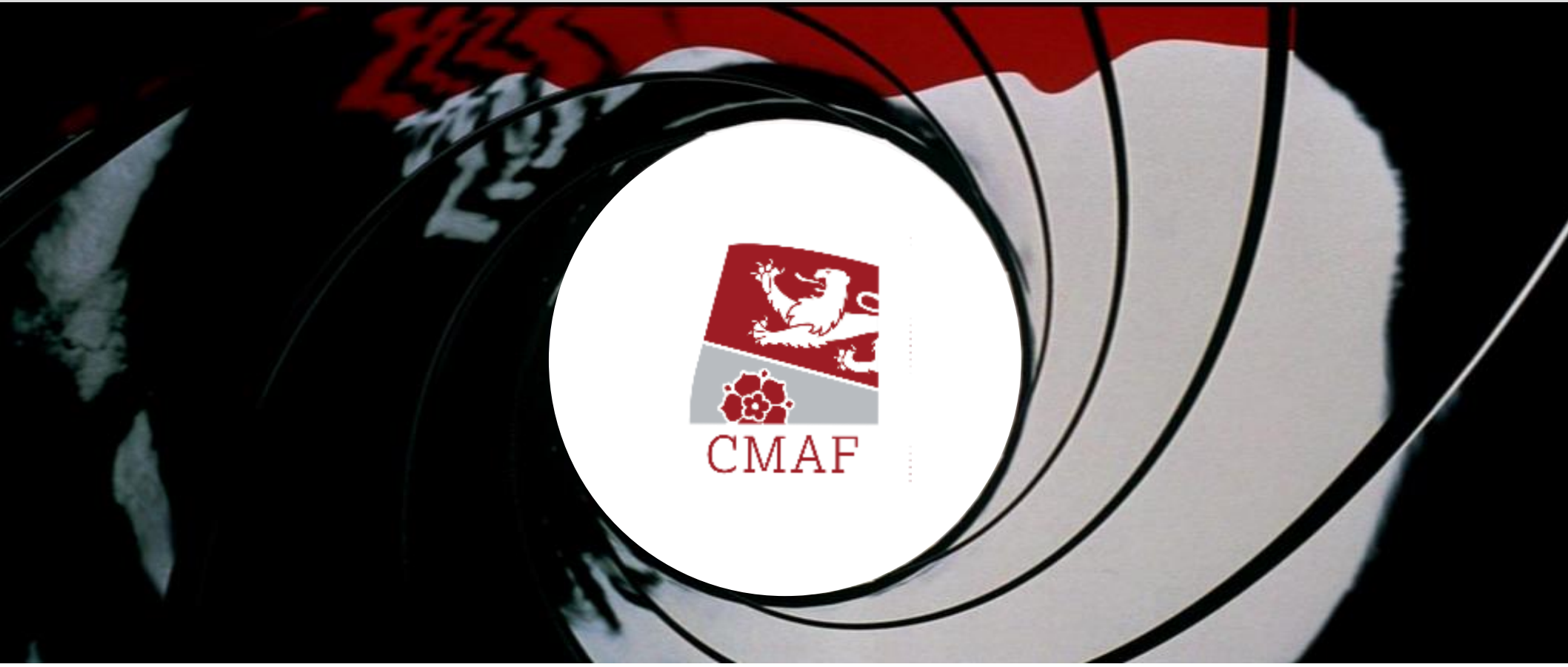
- when combined with internal sales information
- no performance impact from sample size
- on video games data clustering does not add value

Free and easy to access source of competitive intelligence that allows to take protective actions against new product launches prior to launch!

Since there is predictive value further research

- to test suitability for market response model
- explore different markets if predictive value holds

Thank you!



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