What's new in forecasting software?

Oliver Schaer
with Robert Fildes, Ivan Svetunkov & Alisa Yusupova

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Marketing Analytics and Forecasting
Lancaster University Management School
University of Virginia
Darden School of Business

The foundation of this talk

ORMS TODAY
informs
25TH ANNIVERSARY
NEWS FEATURES PODCASTS

Survey: What's new in forecasting software?

The process of evaluating the right software for a company can be challenging and very specific.

By Robert Fildes, Oliver Schaer, Ivan Svetunkov, Alisa Yusupova

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Background on the ORMS-Today survey

Longstanding biannual-survey

Chance for software vendors to present themselves to the OR/MS-community for free

Aims to provide

- an overview on what is out there;
- sense the product functionality;
- and identify developments in the market.

What it does not provide

- No product assessment

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Data collection process

Major survey redesign

- Very valuable feedback from vendors on initial drafts

Survey covers a range of subjects including

- Data handling & connectivity
- Forecasting features
- Support & licensing
- Recent changes and future trends in the market

Identified and contacted 200+ forecasting vendors via e-mail or web form (full list in the online appendix)

32 forecasting products included to date

45% represent general-purpose forecasting software

- Remainder specialised software, e.g. on inventory management or energy forecasting

Adexa Predictive Analytics	Fuse Inventory	Prophecy
Alyuda Forecaster XL	FutureMargin	RastPro
Analytica	gretl	SAS Energy Forecasting
Arkieva	iData	SAS Forecast Server
Autobox	iqast forecast desktop/server	SAS Visual Forecasting
Azure Auto ML	Minitab Statistical Software	Optimact
Cognira Retail Science Platform	Nominator	Stata
Dataiku Data Science Studio	NumXL	Tangent Information Modeller
Evo	SigmaXL version 9	The Finished Goods Series
FC+	Optimal Economist	Unified Demand Forecasting
Forecast Pro	Optimal Scientist	

contact cmaf@lancaster.ac.uk to add your software or be notified when the next survey starts

CURRENT STATE OF FORECASTING SOFTWARE

Changes in software build and distribution

Modular software design

- More flexible and customer oriented software design
- General-purpose becoming specialised software

Substantial increase in Software as a Service (SAAS)

- Easier to maintain (on both ends)
- Ability to scale infrastructure
- Downside: dependency from service provider

Changes in software build and distribution

High database connectivity in most solutions

- Local data warehouse, Big Data frameworks (e.g. SPARK or Hadoop) or cloud data centers (Google BigQuery)
- More support for open data-formats

Two-third of software integrate with ERP systems

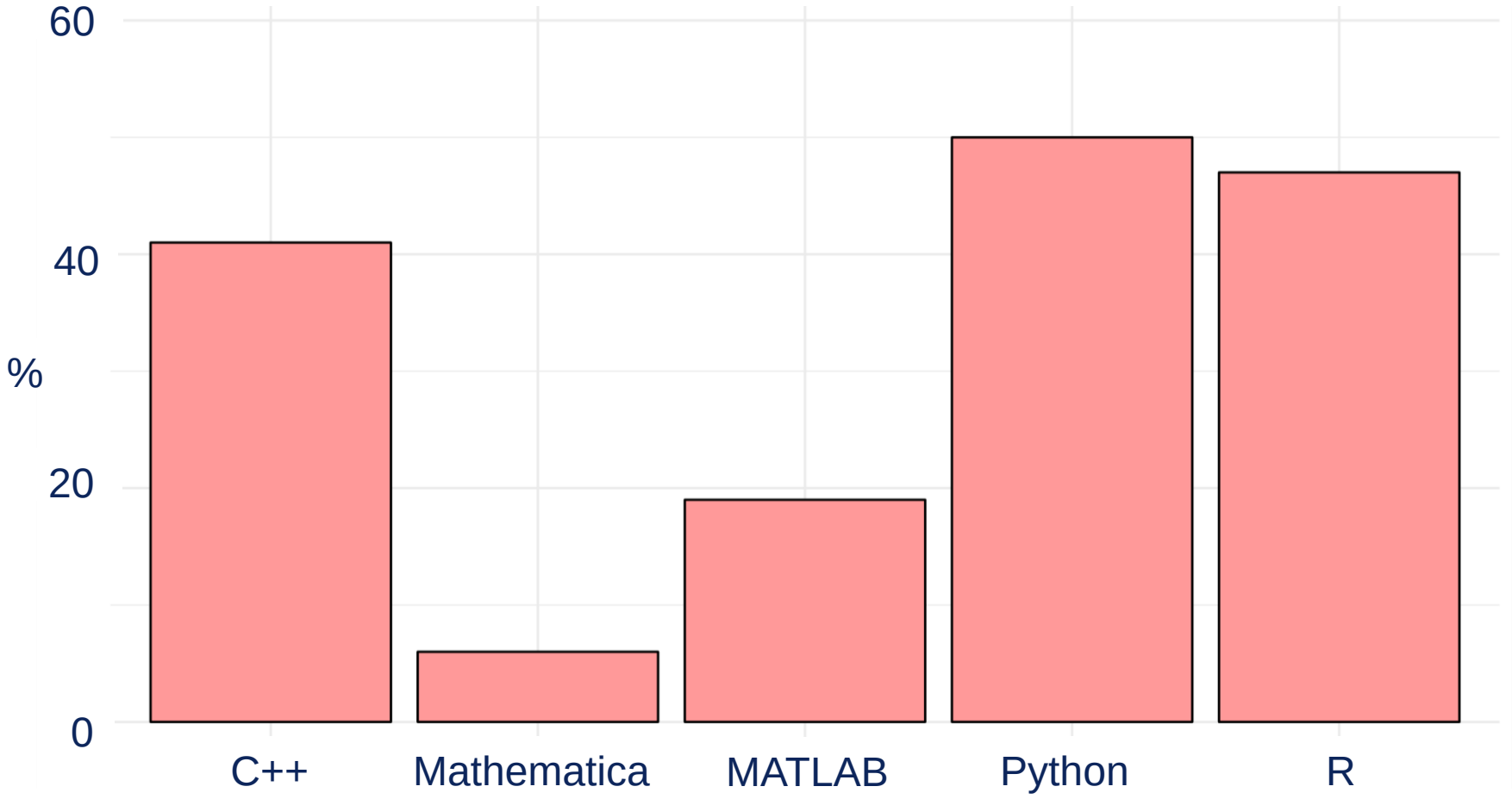
Focus of updates outside forecasting algorithms

- Collaborative features;
- Graphical user interface improvements (e.g. Code editor & Data visualization)

Software became multilingual

Integration with other programming languages

- Enables access to a larger pool of algorithms



Out-of-the-box forecasting functionality

Most software solutions support:

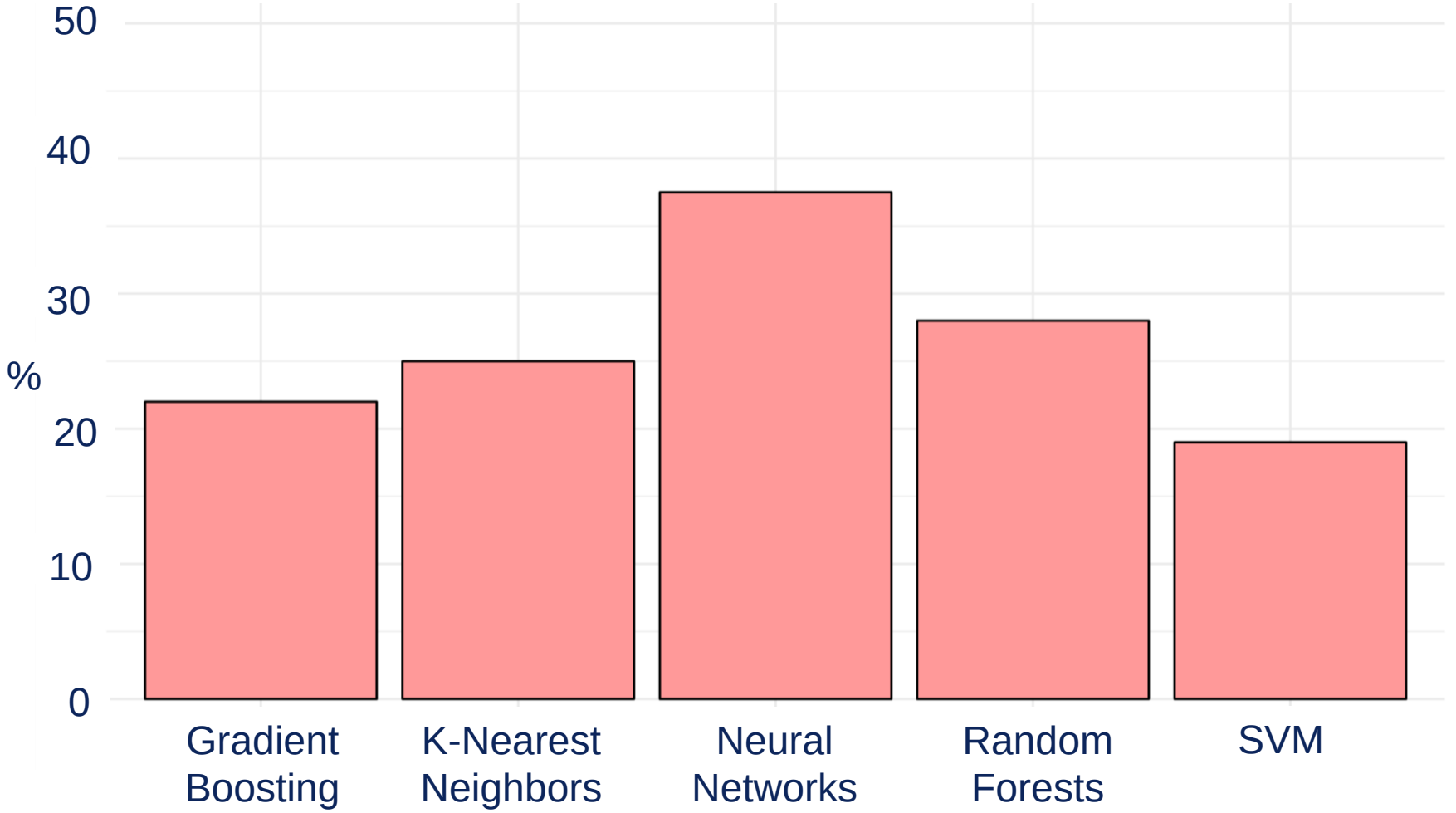
- standard univariate time-series methods, e.g. ARIMA or exponential smoothing;
- multiple linear regression.

Two-third of the products allow:

- ad-hoc judgmental adjustments;
- new product forecasting

Out-of-the-box forecasting functionality

Increase in availability of ML and AI algorithms



What is missing in forecasting functionality?

Forecast evaluation remains a problem area

- Rolling evaluation is not available in 1/3- of solutions
- Only about half of the solutions include a Random Walk
- 1 in 3 products do not track statistical forecasts and expert corrections

What is missing in forecasting functionality?

Algorithms

- Absence of LASSO and other regularization techniques
- Some inventory management software lack the support of certain distributions suited for intermittent demand

Specialised time-series visualisation not available but often covered in external software

What else makes forecasting software different?

Functionality to support data protection law regulations (GDPR etc.) not available widely

Only half of the responses included details on cloud quality standards

- Uptime, IT security and accessibility standards

Training and support

- Free support limited
- Basic support vs. in-house forecasting experts
- Service Level Agreement up to Forecast as a Service

Summary on survey

Traditional forecasting USP are disappearing

- More flexible software design
- Increase in data connectivity and software integration
- Integration of open-source software

Higher weight on traditional IT factors

- Service level agreement and data security
- Price

Soft factors

- Technical support & training
- Look and feel?

THE FUTURE OF FORECASTING SOFTWARE

The role of the customer in software development

Often new algorithms get only implemented if there is substantial demand for it

- Competition results generate a buzz → LightGBM
- Open-source packages can popularize new algorithms

In some cases users seem to be reluctant to adopt certain features, e.g. prediction intervals

Industry collaborations with academia to develop new forecasting methods (contact cmaf@lancaster.ac.uk)

Future trends to impact software market

Impact of Big Data

- Increase in volume and velocity propels automation
- Allows estimating more complex product interactions

Impact of COVID-19

- Ability to apply judgmental interventions
- Automated anomaly detection

More machine learning and AI

- M5 and other Kaggle competitions
- Increased interest to incorporate leading indicators (e.g. Sagaert et al. 2018 or Schaer et al. 2019)

DECIDING ON THE RIGHT FORECASTING SOFTWARE

How to select your forecasting software?

Determine forecasting needs

- Type of time-series (e.g. intermittent demand, new products, leading indicators)
- Volume and frequency of forecasts
- In-house forecasting knowledge vs. training needs

Platform needs

- Integration with ERP and data warehouse?
- Are there specific security requirements?

License preference

- Software as a service vs local installation

How to select your forecasting software?

Helpful to chose a vendor from your area

Last but not least, test before you buy:

- Benchmark new solution against previous forecasting process with own data and standard forecasting approaches and open-source ML packages
  (ad alert: CMAF is also happy to support this process)
- Look and feel (ideally evaluated by the end-users)
- Assess documentation quality and support options

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