A FINancial supervision and TECHnology compliance training programme

WP7

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement no. 825215 (topic ICT-35-2018, Type of action: CSA)The content reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.

WP 7 inital remarks

- collaborative work between FIRAMIS and ASE
- leadership M1-M15 FIRAMIS; M16-now ASE
- presentation in almost chronological order
- main reference: intermediate evaluation report
- statements and examples are backed by links

Objectives in WP 7

Dissemination: externally communicate the project, promote and raise awareness and impact

- social network channels, web-site, online communication infrastructure
- feedback given in SupTech and RegTech workshops, and by int. advisory board
- discussion between the partners and the international regulators

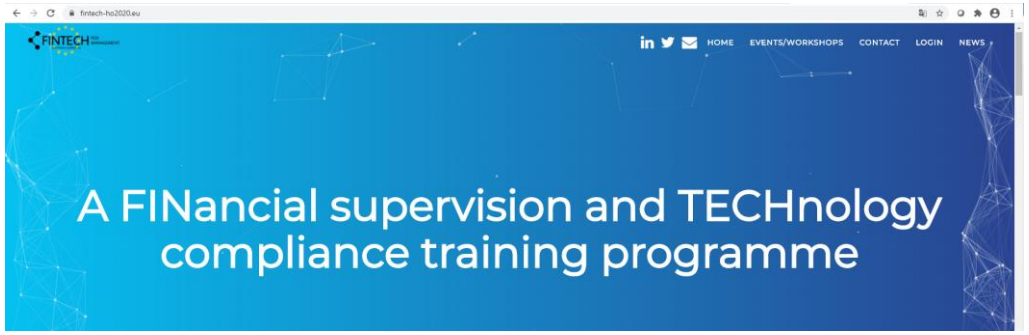
Project statistics related to WP7

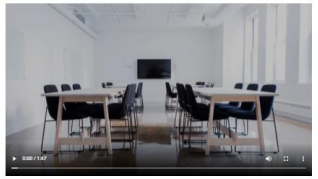
1. Feedback from > 80 SupTech events and almost 10 workshops for RegTech, Research and Validation
2. > 20 industry events where FIN-TECH has been presented/introduced
3. > 30 financial institutions and associations involved
4. > 25 national supervisors and European supervisors / central banks involved including ECB, EBA, ESMA, EIOPA
5. EC interaction: DG FISMA, EU Fintech Lab, other related projects like INFINITECH, FINSEC, AI4EU, EU Blockchain Observatory and Forum, etc.
6. Several fintech hubs from Europe's financial capitals involved
7. > 1300 participants registered, > 550 feedbacks, average workshop rating is 4 out of 5
8. > 160 forms prepared to collect workshop feedback from organisers and participants
9. > 120 pages of detailed partner feedback about the workshops
10. Many supervisory authorities and banks sent their top staff from management and technology
11. Knowledge exchange ranging across the European financial landscape
12. Some of the most trending technologies in BDA and AI covered (like eXplainable AI, network analysis and graph theory)
13. Central project platform for project management, dissemination, evaluation, feedback generation and coding with > 300 users and almost no downtime since project inception in 2019
14. Social media posts with high number of views

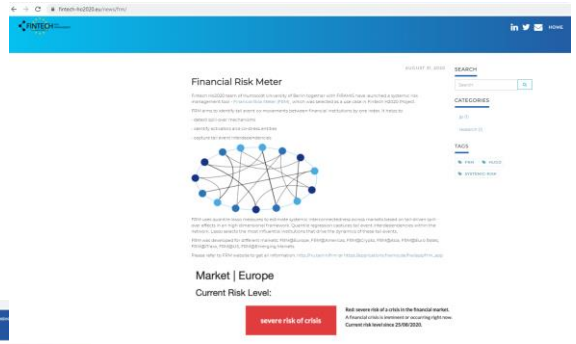
Main achievements

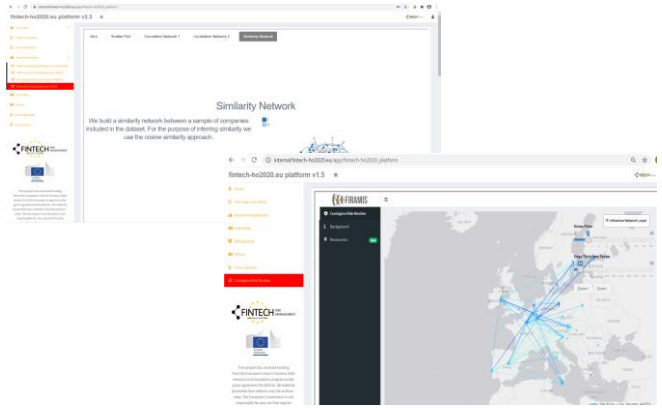
- Workshops, knowledge transfer and coding experience was very much appreciated by supervisors and industry, althoug sometimes complicated to teach
- Adressing specific supervisor needs and backgrounds
- Many ways to get and stay involved with the project
- Choice of use cases was very up-to-date and helpful
- Feedback was collected with high quantity and quality although obtaining feedback from supervisors and industry is not easy as they have restrictions
- The timing for partially academic exchange with practicitioners was good
- Impact of the work is large and it i spossible to come up with recommendations for the future

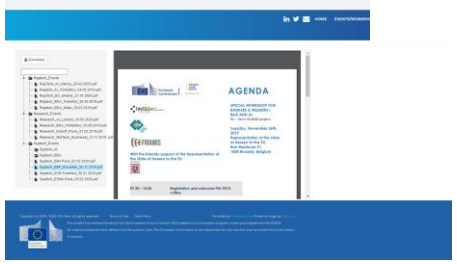
Social network channels, web-site, online communication infrastructure

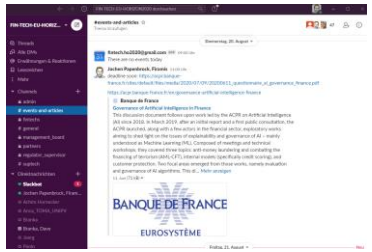


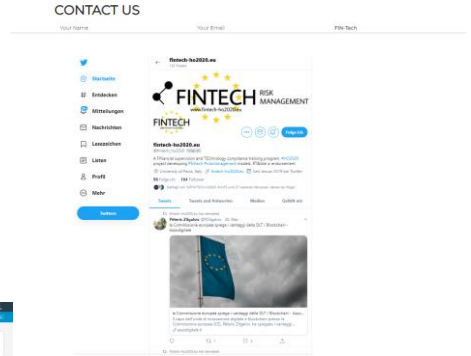


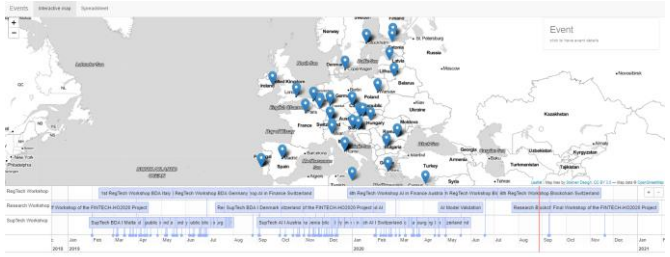


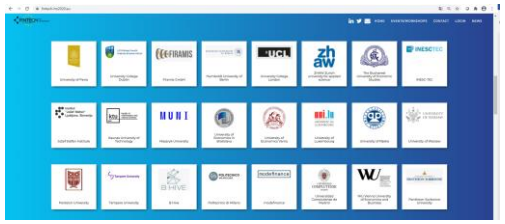






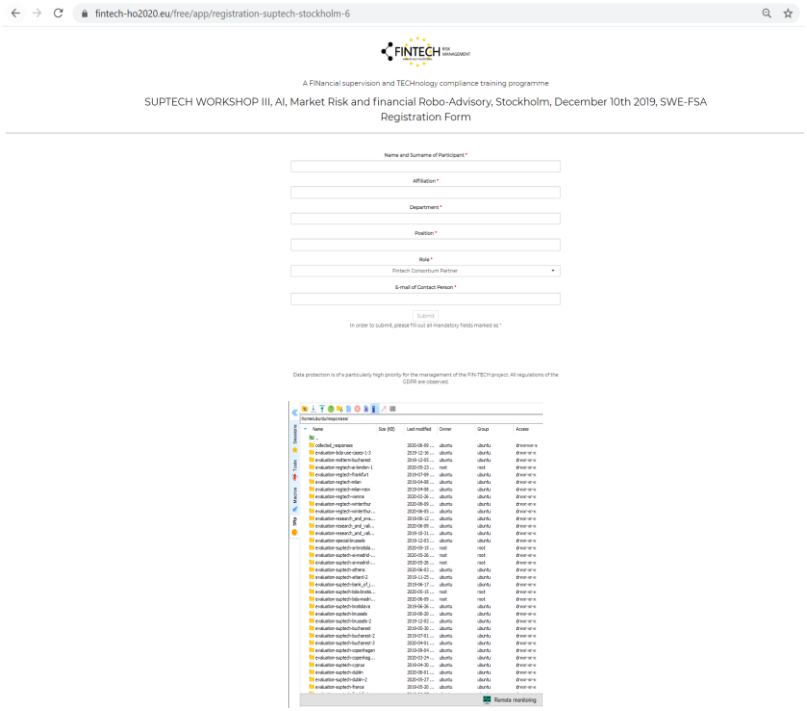


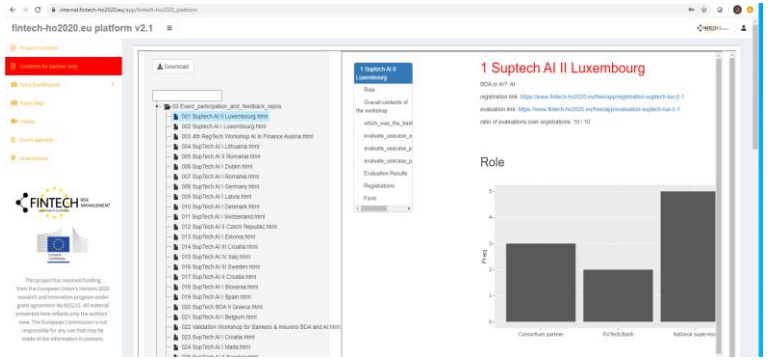


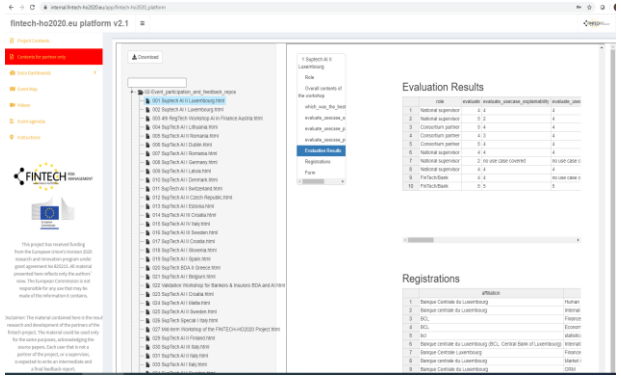


360° Feedback

- Collected from national und international supervisors, industry, partners, int. advisors
- Workshops, events, online, e-mail, webconferences, phone conferences
- Online and offline
- Opinions and free text, forms engine







Obstacles to Fintech scaling

- AI systems, are becoming more capable, finding their ways to new industries and applications
- AI systems are becoming more complex and intransparent (e.g. deep learning)
- Supervisors will not accept black box models. Financial institutions need full control over data and AI. Final authority is with humans.
- EU citizens are becoming aware of the necessity of data sovereignty and ethical, responsible and sustainable AI (see also EU-GDPR)
- Trust has to be created with supervisors, consumers and management of financial institutions
- [Developments are in flow and so is legislation and policy finding]
  Dr. Shivaji Dasgupta, Managing Director Technology, Data and AI @Deutsche Bank

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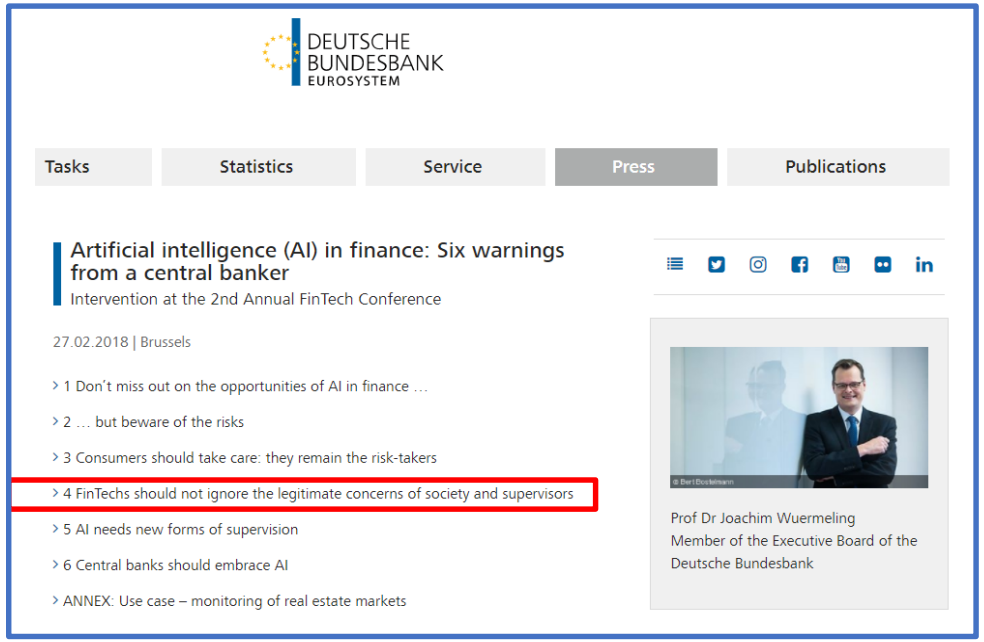
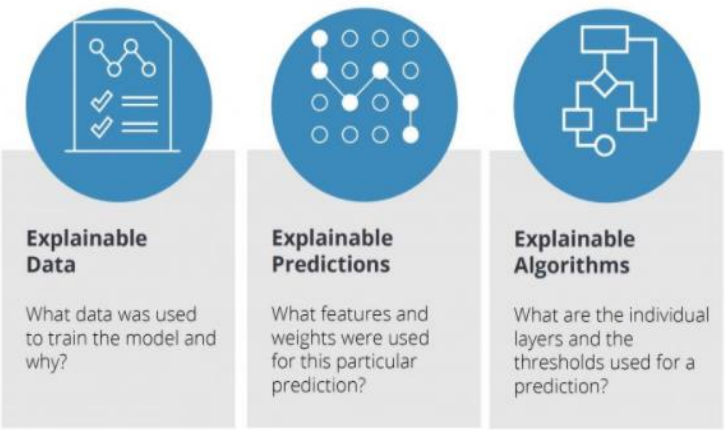


Tech for Trustworthy Applications

- The right technology mix can create trust: Graph Analytics and Transparent, Explainable AI (XAI) are identified as trust enablers. We need to understand why and how AI makes predictions and decisions.
- These technologies can be used to understand and explain large complex data, models and algorithms
- An entire industry is currently emerging around these technologies: governance, compliance, validation, regulation, audit and risk management for data and models
- XAI has emerged since 2017:



Questions around AI explainability help us understand how data, predictions and algorithms influence decisions.

https://neo4j.com/blog/ai-graph-technology-ai-explainability

- Accenture 2017: ‚The technology is not yet readily available for commercial purposes and only known to be explored from an R&D perspective. For example, the Defense Advanced Research Projects Agency (DARPA) is spending $70 million to develop this technology, as they have been using ML/AI techniques in many facets of their work.10 A large retail bank also claims to be investing in XAI for commercial purposes.’
- PWC UK 2019: ‚Explainability is key to building trust’; ‘AI-based decisions need to be explainable in order to be trusted (82% of UK CEOs)’
- 2020: academics/conferences, industry, supervisors and politics cover XAI with increasing trend (see next slides)

An industry is emerging

- Bigtechs, Consulting firms and other vendors currently jump on the train
- Industry conference contributions tell the same story; current focus on industry implementation and deployment
- Gartner named graph analytics and XAI top-10 trending technologies in 2019 and 2020
- ‘The application of graph processing and graph databases will grow at 100% annually through 2022 to continuously accelerate data preparation and enable more-complex and adaptive data science.’ (Gartner)
- Graph analytics CAGR > 30% (Markets and Markets); some media report that XAI holds immense market potential and brand value
- Examples for companies producing graph analytics and XAI: AWS, Google, Apple, IBM, SAS, Oracle, NVIDIA (cuGraph) and smaller companies like FICO, Element AI, simMachines, Cognitive Scale, Fiddler/Amazon, Zest/Microsoft, H2O, Neo4j, Temenos
- Recent announcement: ‚EaaS‘ – Ethics as a Service (Google)

Bosses want to see explainable AI

Almost one-third of UK bosses surveyed in the latest PwC global CEO survey plan to use artificial intelligence in their businesses – but explainable AI is critical

By Cliff Saran, Managing Editor ComputerWeekly.com Published: 30 Apr 2019 0:01

NEWS

Companies want explainable AI, vendors respond

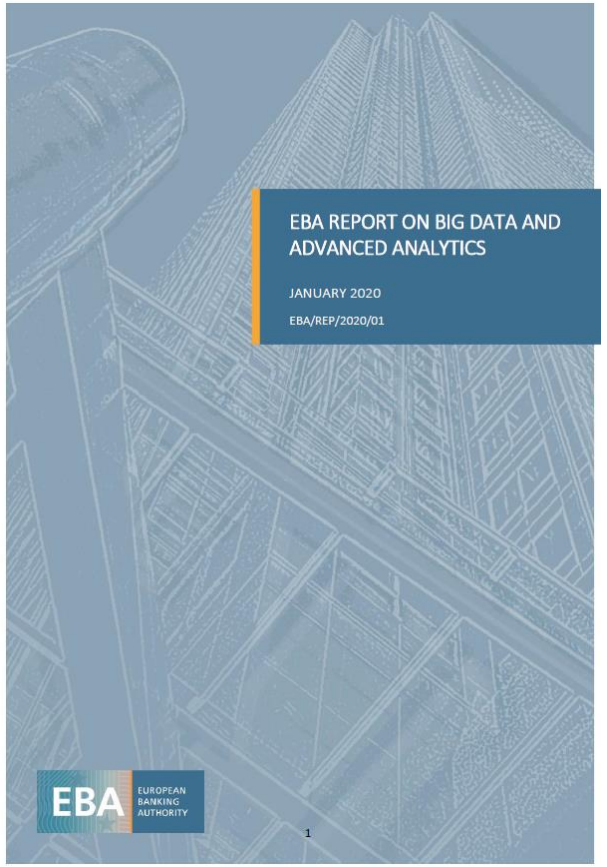
Dispatch from the Strata Data Conference: The push for explainable AI is on, and companies like H2O.ai and Microsoft are looking to deliver.

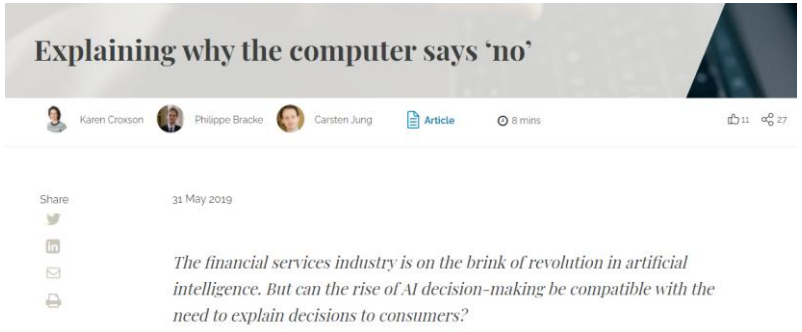
By Nicole Laskowski, News Director Published: 27 Oct 2017

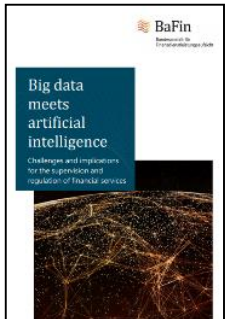
Fed up with the bribery, insider trading, embezzlement and money laundering committed by white-collar criminals?...

XAI at supervisors

- Since 2018 many national and international have published about BD/AI and discuss the potential of explainability and the need for transparency







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Zentral bank voices on XAI

I mentioned AI earlier and the risk of it becoming a “**black box**”. It is therefore essential that AI algorithms remain explainable and with adequate governance - **to justify why and how a financial decision has been taken**, and make sure that no combination of variables will serve as a proxy for a model based on a discriminatory approach.

Denis Beau, First deputy governor, Banque de France

Financial inclusion in the digital age: how to make a difference ? SINGAPORE FINTECH FESTIVAL 2019 https://www.banque-france.fr/node/230898

‘It is often difficult to know
(i) how reliable the inferred relationship between input and output is and
(ii) which causality exists between them. This is called the **explanatory gap of AI**. […] Supervisors have to adjust their approaches and skills to escort the introduction of AI/ML in banking. Banks have to give supervisors sound explanations of what their AI/ML systems actually do, as well as to what end. ‘

Joachim Wuermeling, Member of the Executive Board, Deutsche Bundesbank

page 158 ff.: https://www.eurofi.net/wp-content/uploads/2020/04/views-the-eurofi-magazine_zagreb_april-2020.pdf

Is AI use growing in the financial sector?

Joachim Wuermeling

Member of the Executive Board, Deutsche Bundesbank

innovation in the nineties: Whereas derivative instruments have made local risk globally tradeable, AI/ML makes banks' specific local information substitutable and therefore globally accessible and processable.

At the same time, AI/ML offers many opportunities to banks as well as to their new competitors: it enables the financial industry to exploit masses of information in order to improve their risk management and decision-making processes. Therefore, banks are encouraged to use AI/ML where this leads to improved service to their clients and better risk management, or, in a word: more effective and efficient banking operations.

However, a lesson from the past is that innovation unfolds its benefits only if its major implications are well understood. By construction, in AI systems there exists a strong nonlinear relationship between their input and output. This, along with tremendously increased computing power, is many situations where the explanatory gap does not matter. In those cases, all we need to know is that AI works as expected, and that, if it stops working as expected, this can be detected and fixed quickly. In such cases, we will not need specific regulatory safeguards.

Supervisors have a task when the outcome of an AI/ML method is critical for the functioning of internal controls, for compliance with external requirements or for banks' relationship with their customers or counterparties. In these cases, banks have to fulfil requirements for their AI/ML methods similar to those for any other quantitative model used in risk management: sound modelling practices, reliable processes surrounding the methods, rigid and effective validation, and appropriate management of the inherent model risk.

In a nutshell, the supervisory approach should be to look first at the scope of application of an AI/ML system. If an AI/ML application

More opinions by regulators/supervisors

Bank of England (Joseph, 2019) states that “Explainability means that an interested stakeholder can comprehend the main drivers of a model-driven decision.”

The Financial Stability Board (FSB, 2017) suggests that “lack of interpretability and auditability of AI and ML methods could become a macro-level risk.”

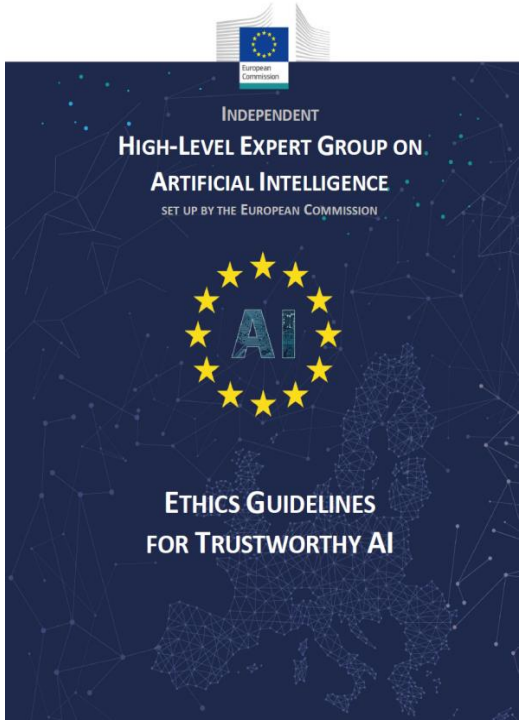
The UK Financial Conduct Authority (Croxson et al., 2019) establishes that “In some cases, the law itself may dictate a degree of explainability.”

The European GDPR (EU, 2016): the data subject is […] entitled to receive meaningful information about the logic of automated decision-making.

Responsible, trustworthy AI

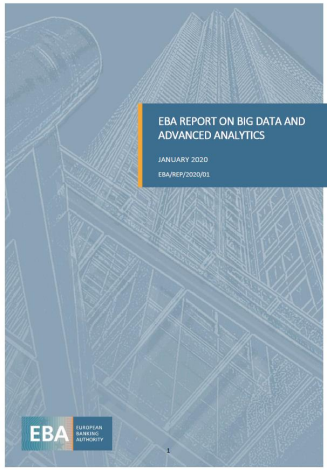
‘Building an ecosystem of trust is essential. A European approach to AI should ensure that machine-based learning technologies are human-centric, ethical, sustainable and respect fundamental rights and values.’

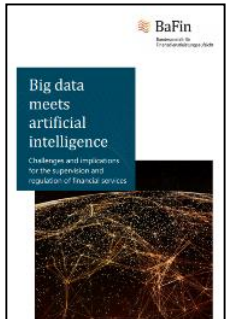
Pēteris Zilgalvis, https://www.eurofi.net/wp-content/uploads/2020/04/views-the-eurofi-magazine_zagreb_april-2020.pdf p. 158



Graph/network analytics as key technology

- Can be characterised as ‚multi-purpose weapon‘ for complex, even temporal data, including visualisation and human interaction
- Since Global Financial Crisis, graph analysis has been broadly adopted in financial servces, e.g. as supervisory tool für systemic risk management
- **EBA** definition ob big data: the 3 Vs (volume, velocity, variety) plus variability, veracity, **complexity, and linking multiple data sets** and EBA definition on AA (Advanced Analytics): .. include … ML, .. **network** and cluster analysis, … **graph analysis**,
- Can be used for explaining data and in combination with machine learning; Enhancing AI with Context & Connections
- Academic conference and industry events on financial network analytics emerged
- Analysis of Complex Systems in Physics and Biology
- Both industry and supervisory tool (see **Bafin BDAI** report §6.2.1.2)
- For monitoring transactions: AML, KYC, Transaction monitoring
- Analysis of interconnected social ecosystems: p2p platforms (digital platforms in general)
- named by Gartner in 2019 and 2020 as top trending technology in coming years
- Graph analytics/databases is becoming a large industry





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Early Activities on transparency and explainability of XAI in this project

For example, there were presentations, publications and further activites regarding XAI by the following partners:

- Paris1 (see right)
- Madrid (see here: https://ieeexplore.ieee.org/document/9050779)
- UBER / Bundesbank / Ernst&Young
- ZHAW
- FIRAMIS
- Etc.

Big Data & Artificial Intelligence
Workshop 21 March - Summary

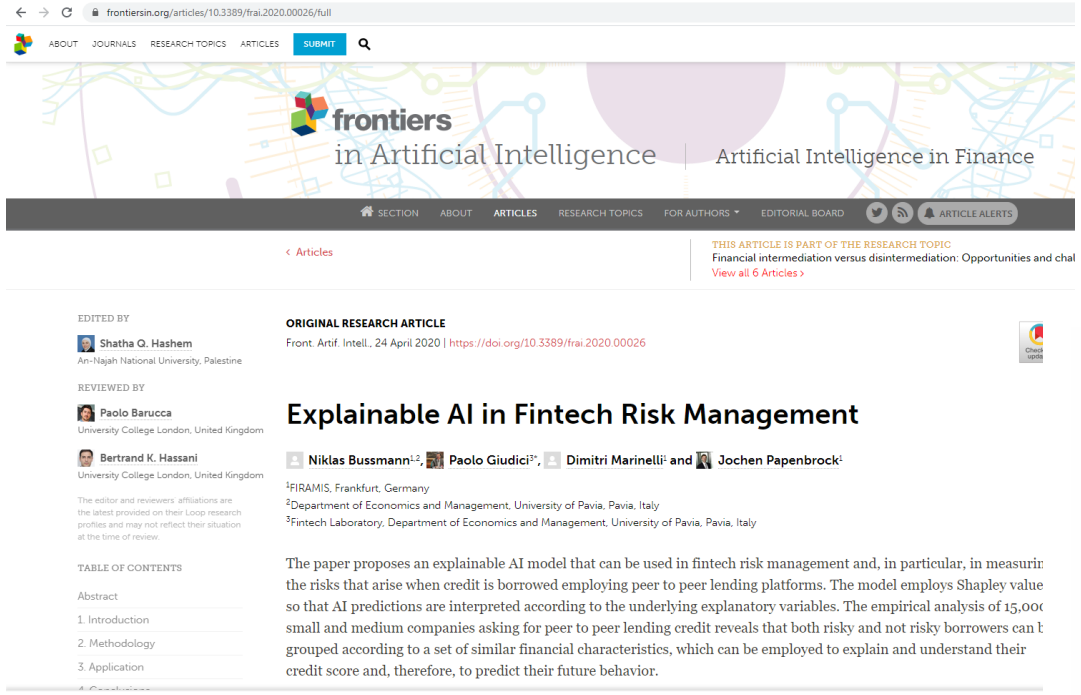
Dominique Guégan*
Université Paris 1 Panthéon-Sorbonne
Labex Refi

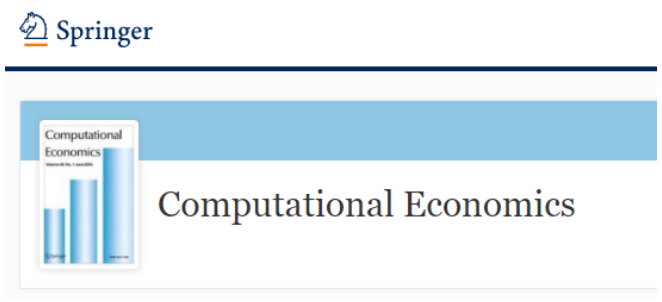
Alexis Bogroff†
Université Paris 1 Panthéon-Sorbonne

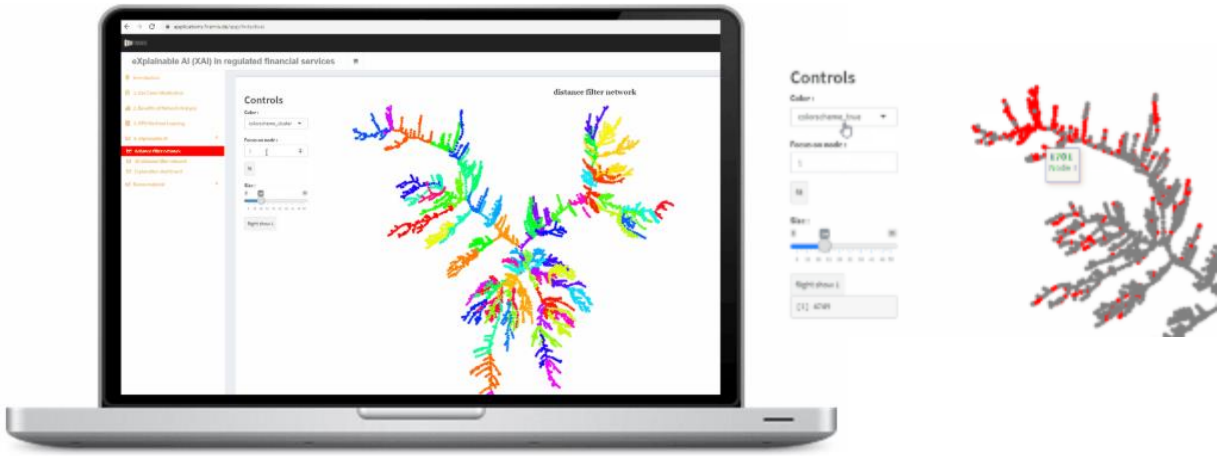
2.2.3 Transparency, interpretability

11.45 – 13.00	**Session Financial Actors & FinTechs** Banque de France - Farid Oukaci QuantCube - Thanh-Long Huynh Scaled Risk - Bertrand Tillay-Doledec Dreamquark - Nicolas Méric BNP Paribas
13.00 – 14.15	**Lunch**
14.15 – 15.00	**Session Artificial Intelligence** Présentation de la consultation publique de l'ACPR "*Introduction to AI*", Su Yang - ACPR "*The ACPR public consultation*", Olivier Fliche - Directeur Pôle Fintech-Innovation, ACPR
15.00 – 17.00	**Research topics around AI** "In Algorithms We trust : interpretability, robustness and bias in machine learning", Louis Abraham -Ecole Polytechnique, ETH Zurich, Qwant Care « Algorithmes, biais, discrimination et équité », David Bounie - Telecom Paris "Credit Risk Analysis using machine and deep learning models", Peter Addo – AFD Commission de Surveillance du Secteur Financier (Luxembourg) - David Hagen

XAI use case:
Visualising the ‚brain‘ of the AI model







Visualising the ‘brain’ of an arbitrary (black-box) AI model. Explainable AI is one of the key technologies for human-centric, trustworthy and responsible AI made in Europe. Among others there are two focus areas in this EU Horizon2020 project and also in the fintech company Firamis GmbH: Graph analytics and eXplainable AI (XAI). Nodes are customers of a credit portfolio. The links connect similar AI-decision-making for groups of customers. Similar decision making is color coded in the nodes.

XAI Use Case

XAI and Graph Analytics

Pre-modeling explainability

Goal:
Understand / describe data used to develop models

Explainable modeling

Goal:
Develop inherently more explainable models

Intrinsic

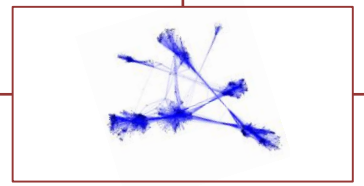
Post-modeling explainability

Goal:
Extract explanations to describe pre-developed models

Agnostic

Network metrics as additional explainbale input features

Visual map to understand linkages, groups and connections of input features



Post-modeling visualization of XAI

Graph theory and representation learning

Evolution and Impact of the XAI use case (1/2)

1. Research of 300 websites and paper to learn status quo (ecpeciall the new papers by Bank of England), establish link to AI strategy of EU and to HLEG

2. Tested at RegTech Frankfurt, good ECB Feedback

3. Idea to combine XAI and Graph Analytics

4. Development of fast code and of Dashboard application

5. Bukarest presentation

6. Denmark Suptech (test), later presented

7. Submission to SSRN

8. Special workshop in Brussels (ECB, EBA, EBF) -> collaboration with Bain&Company and

9. FIRM (Frankfurt Institute for Risk Management and Regulation) AI Roundtable (3 times, Commerzbank/NVIDIA/BCG/Bafin)

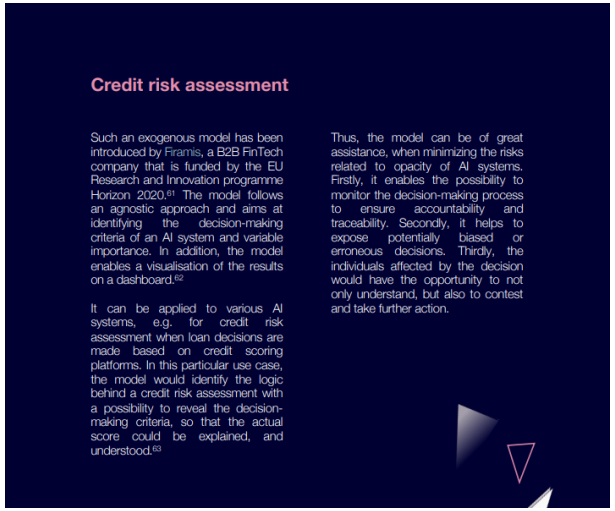
10. EU Fintech Lab

Evolution and Impact of the XAI use case (2/2)

11. Approached by EIOPA for Insuretech task force
12. Ernst&Young present on XAI in SupTech Denmark and because of sucess also at Bundesbank (UBER)
13. Presented at ECB, ESMA, EBA, ACPR/Banque-de-France, Deloitte
14. Creation of Website/Blog: https://firamis.de/ai-fintech-riskmanagement-regulation/
15. Frankfurt Digtal Finance -> Bundesbank -> ‚Explainbaility GAP' -> Expert group SupTech
16. Named on of the best use case in intermediate evaluation report
17. Topic helped to get social media attention
18. Feedback by Intesa San Paolo, DZ Bank, etc.
19. Spin-off papers accepted at Computational Economics (Springer) and Frontiers (‚AI in FS')
20. Derived work with Munich Re -> adaption to Capital Markets and Asset Management

V29 Legal‘s feedback

- Analysing the XAI use cases wrt HLEG criteria
- Proposed at EC‘s public consultation on the White Paper in AI

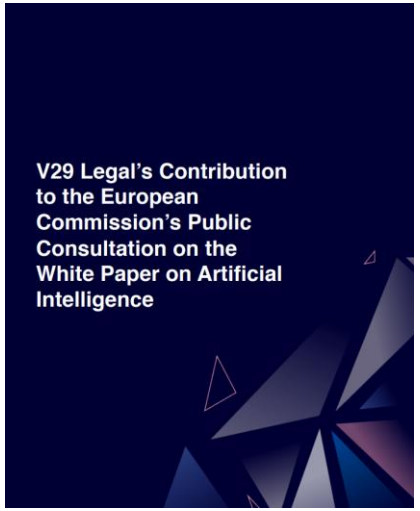


Credit risk assessment

Such an exogenous model has been introduced by Firamis, a B2B FinTech company that is funded by the EU Research and Innovation programme Horizon 2020.[61] The model follows an agnostic approach and aims at identifying the decision-making criteria of an AI system and variable importance. In addition, the model enables a visualisation of the results on a dashboard.[62]

It can be applied to various AI systems, e.g. for credit risk assessment when loan decisions are made based on credit scoring platforms. In this particular use case, the model would identify the logic behind a credit risk assessment with a possibility to reveal the decision-making criteria, so that the actual score could be explained, and understood.[63]

Thus, the model can be of great assistance, when minimizing the risks related to opacity of AI systems. Firstly, it enables the possibility to monitor the decision-making process to ensure accountability and traceability. Secondly, it helps to expose potentially biased or erroneous decisions. Thirdly, the individuals affected by the decision would have the opportunity to not only understand, but also to contest and take further action.



V29 Legal’s Contribution to the European Commission’s Public Consultation on the White Paper on Artificial Intelligence

V. Does the Model help to implement or comply with existing or upcoming regulations?

36 The paper links XAI to three out of seven key requirements of the Ethics Guidelines for Trustworthy AI (*Guidelines*): Human agency and oversight, Transparency and Accountability.

37 Following this approach and given that the proposed Model is a “tool” to identify and visualize the decision-making process of an AI system, it raises the question whether, and

[8] Lundberg, Scott/Erion, Gabriel/Lee, Sun-In, *Consistent Individualized Feature Attribution for Tree Ensembles*, February 12, 2018, https://arxiv.org/abs/1802.03888.

6

V29 Legal

if so, for compliance with which of the 7 key requirements provided in the Guidelines the Model could be helpful to comply with upcoming EU framework:

- Human agency and oversight (1.)
- Technical robustness and safety (2.)
- Privacy and data governance (3.)
- Transparency (4.)
- Diversity, non-discrimination and fairness (5.)
- Societal and environmental wellbeing (6.)
- Accountability (7.)

14 **Firamis:** Here are some use case scenarios:

- Most obvious use case: a loan application is rejected. As a result, the bank has to provide the main reasons for this decision. What are the most important features leading to the rejection? This should be in line with GDPR requirements.
- Groups or clusters of data points express similar decision-making of the machine learning model. These clusters summarise the mechanics of the machine learning model and they represent types of decision-making of the model. Users get a better understanding of what the model has learned in order to verify it and for checking the plausibility.
- Data points at the intersect between clusters point to fuzzy decision-making which can be further investigated.
- A cluster with almost equal amount of predictions for default and non-default could point to bugs or problems in the machine-learning model. It could be checked if those data points are really indifferent or if the model exhibits a buggy decision making in this region of the model.
- Customer segmentation: the data points could not only be clustered by their input variables (representing clusters of similarity of the customers) but also by their variable contributions in the decision-making. This new clustering incorporates the 'intelligence' of the machine learning model (the mapping of input variables to the default labels). Customers in the same cluster exhibit similar decision making, e.g. how and whether they default or not.

Acknowledgements

V29 Legal would like to express a special gratitude to Viola Zollitsch, LLM, for her invaluable support in putting this Contribution Paper together and dedication to the topic. In addition, V29 Legal is grateful to Dr Jochen Papenbrock, CEO of the Frankfurt-based Fintech Firamis and consortium partner of the EU Horizon2020 project FIN-TECH, for providing input with regards to explainable AI and Firamis-technology.

61. Cf Horizon 2020, Research and Innovation programme, https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020 (last accessed June 12, 2020).

62. Bussmann, Niklas/Giudici, Paolo/Marinelli, Dimitri/Papenbrock, Jochen, Explainable AI in Credit Risk Management, December 18, 2019, https://ssrn.com/abstract=3506274 (last accessed June 03, 2020), pp. 3, 15.

Banque de France feedback

Project Review:

« Explainable AI in credit risk management »

Author: Laurent Dupont (Fintech-Innovation Hub, ACPR / Banque de France)

This document is a review of the research paper "Explainable AI in credit risk management" by Niklas Bussmann, Paolo Giudici, Dimitri Marinelli, Jochen Papenbrock (AI_vSSRN_20191218) and of the accompanying code.

Disclaimer

The content of this review should in no way be considered as an approval by the ACPR of the method described in the research paper, whether from a technical or process-oriented perspective. Furthermore, any point of view or opinion expressed herein only reflects the author's thinking and not the ACPR's positions.

Summary of the approach

The approach is quite innovative as it combines black-box ML explanatory method with graph analytics.

Prior research works have embedded network analysis stages in the default prediction itself. For example, they used SVD to analyze latent factors involved in credit scoring on peer-to-peer lending systems. Then a regression model was fitted over the sub-population of interconnected companies – which were thus intuitively subjected to a contagion risk -, and yielded a far better AUC performance than model fitting over the entire population.

By contrast, in this research project the network analysis stage is applied as post-treatment. It consists of a hierarchical clustering of companies in the dataset considered. More precisely, it is comprised of the following steps:

1. An XGBoost algorithm is trained on companies' balance sheet data in order to assess their probability of default over a one-year period.
2. SHAP values are computed on each predictor variable and the score produced by the XGBoost model.
3. An MST (minimum spanning tree) is computed on the vectors composed of the SHAP values for each company.
4. Finally, results are visualized via a dendrogram representation of the MST wherein companies are color-coded either by their predicted (numerical) score or by their (boolean) default status.

Insights gained from the methodology

Two main observations can be drawn from the results presented in this project.

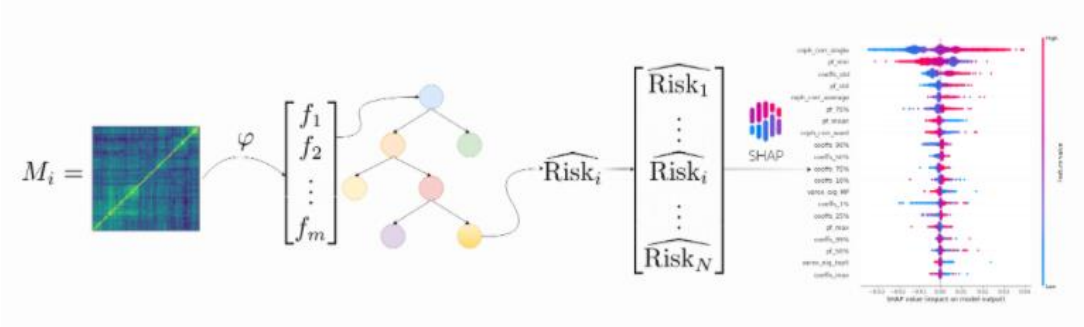
Conclusion

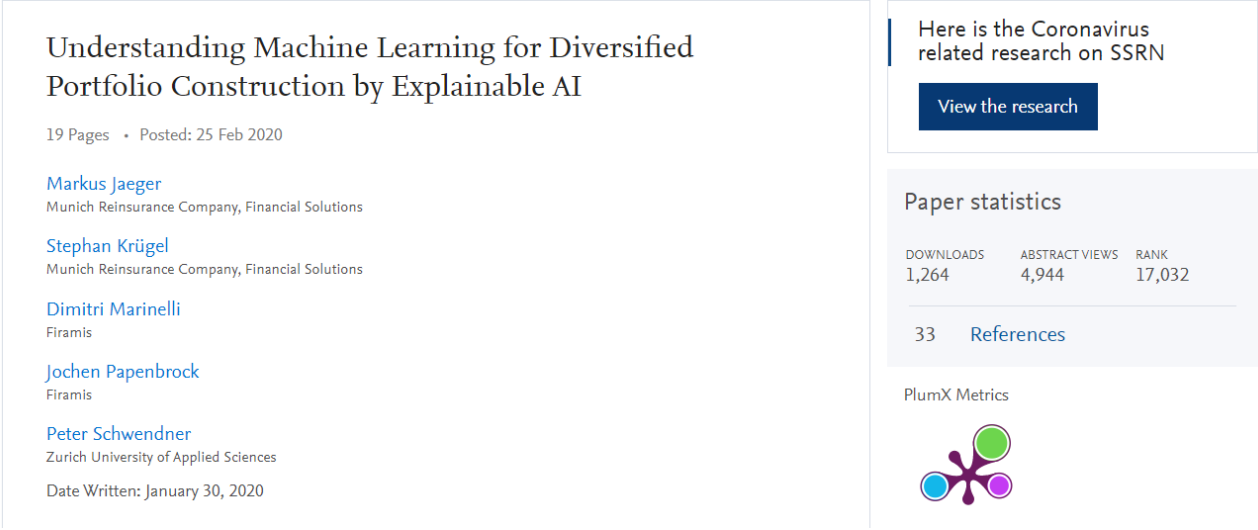
This research project constitutes a step forward in building a framework for analyzing financial risks and specifically credit risk. The combination of a predictive ML model, an explanatory method, and a clustering-based visualization technique enables building a data structure which lends itself to exploratory and investigate works, which would constitute an interesting and valuable continuation of this project – even before applying this method to other use csases.

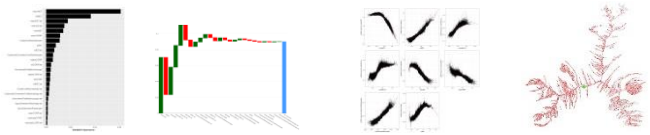
Further Impact, Partnerships and Exploitation

XAI for Asset Management / Robo Advisory

- Transferring the XAI Use Case from Credit Risk Analysis to Asset Management / Robo Advisory
- Collaboration with Munich Re, NVIDIA and Deutsche Telekom

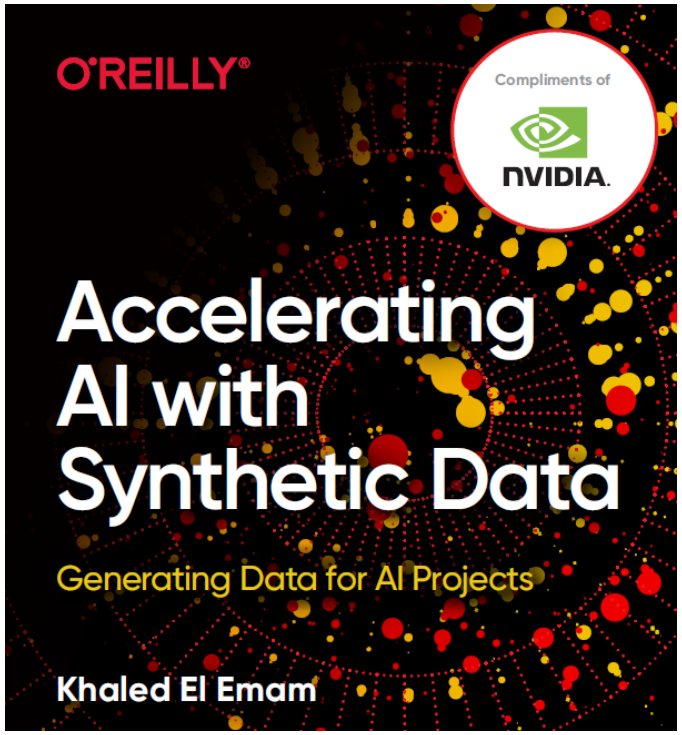


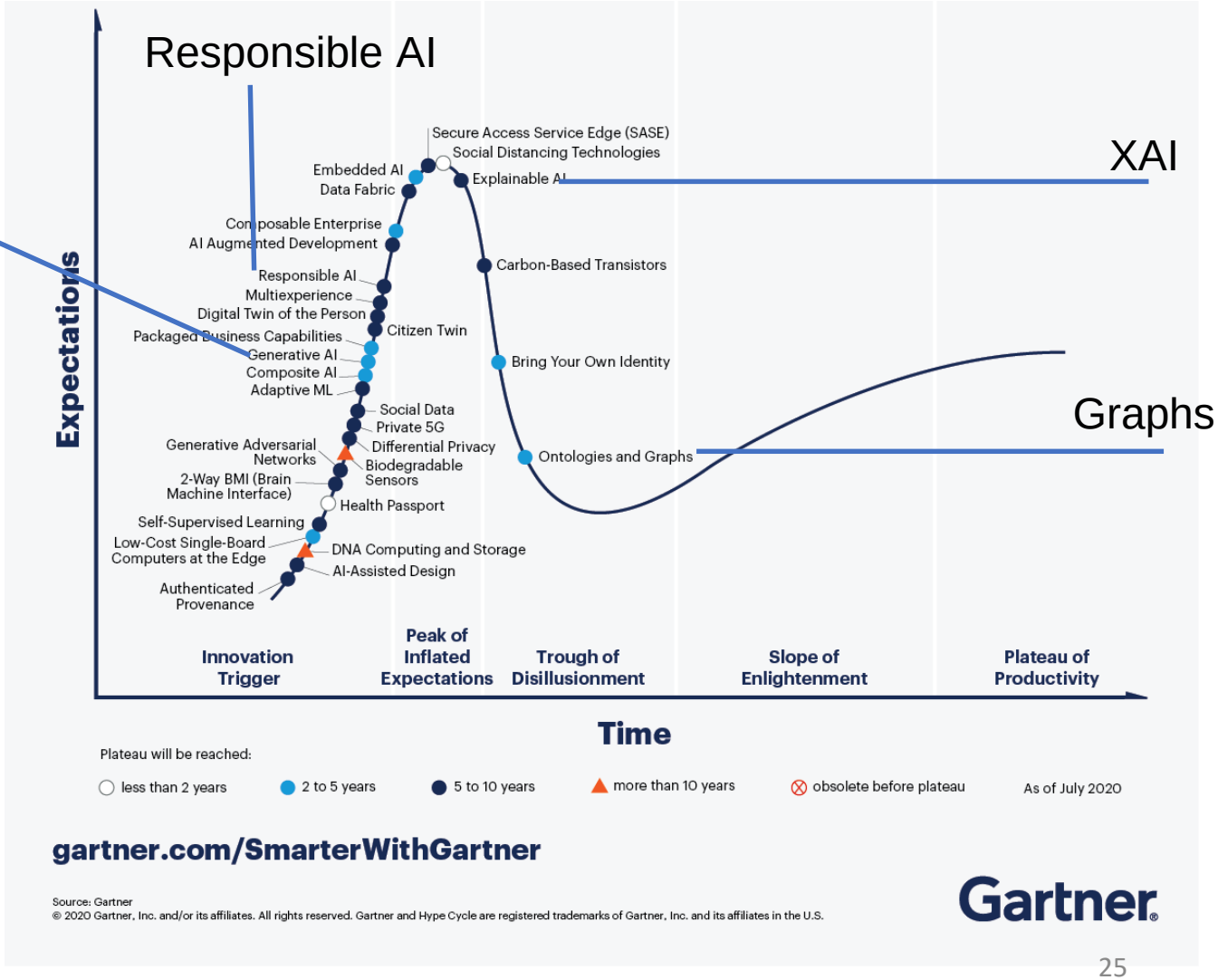




Hype Cycle for Emerging Technologies 2020

Generative AI





Data is often not available, has privacy issues or is costly.

Enhancing XAI by synthetic data

- ‚Matrix Evolutions‘: Generative AI for simulating correlated markets
- Augmenting/enhancing the sampling space of XAI

Matrix Evolutions: Synthetic Correlations and Explainable Machine Learning for Constructing Robust Investment Portfolios

20 Pages • Posted:

Jochen Papenbrock
Firamis

Peter Schwendner
Zurich University of Applied Sciences

Markus Jaeger
Munich Reinsurance Company, Financial Solutions

Stephan Krügel
Munich Reinsurance Company, Financial Solutions

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San Francisco Bay Area	163
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Dr. Jochen Papenbrock
AI and Financial Data Science | FINTECH | Quant | EU Horizon2020 | Startup | AI ...
1w • Edited •

Triple Machine Intelligence Approach for Robust, Adaptive Portfolio Allocation:

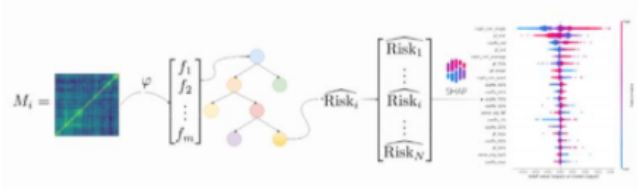
1) #MatrixEvolutions: synthetic market generator to enrich the sample space for ML
2) Hierarchical Cluster Portfolio Construction to address the complexity in financial markets
3) eXplainable Machine Learning: to predict, explain and understand the risk and performance attributions that
otherwise would be hidden under very non-linear relationships or complex statistical dependencies

Research team: Stephan Kruegel and Markus Jaeger by Munich Re (Group), Peter Schwendner, Dimitri Marinelli and Dr. Jochen Papenbrock

Credits:
* we appreciate the infrastructure at Cloud by T-Systems and the NVIDIA GPU resources provided for this research
* research supported by EU Horizon2020 project fintech-ho2020.eu
* Marcos Lopez de Prado for Hierarchical Risk Parity (HRP) and Scott Lundberg for TreeSHAP
* Gautier Marti for his related blog gmarti.gitlab.io, the graphics of this post and #CorrGAN

Underlying papers: https://lnkd.in/df8Z4xB

#ExplainableAI #xai #gpu #highperformancecomputing #AcceleratedAI #RobustAI #quant #portfolioconstruction #portfoliomanagement #explainability #correlation #xgboost #shap #TrustworthyAI #RobustAI



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Further LinkedIn coverage

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Explainable AI (XAI) in Finance

Submission is now open for this research topic at
https://lnkd.in/dbPr3Wa

Contact us for more information.

#explainableai #xai #interpretability #interpretablemachinelearning
#explainablemachinelearning
#trustworthy #humancentric #responsibleai #gpu #highperformancecomputing

Explainable AI in Finance is becoming a very relevant topic as we recognised in our EU Horizon2020 project FIN-TECH fintech-ho2020.eu, for example. I have summarised some key findings here: https://lnkd.in/djWwuDu

Artificial Intelligence in Finance
frontiersin.org • 1 min read

62 · 3 Comments

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My contribution 'Graph analytics and machine learning in the financial industry' (https://lnkd.in/dRc-hrC) on how banks detect loan defaults in good time (in German language) to the book 'Practical Handbook Digital Banking' (https://lnkd.in/dC5T7wW).

Why Graph Analytics? It is a swiss-army-knife-analytics tool for understanding and explaining complex, linked, temporal financial data, especially in combination with machine learning.

#cuGraph #rapidsai #ExplainableAI #gpu fintech-ho2020.eu

Springer Professional Finance + Banking
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Wie Banken Kreditausfälle rechtzeitig aufspüren

See translation

Wie Banken Kreditausfälle rechtzeitig aufspüren
springerprofessional.de

20

Reactions

+12

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1mo • Edited •

The Risk Round Table 'Artificial Intelligence' by Frankfurt Institute of Risk Management and Regulation (FIRM) is a new format for the exchange between practitioners and scientists on the broad field of artificial intelligence (https://lnkd.in/dV9JBAD). It is coordinated by Sebastian Fritz-Morgenthal and me. Past round tables have covered topics like #explainableai
#explainablemachinelearning #xai
#responsibleai #gpu #highperformancecomputing
in risk management and regulation as well as the EU Horizon2020 project in AI and Risk Management fintech-ho2020.eu

Next appointment (webconference):
August 20, 2020, 10:00-12:30 CEST
Agenda:

Presentation by Jan Kiefer from the department of IT Supervision and Auditing at BaFin

Presentation by V29 Legal on Explainable AI and the emerging regulatory framework

Presentation by Gerold Grasshoff, CEO FIRM: Big Data meets artificial intelligence

Participation is possible for all FIRM members and for guests. If you have any questions, please contact me or the office: info AT firm.fm

FIRM RT Artificial Intelligence
firm.fm • 1 min read

28 · 2 Comments

Reactions

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Dr. Jochen Papenbrock
AI and Financial Data Science | FINTECH | Quant | EU Horizon2020 | Startup | AI ...
3w • Edited •

Robust AI in Financial Services

With the availability of #gpu acceleration, clouds and #opensource infrastructure the influence of machine learning is even more extending into production workloads in financial services. The interplay of corporate governance, business strategy and artificial intelligence will be crucial. The industry has unique needs for robustness when adopting AI/ML. The challenge is to implement #RobustAI including concepts like explainability, trustworthiness so that machine reliance does not cause humans to miss critical pieces of the puzzle.

In the EU Horizon2020 project FIN-TECH fintech-ho2020.eu
we have created several evaluated use cases based on #GraphAnalytics (with ability to explain hidden relationships in complex financial transactions) and #ExplainableAI. Both analytical concepts are trending in the next years for good reason (https://lnkd.in/d95BEYZ), especially in regulated financial services (https://lnkd.in/djWwuDu). Generative AI models creating realistic but synthetic data even further enhance #ExplainableAI and privacy-aware computation.

#ExplainableAI #xai #ResponsibleAI #gpu #highperformancecomputing
#TrustworthyAI #HumancentricAI #AcceleratedAI #RobustAI

27 · 2 Comments

Reactions

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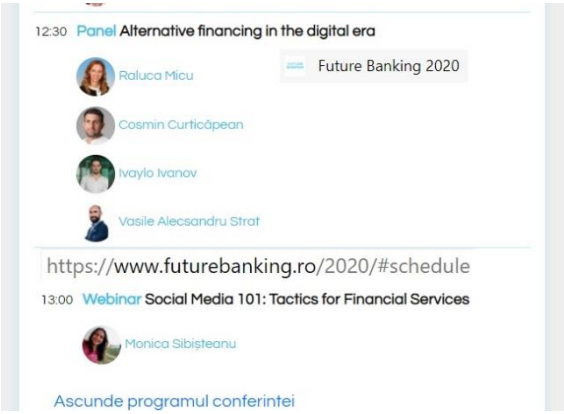
Further dissemination activities

Some past events:

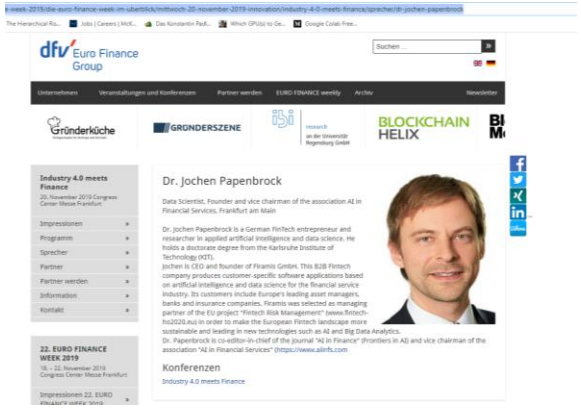


Vasile (ASE) in the Panel

Frankfurt Digital Finance

Frankfurt digital finance -> we were approached by Mr Wuermeling from Bundesbank who confirmed the ‘explainability gap of AI’

Euro Finance Week



‚Recruitment‘ of participants to Brussels special workshop

Coming up:

Representing the project, discussing with Deutsche Bank, SAP, local government (FBDC) and NVIDIA

Further dissemination activities

Round Table AI @Frankfurt Institute for Risk Management and Regulation
(Top German Chief-Risk-Officers Financial Institutions, Consultants and Supervisors)

Die Koordinatoren des Round Table AI:

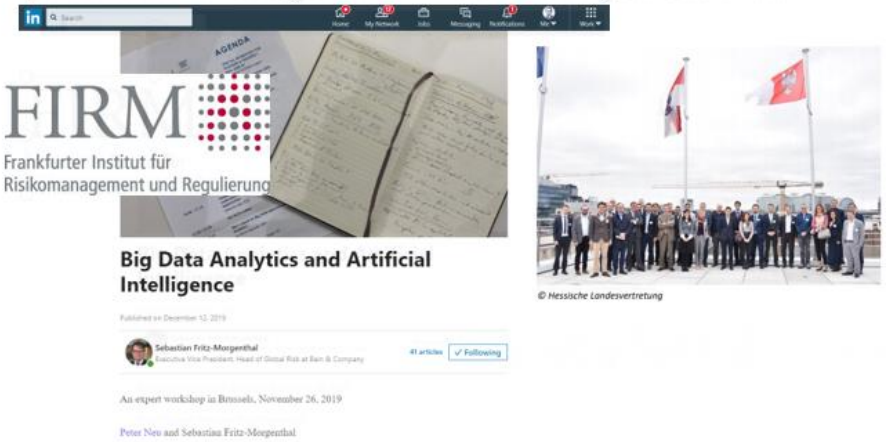
Dr. Jochen Papenbrock
CEO and Co-Founder, Firamis und Executive Board of EU Horizon2020 FIN-TECH (links)

Dr. Sebastian Fritz-Morgenthal
Executive Vice President, Head of Global Risk Management, Bain & Company (rechts)

Speakers so far: Commerzbank, NVIDIA, TechQuartier, BCG, Bafin, ACPR / Banque de France, Firamis

https://www.firm.fm/events/firm-round-table-artificial-intelligence/
https://www.firm.fm/events/round-table-artificial-intelligence/

‚AI in Risk Management – Risk Management of AI'



#ExplainableAI #RobustAI #TrustworthyAI
Explainable Data, Predictions and Algorithms

Further impact and activities with XAI

Federal Ministry for Economic Affairs and Energy

eu2020.de

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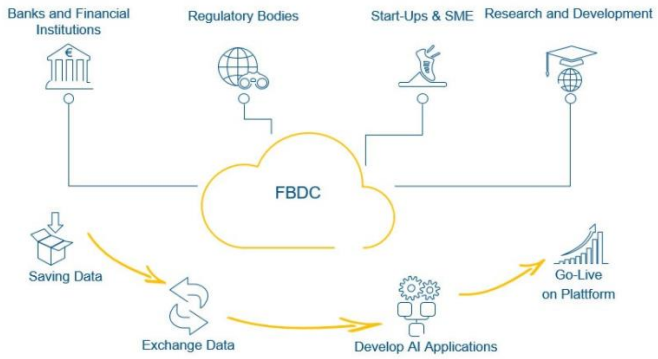
Financial Big Data Cluster (FBDC)

GAIA-X

Appointment by local government:
Responsible for XAI topic in FBDC



frontiers in Artificial Intelligence | Artificial Intelligence in Finance

Special issue on XAI
(Pavia team, ZHAW, WU Vienna, Firamis et al.)

Some challenges and limits of XAI

1. More knowledge needed: https://ico.org.uk/for-organisations/guide-to-data-protection/key-data-protection-themes/explaining-decisions-made-with-ai/

2. Standards need to be developed, e.g. NIST standards: https://www.nist.gov/publications/four-principles-explainable-artificial-intelligence-draft

3. SHAP has economic foundation but is not causal

4. currently dominant, post-hoc explainability paradigm

5. Explainable Machine Learning in Deployment: https://arxiv.org/pdf/1909.06342.pdf

6. XAI for which audience

Impact / Recommendations

expected potential scientific, technological, economic, competitive and social impact, and plans for using and disseminating results

BD and AI as well as the BDAI-driven business models in FIN-TECH (as well as their risk management) are extremely complex, many disciplines are involved and the (legal) uncertainty is high. Financial industry is undergoing one of the largest transformation and disruption in history. Society and supervisory community are in need for new standards and policies. The feedback of all the comsumers of our prepared material (slides/code, Suptech/Regtech/research workshops) was that they were thankful for the knowledge transfer. An environment for all to learn is necessary. We advocate more knowlegde programs, an experimental EU cloud infrastructure for ecosystem building and a field for experimentation on European level: sandboxes.

BD and AI can only be used if it does not harm EU society/consumers and if it is under full control. Those financial institutions who seem to shy away from effort already make themselves suspicious to regulators. Although BDAI has much potential it has risks and creates cost to control them and make it transparent. Advanced technology and knowledge is needed. It is a huge market/industry and good standards could be exported to the world. However, US is leading and our data is in US. We need projects for data sovereignty (like the European cloud) and a local analytics/AI industry.

WP 7 – Dissemination and Impact

- Transfer of WP7 leadership from FIRAMIS to ASE starting month 16 of the project.

- ASE has done an evaluation of the feedback obtained for the events and worked with FIRAMIS in helping partners update their situation.

- ASE has proposed some add-ons to the strategy of feedback employed until month 15 for increasing the richness of the obtained feedback.

- ASE has proposed some add-ons to the dissemination strategy employed until month 15 for increasing the dissemination and the impact of the project.

WP 7 – Dissemination and Impact

- ASE proposed the following add-ons for increasing the richness of the obtained feedback.

- The entire structure of feedback forms created by FIRAMIS will be further used for gathering feedback from the participants to the events of the project.

New

Partners will fill a **form** after the Blockchain Suptech listing the main takeaways and also the main suggestions.

New

Supervisors will fill a **form** after the Blockchain Suptech listing the main takeaways and also the main suggestions.

Why ?

- More and richer feedback!
- Recurring ideas!
- Identify similar questions!
- Good practices!

- More flexibility!
- Structure but also diversity!
- Identify main differences!

WP 7 – Dissemination and Impact

Internal awareness – Increase network strength without endangering the diversity!

Why?

Communicating and sharing information about national level activities and increase the survival chances of the network (including all stakeholders involved) after the end of the project!

How?

New

Community LinkedIn!

Blog – News

Video – material!

WP 7 – Dissemination and Impact

External impact – Increase the visibility of the project and creating more connections at national level

Create links with other initiatives / fintechs / communities / projects.

Increase the target audience (non-technical).

Add value into day to day activities of interested stakeholders and they will start to engage.

Add a new layer to the project – “the platform”.

How ?

Community LinkedIn!

Blog – News

Video – material!

New

Why ?

Increase the survival chances!

Obtain media visibility!

Get the attention of a wider target!

WP 7 – Dissemination and Impact

Enhancement of the Network

Zoom Workshops

New

Mixing stakeholders!

Increasing cross-border connections!

Increase the visibility of the project!

Enhance the platform effect!

Leverage on the existing networks and infrastructure of the partners!

Produce content for the 3 channels!

Community LinkedIn!

Blog – News

Video – material!

Zürcher Hochschule für Angewandte Wissenschaften

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement no. 825215 (topic ICT-35-2018, Type of action: CSA)The content reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.