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IFIP WG 10.4 event

Praia do Forte - BA

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Critical and non-critical AI applications

the need for interpretability issues

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Technological Innovations

Artificial Intelligence solutions for R&D and innovation projects

Research, development and applications of artificial intelligence approaches, methods and techniques to overcome technological challenges and meet current business demands from various sectors of society.

Member of

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BIDS

a living *Artificial Intelligence* laboratory connecting researchers, corporations and startups in an ecosystem of innovation

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Artificial Intelligence

Some applications

AI applications

Critical applications, mission critical
(e.g., as in Draft Law of the Brazilian Federal Senate)

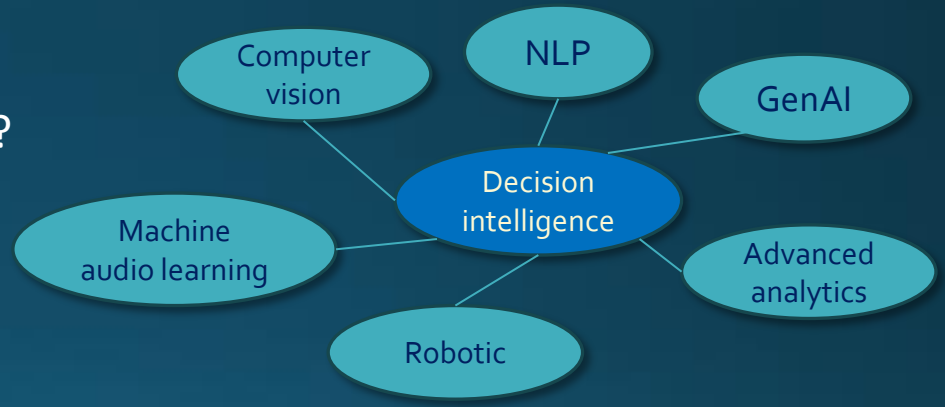
- Critical services (high risk) with high algorithmic impact
- Autonomous vehicles
- Diagnosis and medical procedures
- Management and operation of critical infrastructures (transit, water and energy supply networks)
- Support for the administration of justice and law
- Assessment of access criteria to essential services
- Support logistics for emergency services, such as firefighters and emergency services
- Biometric identification

Non-critical applications: what else?

Important but-non-critical applications

There are a lot of applications that fall into we can call as “important but-non-critical applications”

- Computer vision for identifying and classifying objects
- Predictive analysis for power performance
- Fault detection, but to some extent it is non-critical?
- LLM for chatbots, but GenAI (?)
- Immersive experiences
- …



Important but-non-critical applications
to what extent?

Some FITec AI projects

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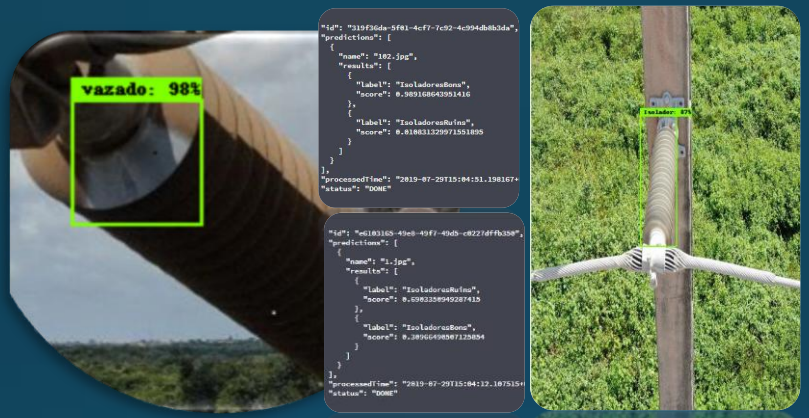
IoT energy

fleet management

chatbot



ML Identification

ML Inspection

production control

resources monitoring

Insulators' identification

R&D project

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Detection and classification of power meter

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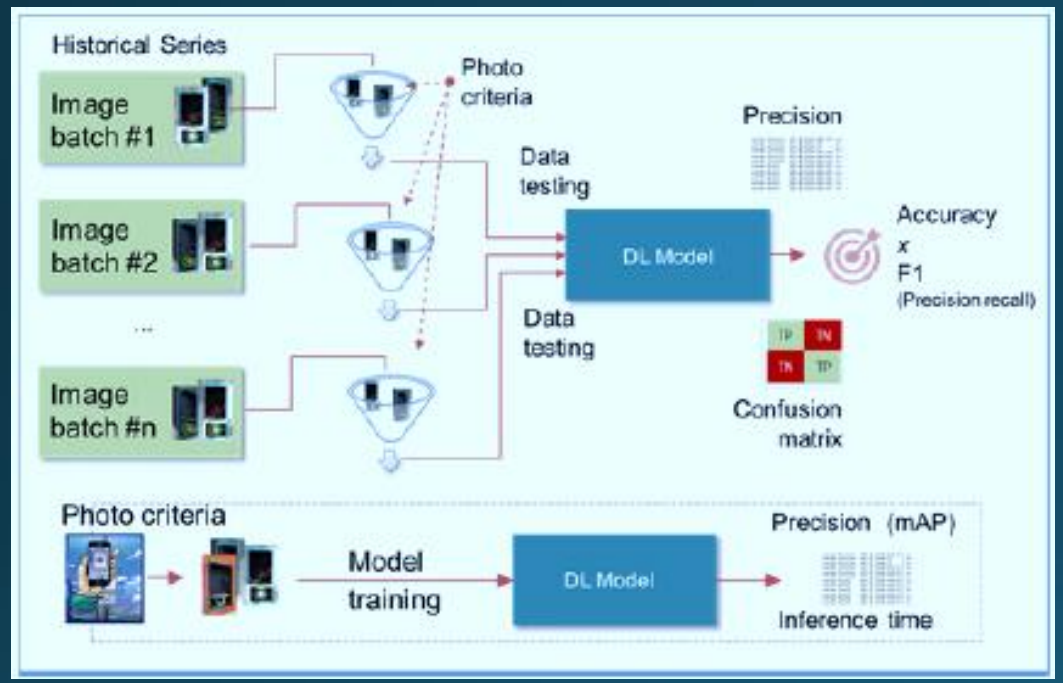
R&D project



Source: (Finardi et al., 2021)

Digital Transformation

R&D projects

Engineer Asset Management
Predictive analysis and RCM

Power Performance Assessment
Prediction, identification and RUL

Soundscape Monitoring
Machine audio learning

Digital Transformation

R&D projects

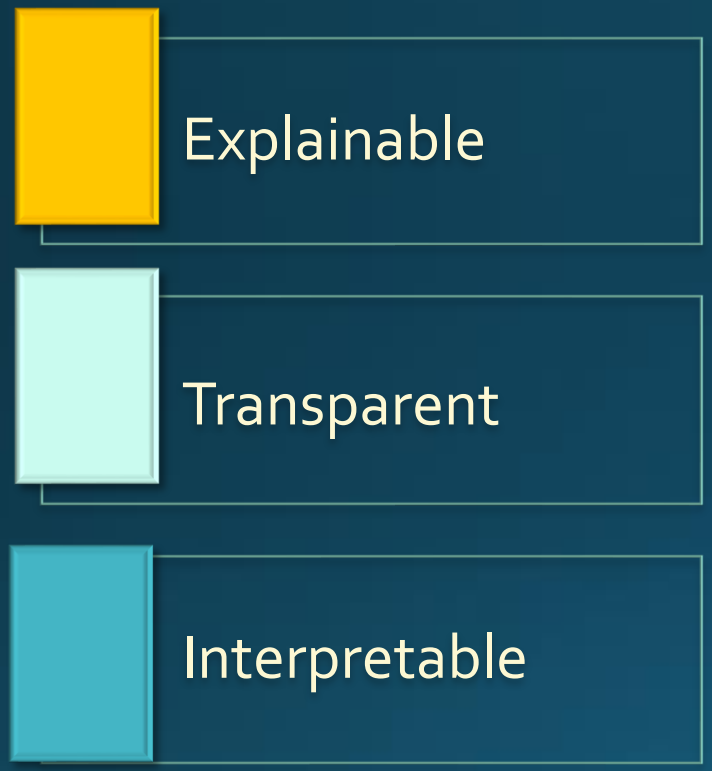
Project New Energy Connection (Equatorial Energia)

LLM
WhatsApp
Usability and UX
New interaction process

Project ACGM

includes a Virtual Showroom: immersive environment for displaying and interacting with products such as laptops and monitors, mediated by a virtual assistant (GenAI) that responds to technical details of the products.

Critical or non-critical: the interpretability need



Cf. (Holanda & Pfeiffer, 2023)

XAI – eXplainable Artificial Intelligence

The decision of the model can be comprehended *post-hoc* by experts using tools and considerations

Transparency

refers to the characteristic of a model being, in itself, understandable by a human

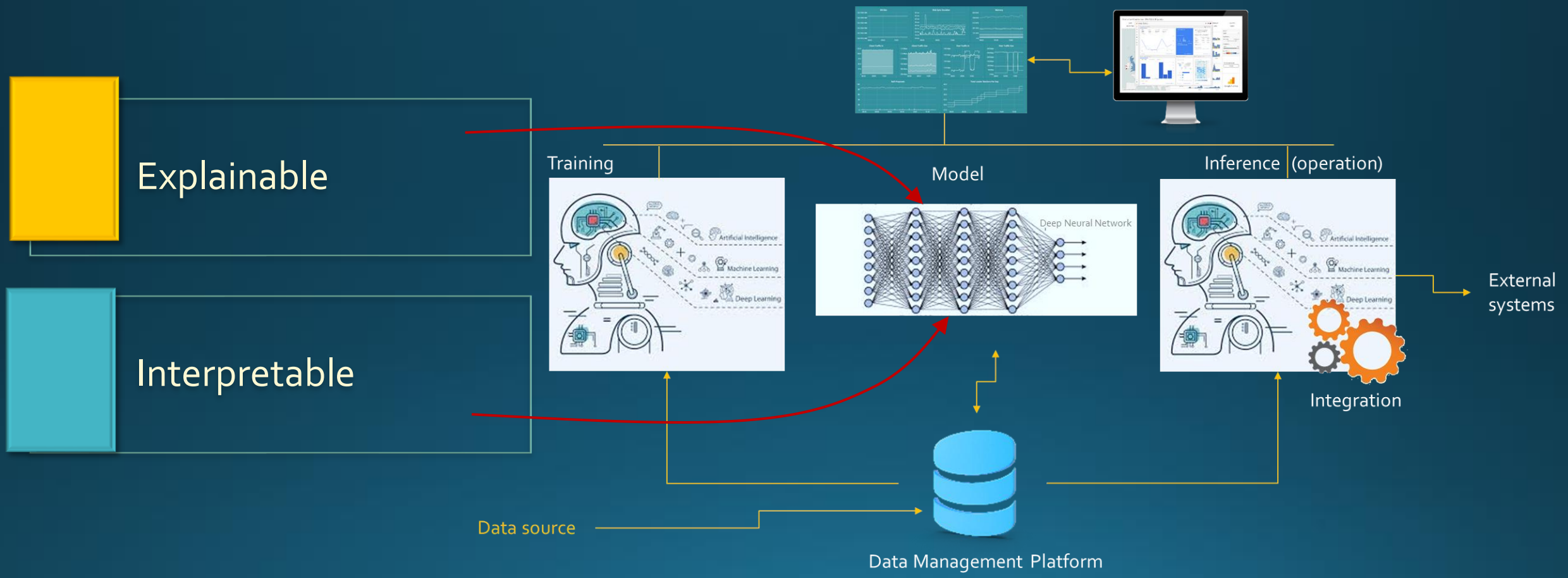
Arrieta et al. (2020)

IML – Interpretable Machine Learning

The decision of the model can be easily comprehended by experts according to the *ante-hoc* model design and their domain knowledge

Rudin et al. (2022)

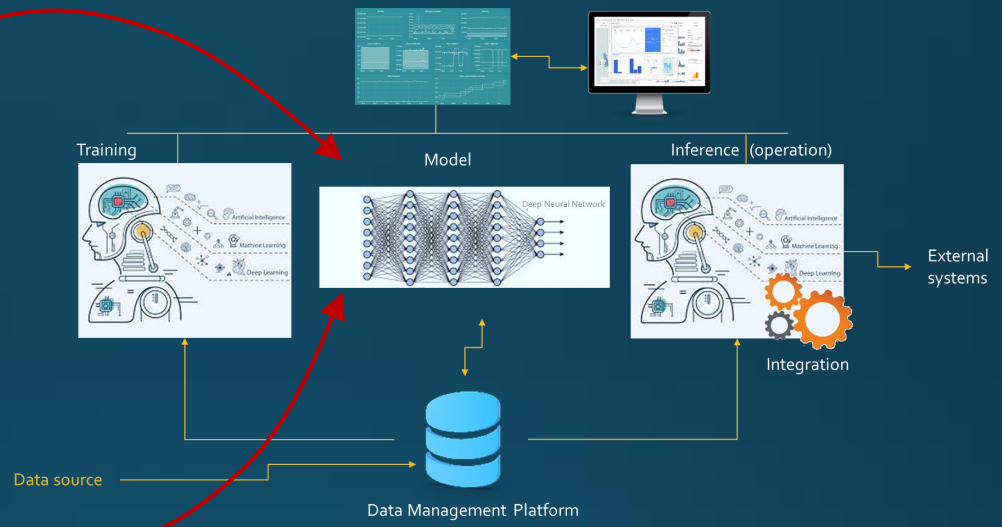
Critical or non-critical: the interpretability need



Critical or non-critical: the interpretability need

Explainable (XAI)

Interpretable (IML)



- There is a long discussion on IML *vs.* XAI: which is more trustworthy, or which may be less accurate
- There is no consensus in the literature or in practice regarding this

Critical or non-critical: the interpretability need

- Black boxes are generally unnecessary, given that their accuracy is generally not better than a well-designed interpretable model (*sic*)
- Explanations for black boxes are often problematic and misleading, potentially creating misplaced trust in black box models
- Explainability techniques give authority to black box models rather than suggesting the possibility of models that are understandable in the first place
- An interpretable model is constrained, obeying a set of domain-specific constraints that make judgment processes understandable

(Rudin et al., 2022); (Rudin and Radin, 2019)

References

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Thanks!

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