Styrelsen for Dataforsyning og Effektivisering

Brief from Denmark

State focus on it-projects (minimize scandals)

Now focus it-systems (legacy systems):

- security risks
- use of vendors/contracts
- budgets
- patches

~~State board reviewing~~

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Brief from Denmark

SDFE:

It-security and GDPR

Focus on enterprisearchitecture

- Architecture Board
- Reviews start projects
- System consolidation
- New technologies

Focus on vital competences (combining geospatial/business with ict/data)

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Working with New Technologies

Organization:

- No common technology catalog
- No R&D
- Clear goal
- Process for identifying
- Cooperation with vendors
- Security and ethics

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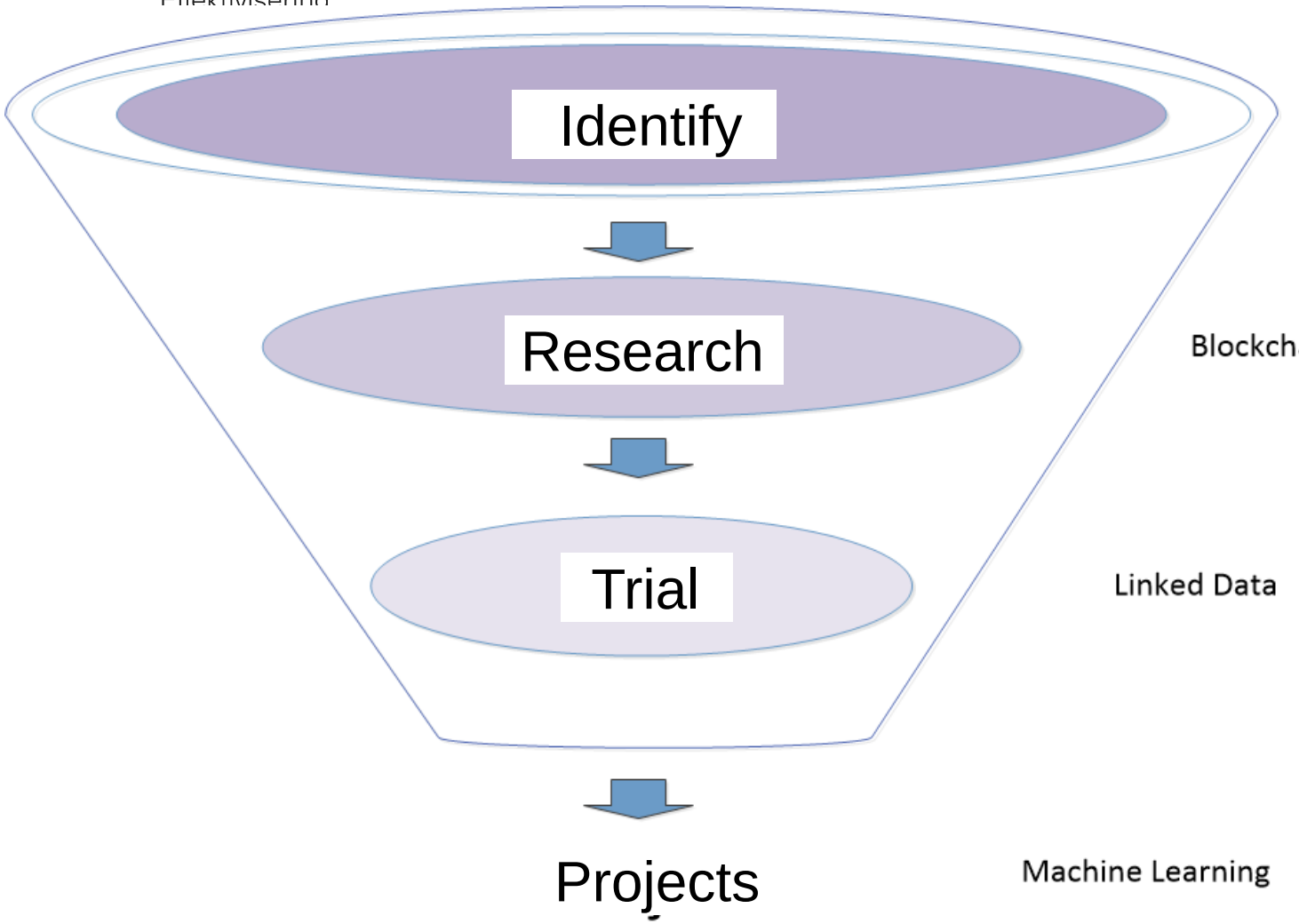
Working with New Technologies



4D

IoT

Blockchain

Smart Cities

Linked Data

3D

Machine Learning

Technological Trends as Strategic SDFE Business Drivers

Blockchain Protecting sensitive data and making sure data has not been tampered with (authoritative data)!

IoT Working together with international standardization institutions to draft a reference architecture

SmartCity How do we make the leap from concept to a scalable reality?

Autonomy (e.g. national infrastructure for drones, connected autonomous cars etc.) Whit the advent of autonomous vehincles, what are the technical challanges to make them safe (both for airspace and roadnetwork)

Machine Learning

Project: Change and object detection in aerial photography

Project: Utilizing Machine Learning for geospatial imagery

SDFE objective

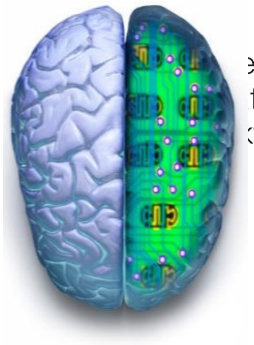
- Urban planning applications (energy audits, investment, etc.) require an understanding of built infrastructure and its environment, i.e., both low-level, physical features (amount of vegetation, building area and geometry etc.), as well as higher-level concepts such as land use classes (which encode expert understanding of socioeconomic end uses). .is kind of data is expensive and laborintensive to obtain and to extract information from.

Machine learning hypothesis

- We propose the use of state-of-the-art convolutional architectures such as deep learning (e.g. Mask R-CNN) to train classifiers that recognize broad land use classes, such as building objects from SDFE aerial photography and possible also satellite imagery (Copernicus constellation). We then use the features extractedd from the model to perform a large-scale comparisons of urban environments, to detect change from time-series datasets. For this, we construct a novel dataset for land use and change classification, pairing sampled locations with ground truth land use class labels obtained from the aerial survey. The trained model can now segment building objects that have been flagged as changed.

SDFE business case

- This approach will automate the workflowcycle, free up valuable time and reduce CAPEX and consultancy fees associated wiht external vendors taking on the assignment of carrying out the different tasks by manual labour, and streamline our strategic business model of delivering faster time-to-market geospatial datasets. Using machine learning opens up the possibility for testing thusands of hypotheses and uncovering unknown correlations in very large (geospatial) datasets, hidden from human operators.



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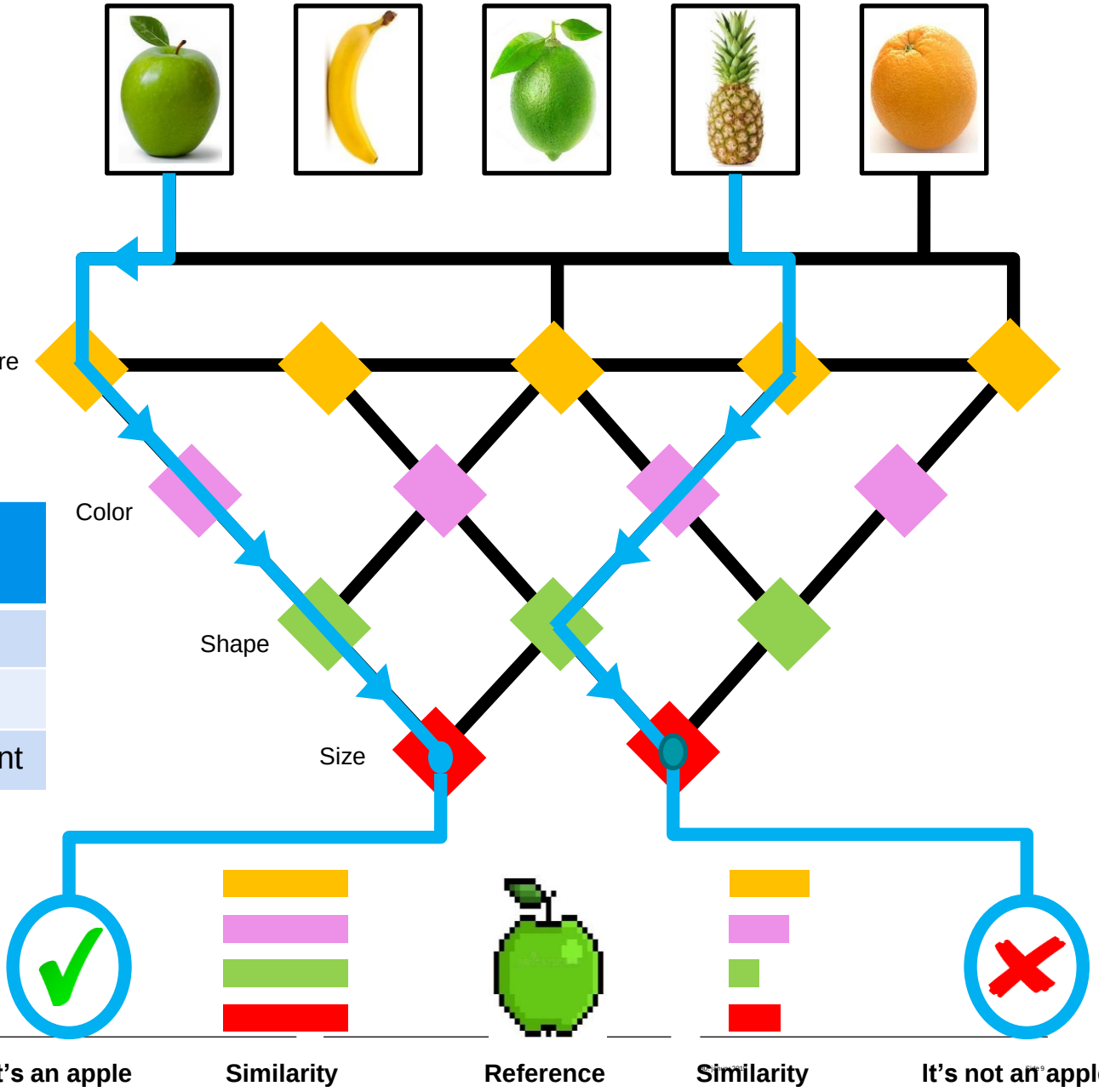
Deep Learning
- How does it work?

Problem class	Learning method
Classification	Supervised
Segmentation	Unsupervised
Regression	Reinformcement



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