

SCC.NRG.AI4ME: Self-optimising distributed encoding nodes.

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Acknowledgements

Supervisors: Dr Haris Rotsos, Prof Nick Race

Overview of Today's Presentation

Object Based Media

- Traditional

- Dynamic Objects

High Level Overview

- Worked Example

- Toy Example

- Node Distribution

Testing the hypotheses

- Generation of Objects/Cross-correlation

- Optimisation of Objects

- Network Distribution

- Encoding/Decoding Weights

- Objects as Code (OaC)

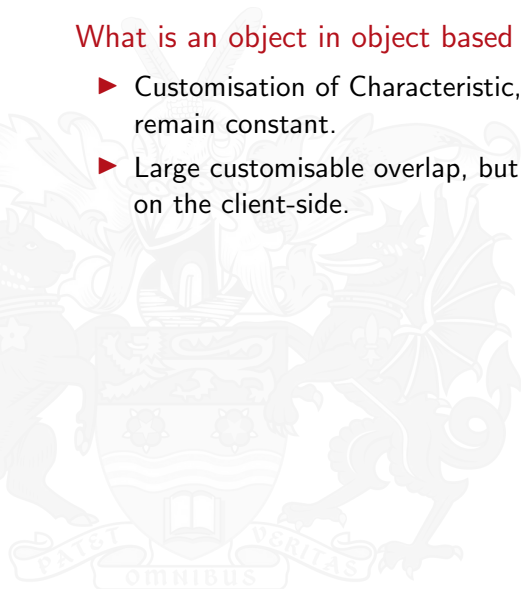
Any Questions

References/Inspiration



What is an object in object based media?

- ▶ Customisation of Characteristic, but the meta characteristics remain constant.
- ▶ Large customisable overlap, but not computationally feasible on the client-side.



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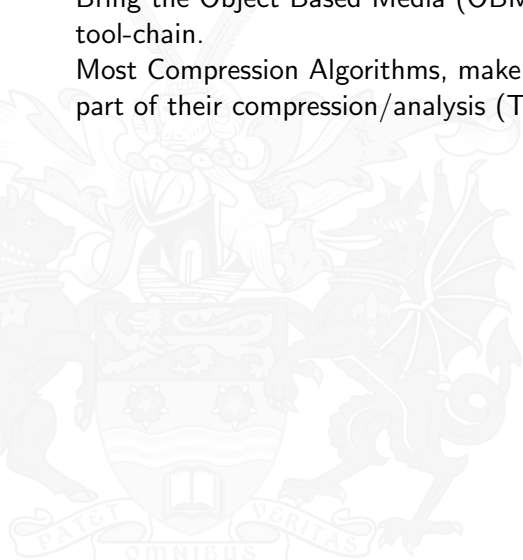
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Theorem

let position be time-series like such that.

$$A = \{S_0^A \cdots S_n^A\}, B = \{S_0^B \cdots S_m^B\}$$

where for a given object S_x assume.

$$S_x \in A, S_x \in B$$

$$A = \{S_x | \Sigma_1\}, B = \{S_x | \Sigma_2\}$$

such that.

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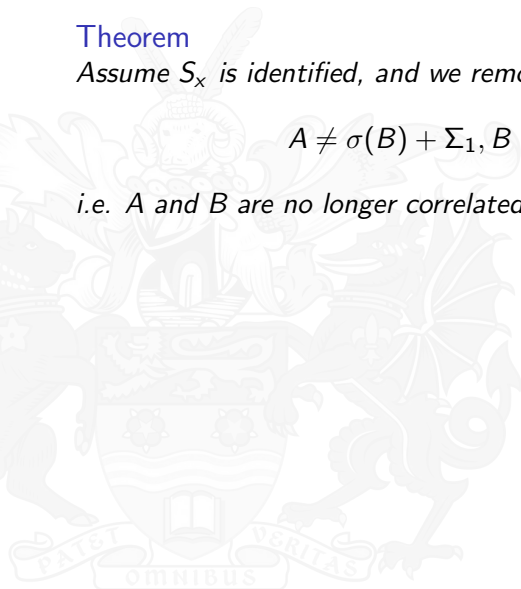
But how do you identify S_X ? No idea.

Theorem

Assume S_x is identified, and we remove signal S_x from the sets.

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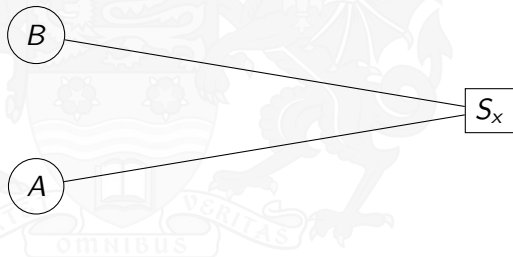
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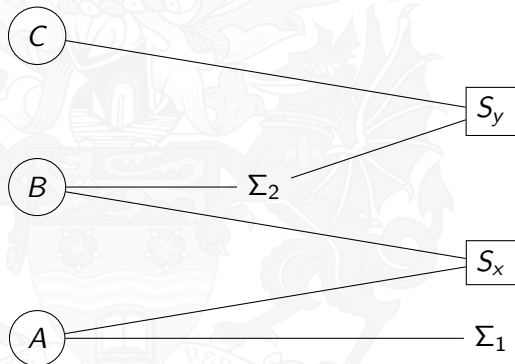
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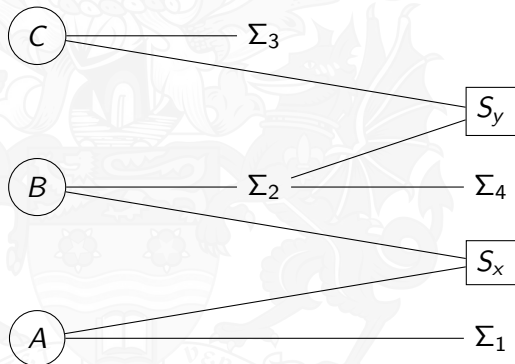
Figuring out if S_y is not in A or S_x ? No Idea.

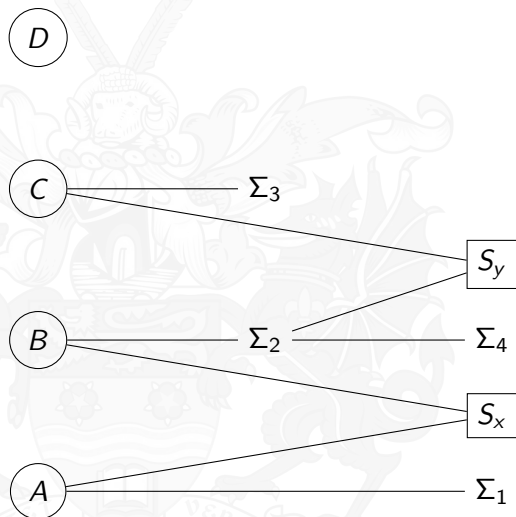
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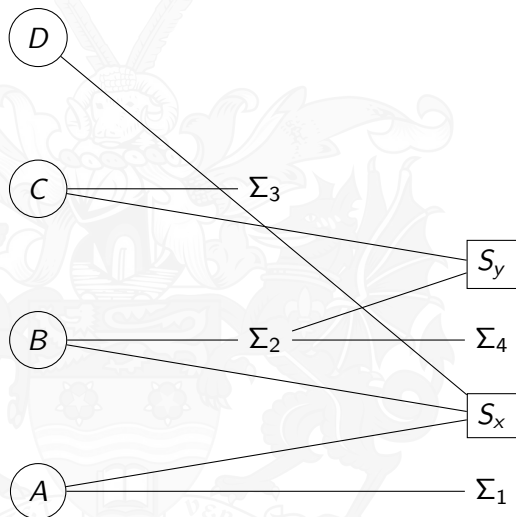
Self-Optimising Objects

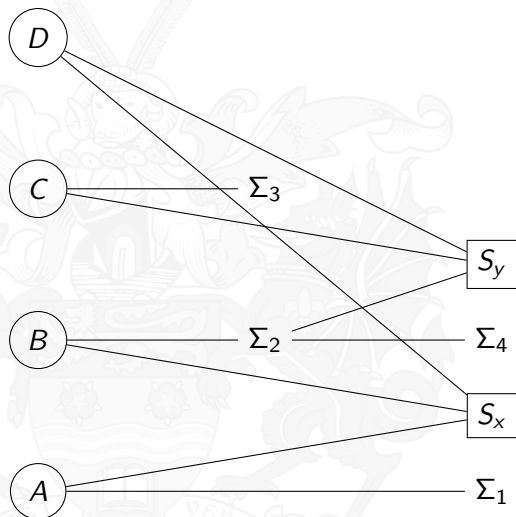


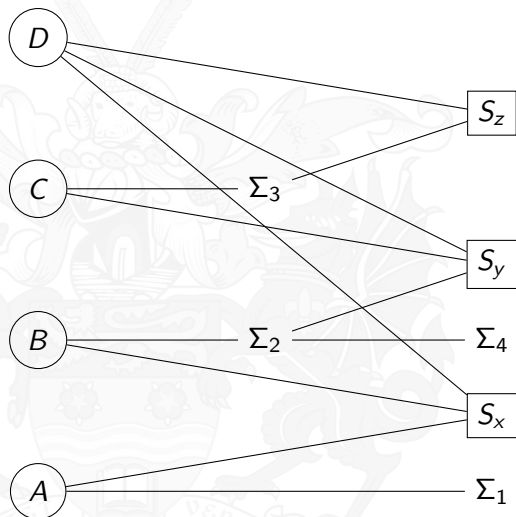


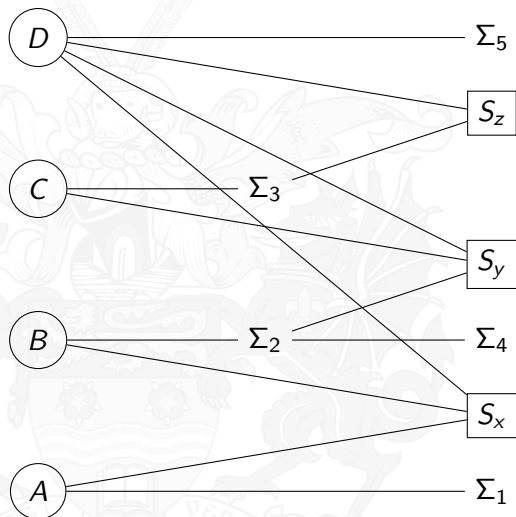


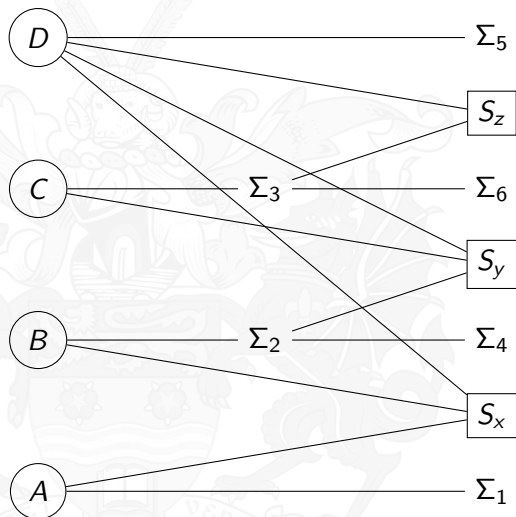


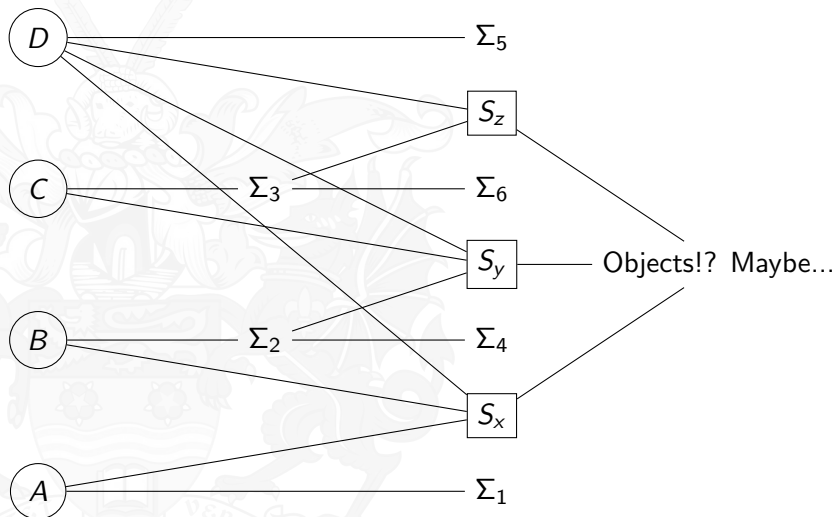


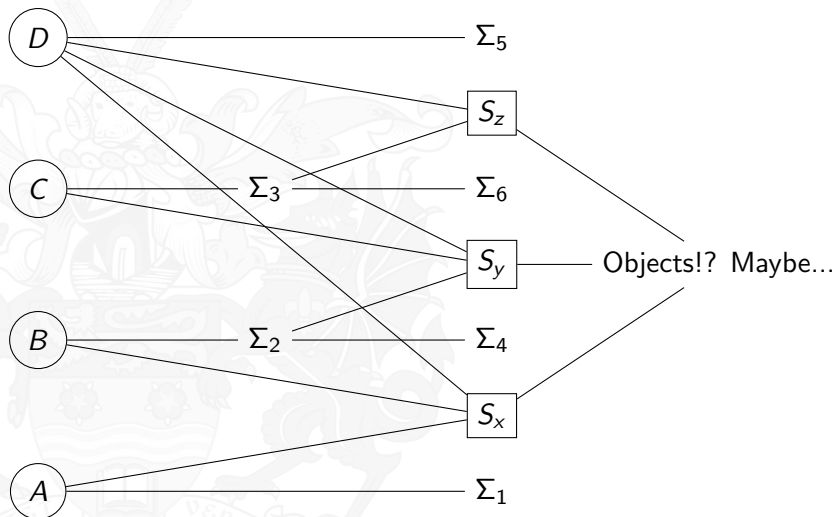










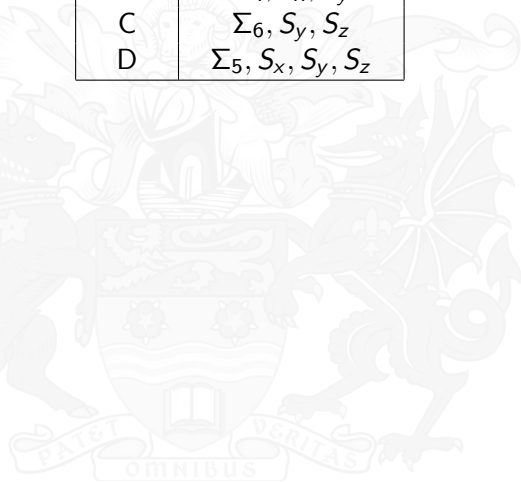


How do you optimise the ordering for encoder objects? No idea.

Toy Example

Alice, Bob, Charlie, Dave

Client	Servicing Nodes
A	Σ_1, S_x
B	Σ_4, S_x, S_y
C	Σ_6, S_y, S_z
D	Σ_5, S_x, S_y, S_z



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assume that if the set is an itemised set of objects.

$$\Sigma_n \rightarrow \emptyset$$

Discard Σ_n as remainder Over large number of nodes.

$$A = S_x, B = S_x, S_y \dots$$

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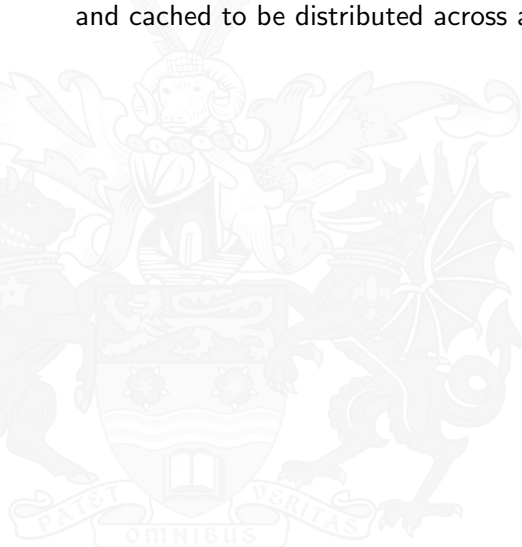
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How to Assess if Σ_n is just artefact or truly unique? No idea.

Distributing Nodes

How does sub-division help us?

Similar Encoding properties/objects would be dynamically grouped, and cached to be distributed across a network.



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Add a new Client E. Existing parts of E that are already cached closer to the client fetch faster / optimisation to identify similar signals from a lower-quality/partially computed version.

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E	Σ_7, S_z, S_y

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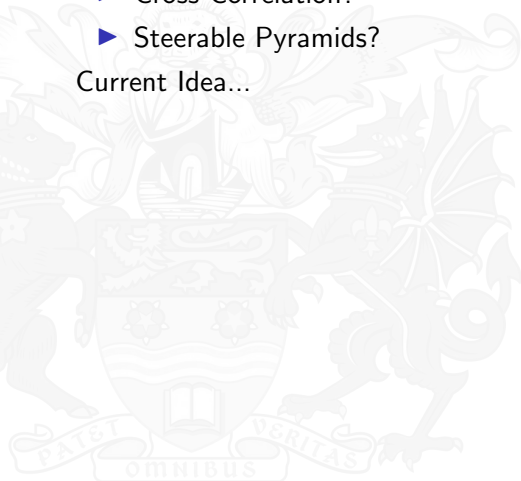
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But how to identify S_z in E without full render? No idea.

Assuming that both signal A and B are correlated if they contain the same object with a different single change.

- ▶ Cross-Correlation?
- ▶ Steerable Pyramids?

Current Idea...



Optimisation of an Object Tree

How do you optimise extraction of signals?



Network Distribution

How do you distribute this over a network?



Encoding/Decoding Weights

How do you identify ways to optimise self consumption/propagation



Dynamic Generation

Identifying Objects as Code (OaC) and their applications



