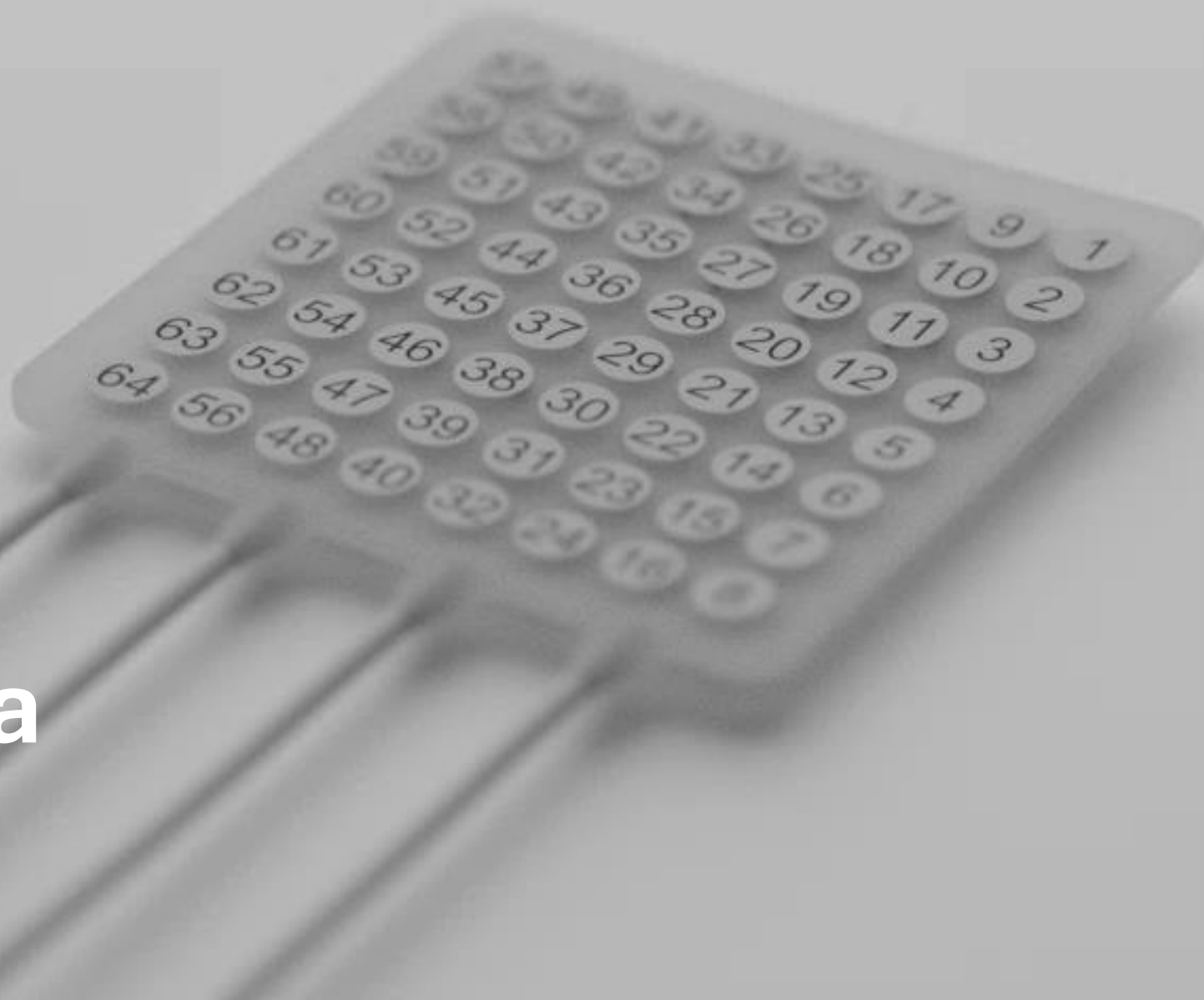


SURF

Creating Synthetic Data

Hizirwan Salim

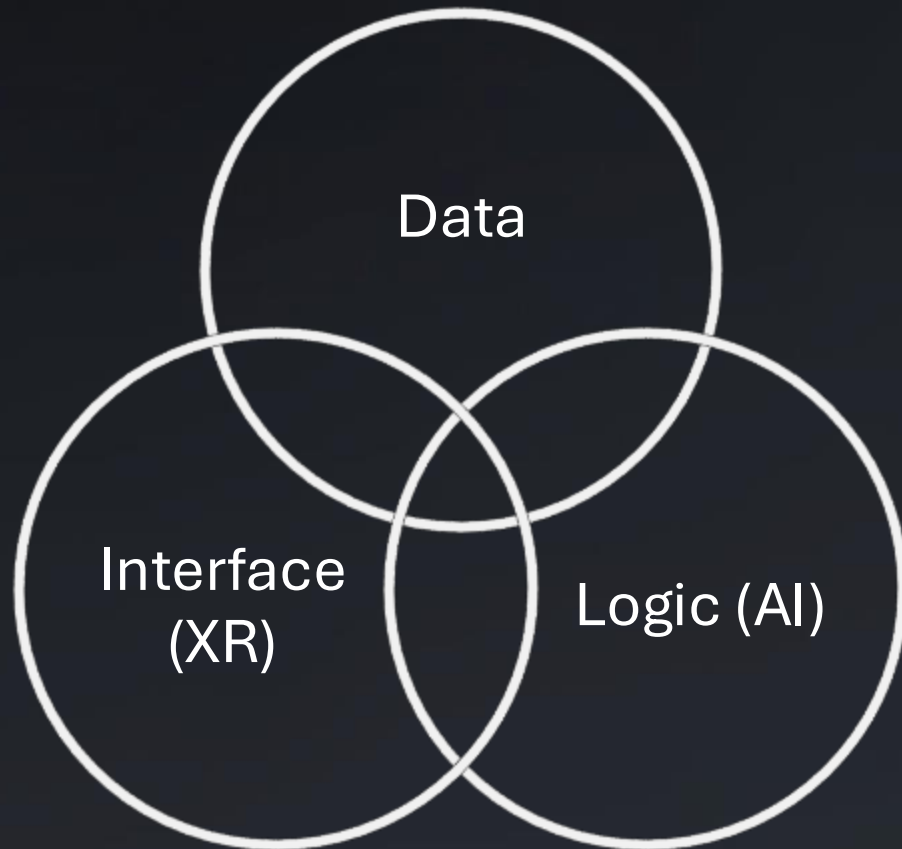
23 December, 2024



| What I would like to get across

- Context: Intersection of XR and AI
- Synthetic data is cool
- An example project and how you could do the same

| XR + AI



SURF

*Background adapted from Microsoft

| XR + AI – ChatGPT

+ New Thread

ChatGPT



Examples

"Explain quantum computing in simple terms" →

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →



Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests

☀ Light Mode

🗨 OpenAI Discord

🔗 Updates & FAQ

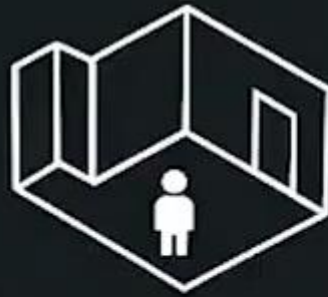
🚪 Log out

view: ChatGPT is optimized for dialogue. Our goal is to make AI systems more natural to interact with

**| XR + AI – LLM's connected
+ Augmented reality**



| XR + AI - Meta Scene Understanding



Walk around your space to
build the point map

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Synthetic Data

Inspired by presentation of Microsoft on
[Synthetic Data](#)



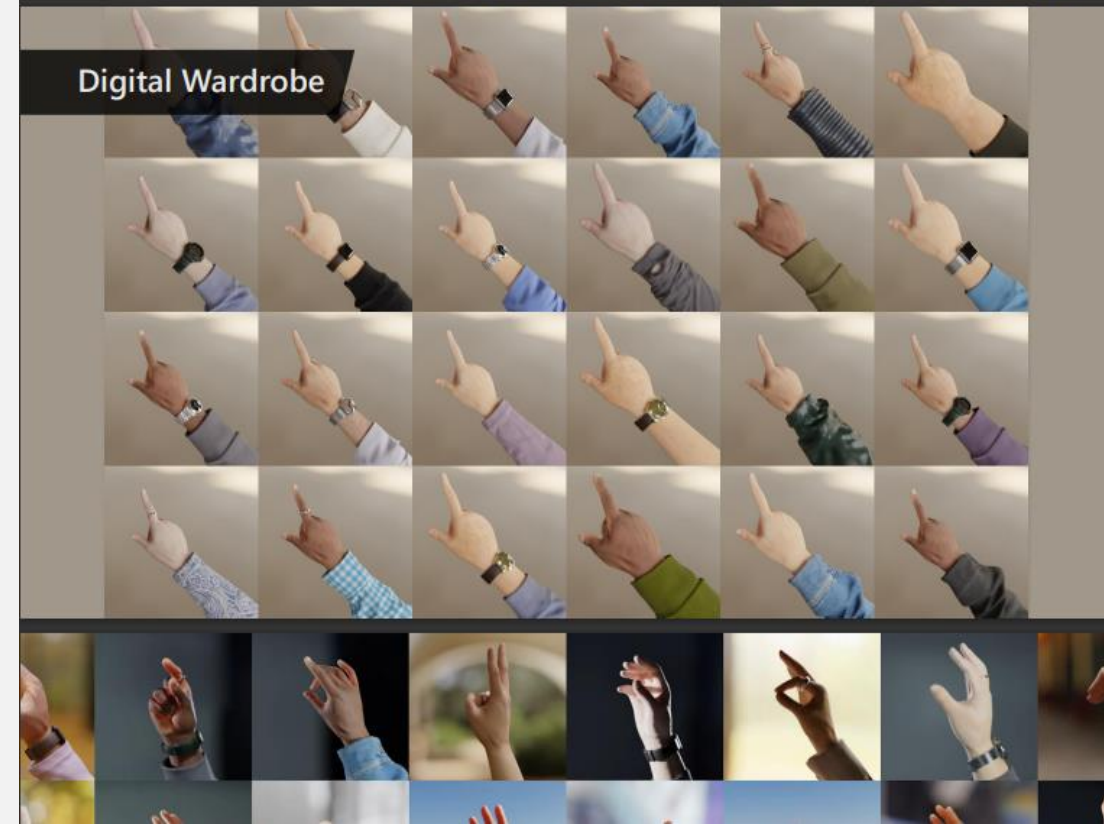
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Mocap pose database

Hand shapes and poses recovered with
cloud-powered offline fitter.

Hand model fit to data

300,000 data points / frame

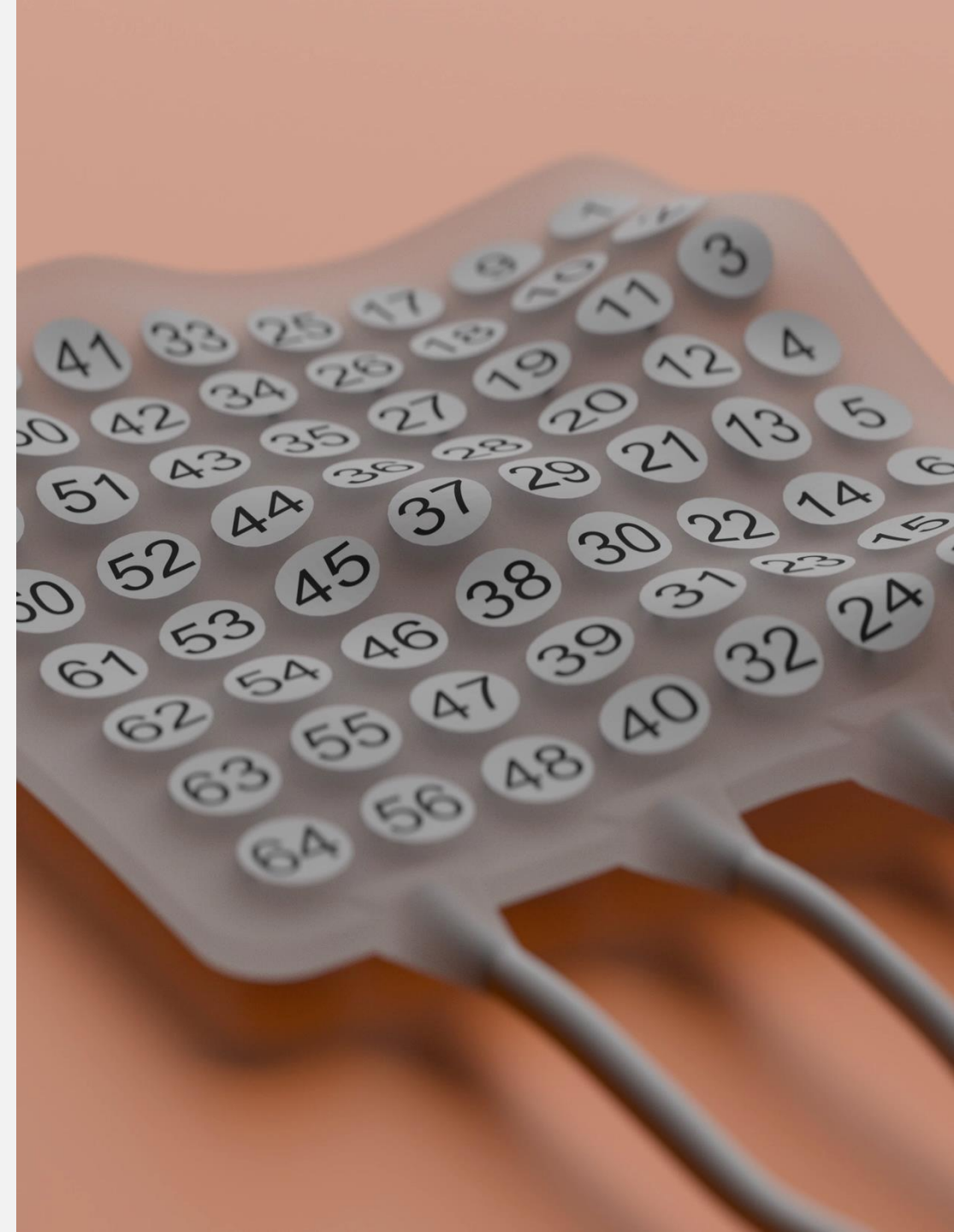


| Synthetic Data – Benefits

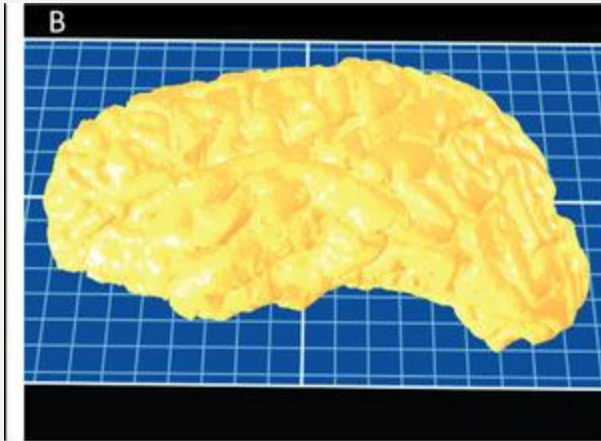
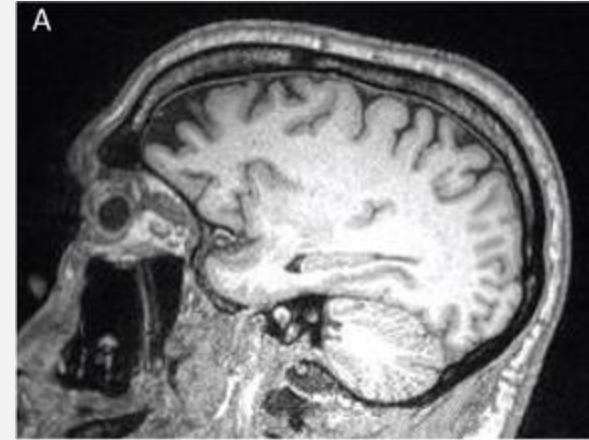
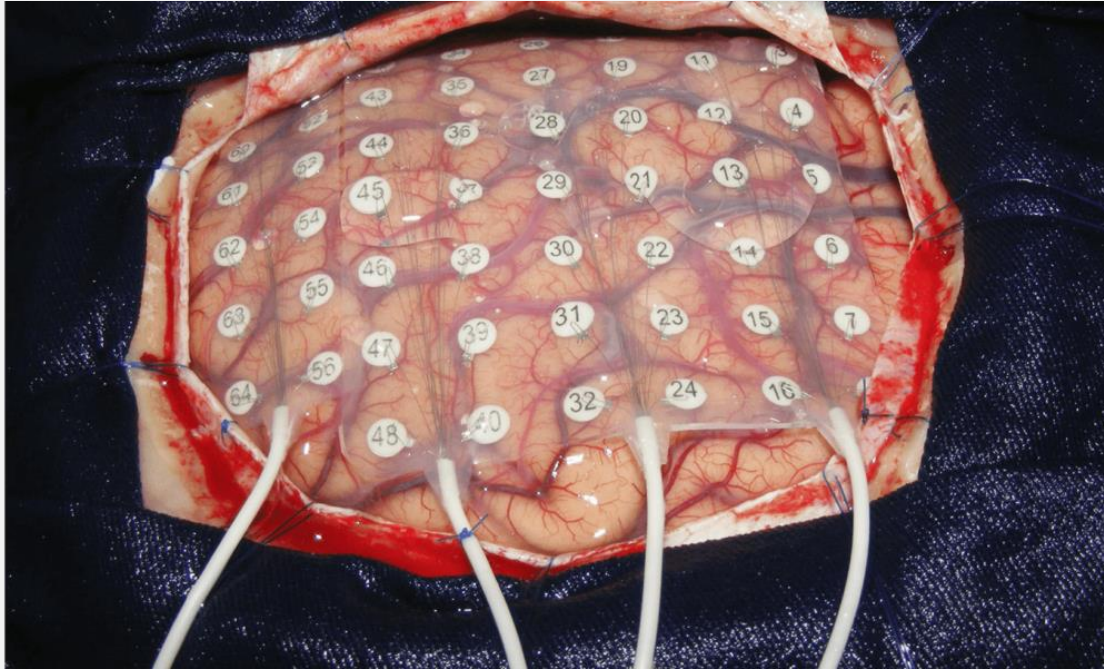
Synthetic training data are labelled images made using computer graphics.

Why use synthetic data?

- Create large dataset
- Easy to control variation in dataset
- Generate labels impossible to annotate by hand
- Clean labels without annotation noise or error



| The Example project - Neurosurgery



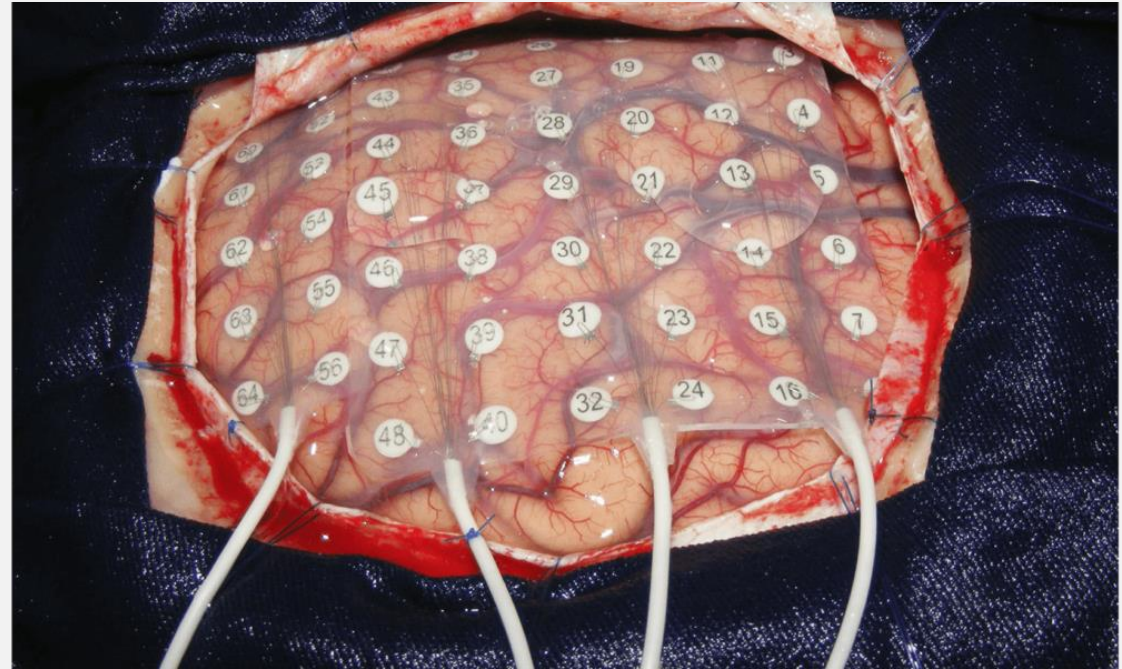
| Example project – Sensors



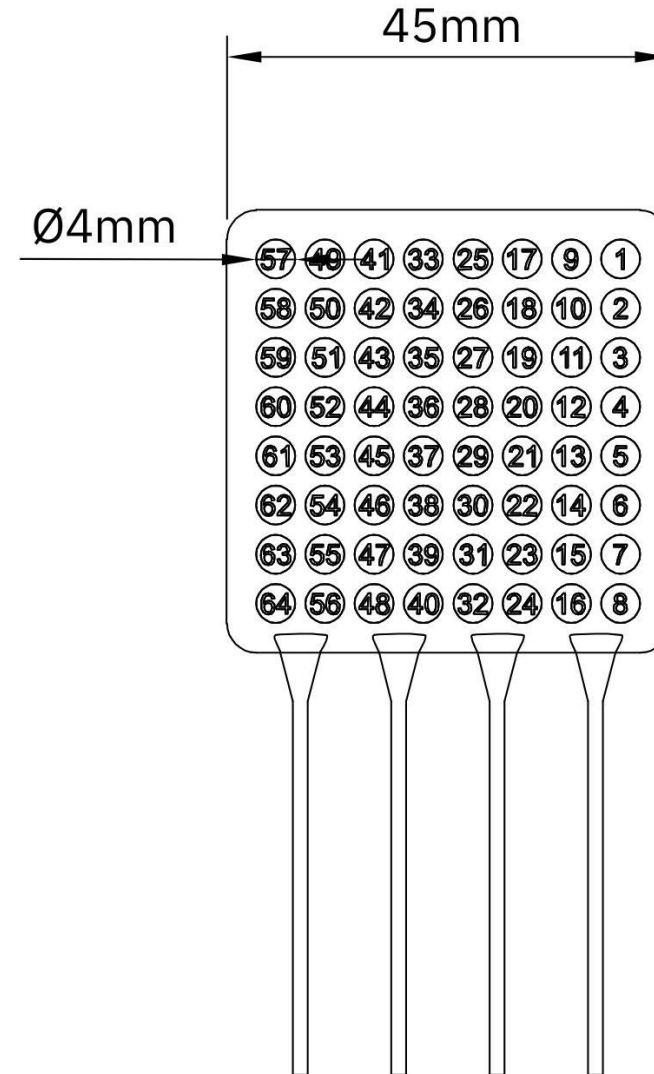
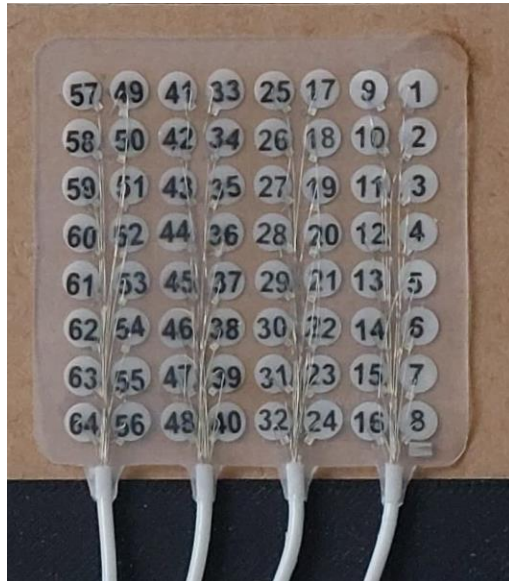
| Example project – The processing



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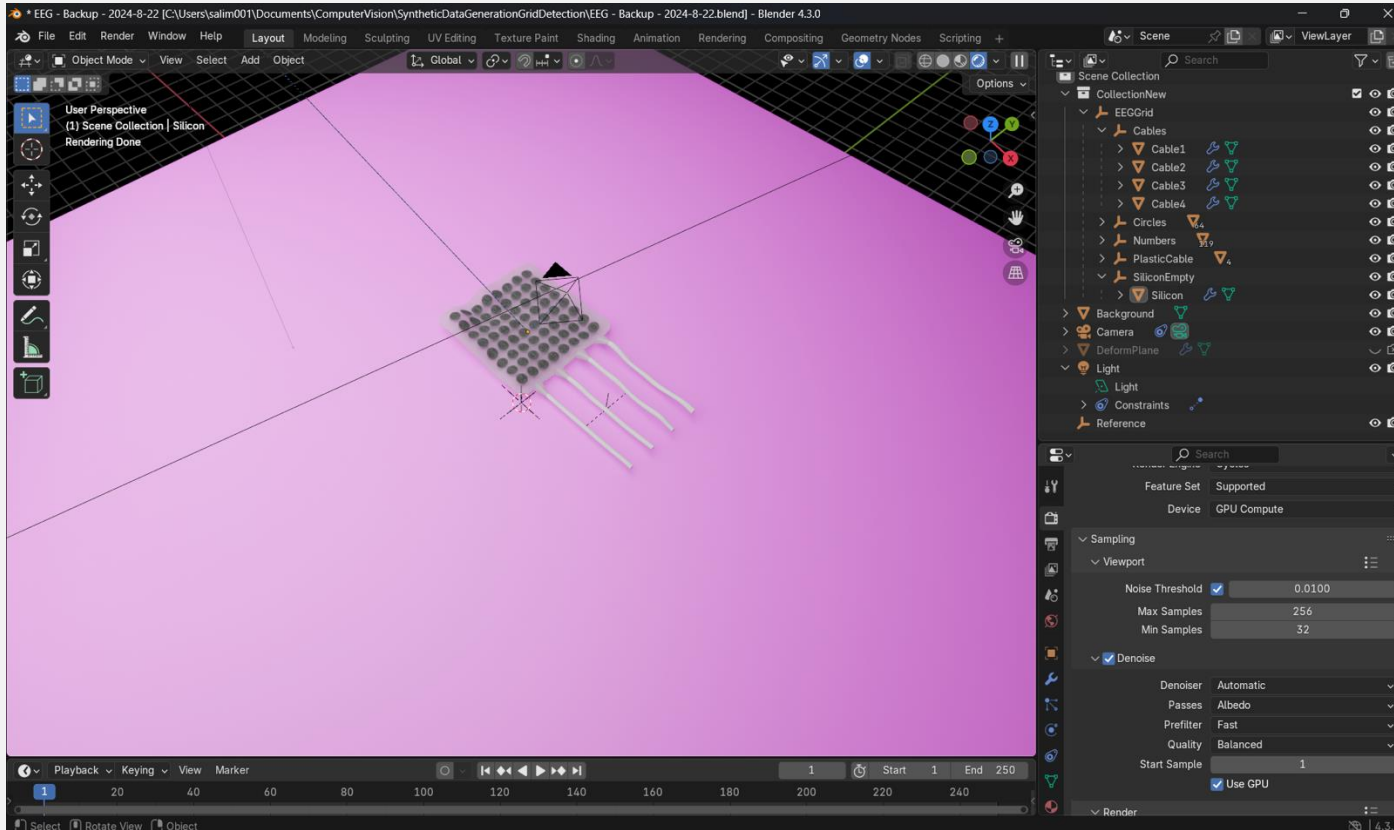
| The Example project – Create the object



Fusion 360

SURF

The Example project – Renderer and parameterize

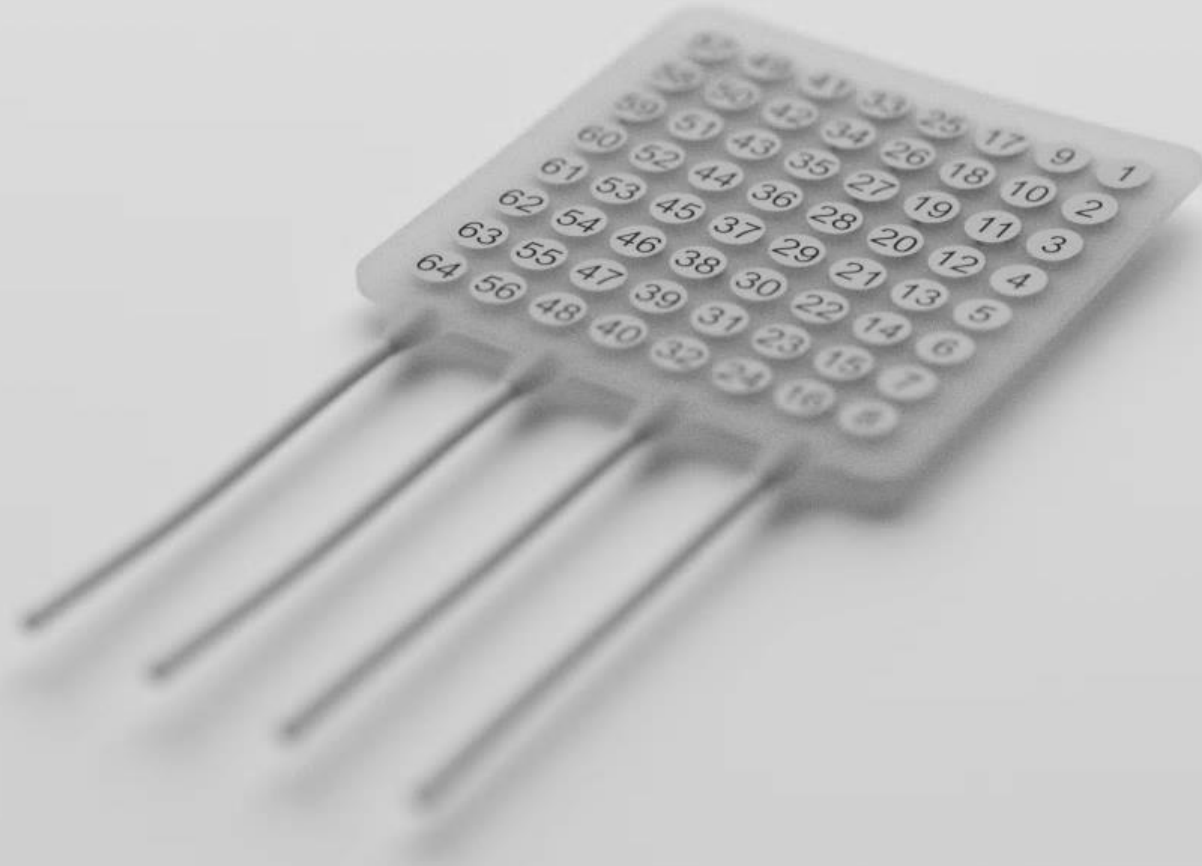


Automated renders
with randomized:

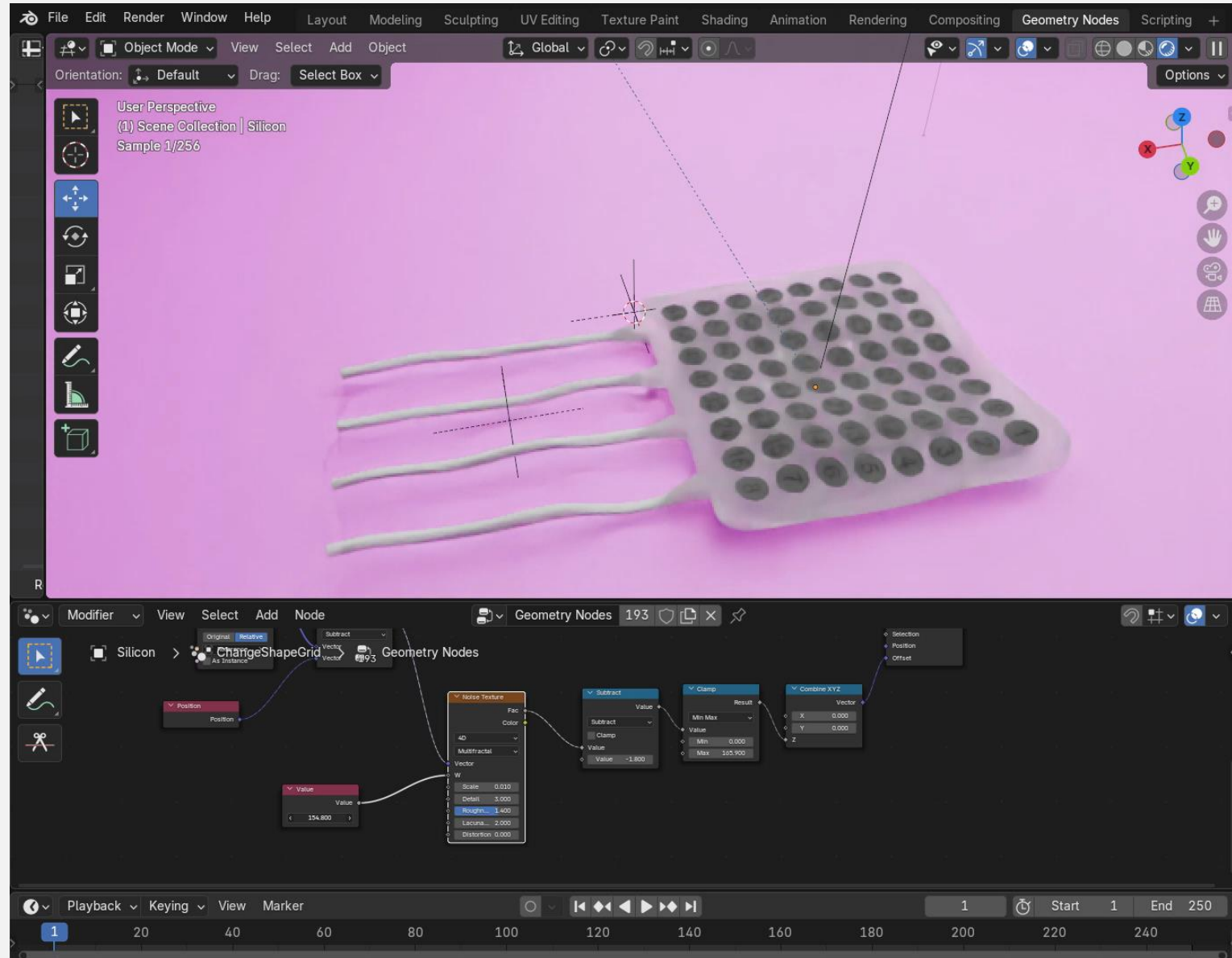
- Camera angles
- Lighting
- Resolution
- Background
- Grid shape

90.000+ images
rendered

| The Example project – Demo



The Example project – Demo backup



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| Ad – SURF blender course



Paul Melis



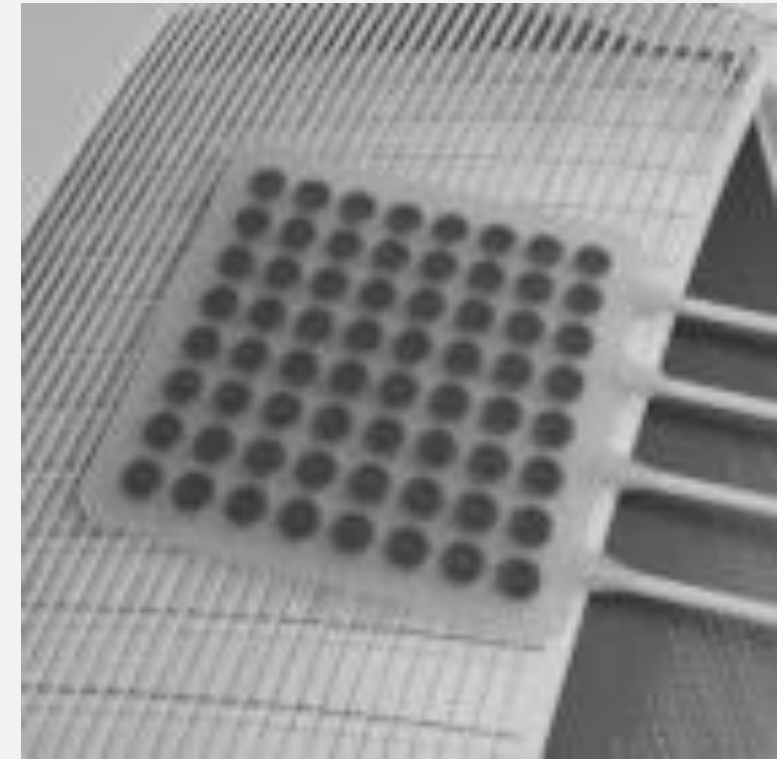
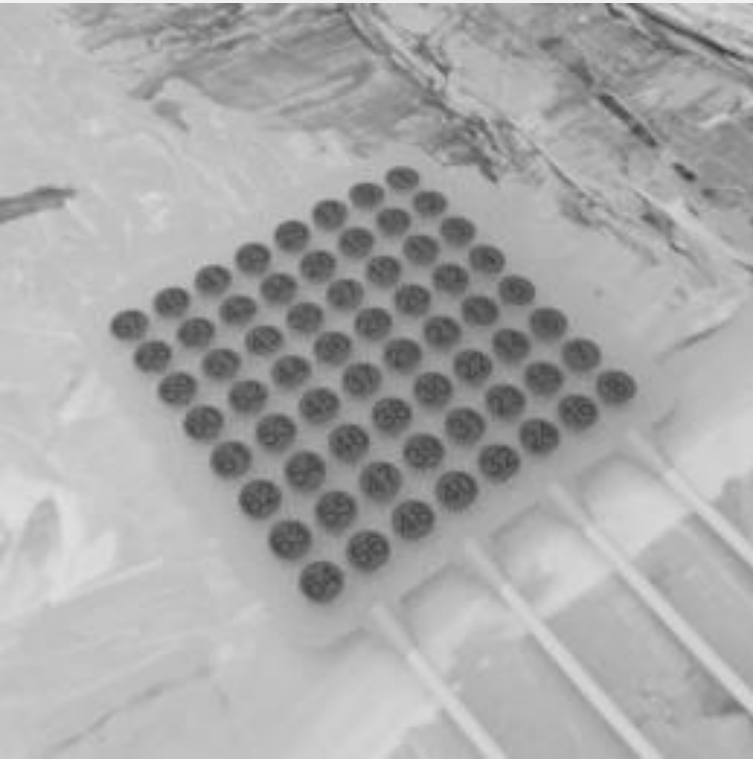
Casper van Leeuwen



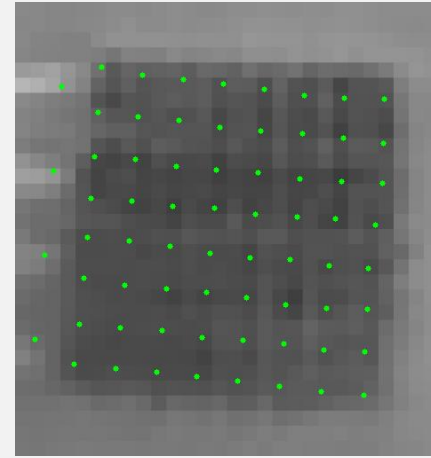
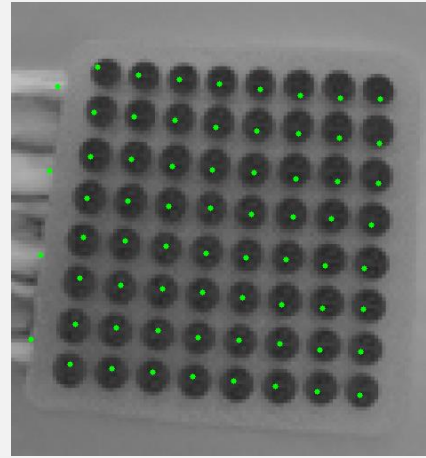
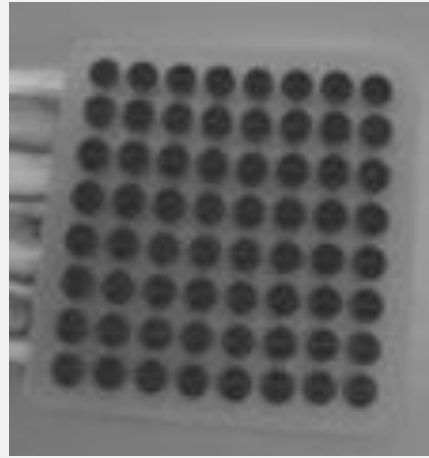
Ben de Vries



| The Example project – Data set examples

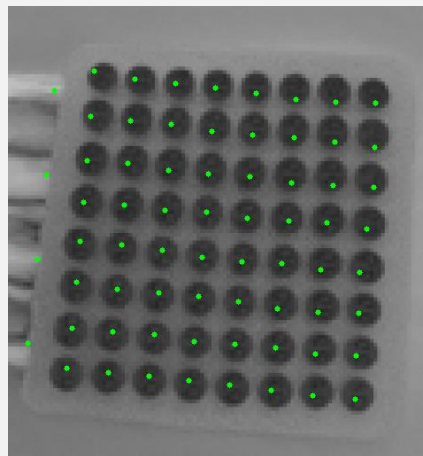
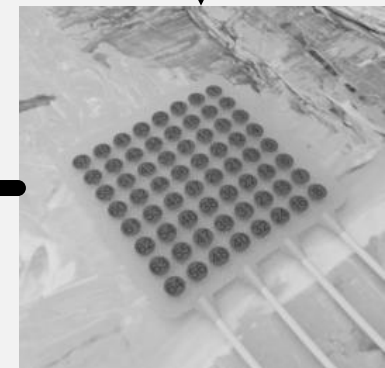
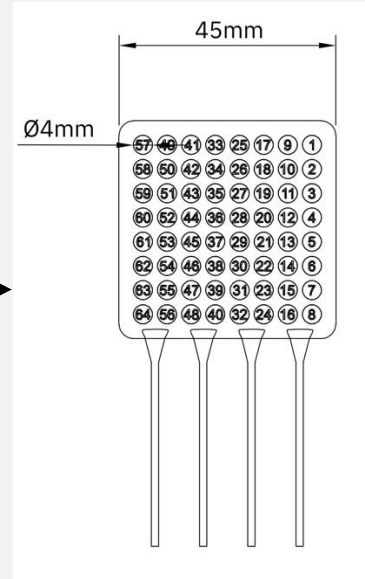
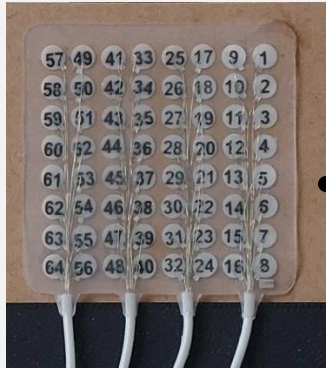


| Example project – The processing



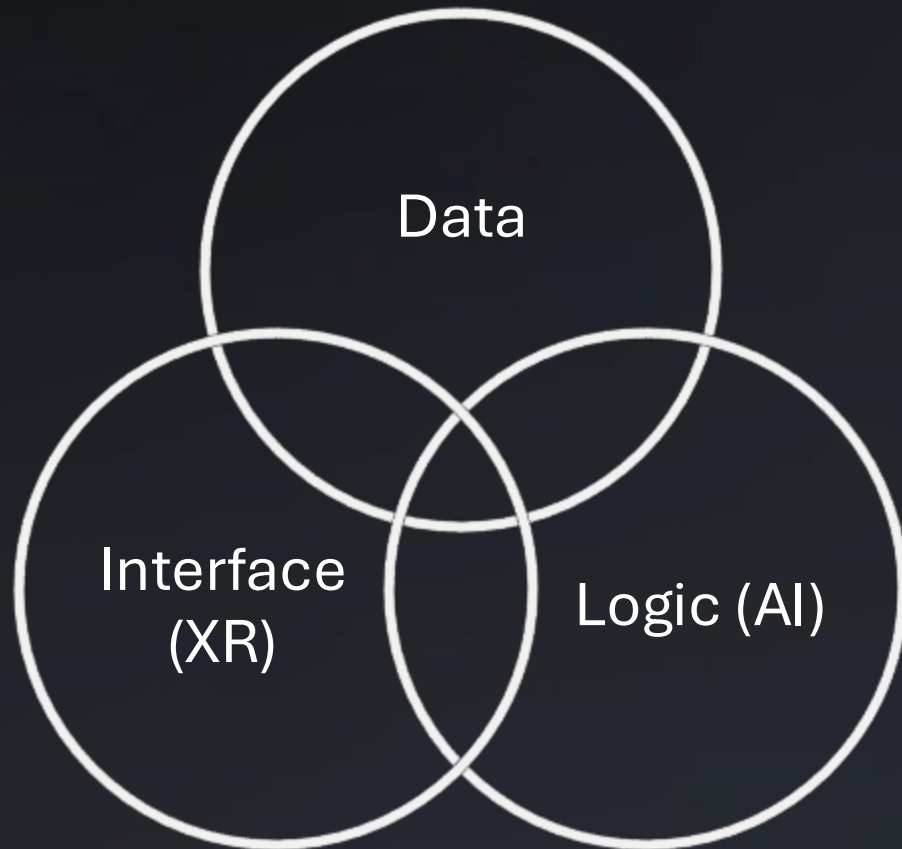
SURF

Example project – High level recap



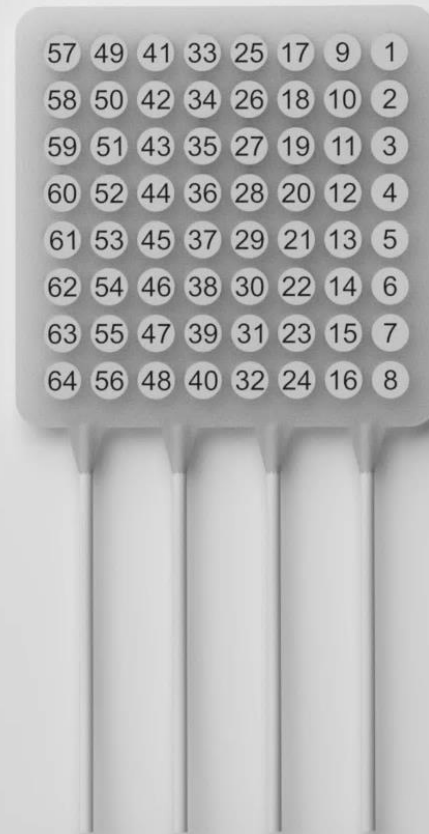
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| XR + AI



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*Background adapted from Microsoft



Hizirwan.salim@surf.nl