



University
of Glasgow

On the Way of an AI-based Spin-out

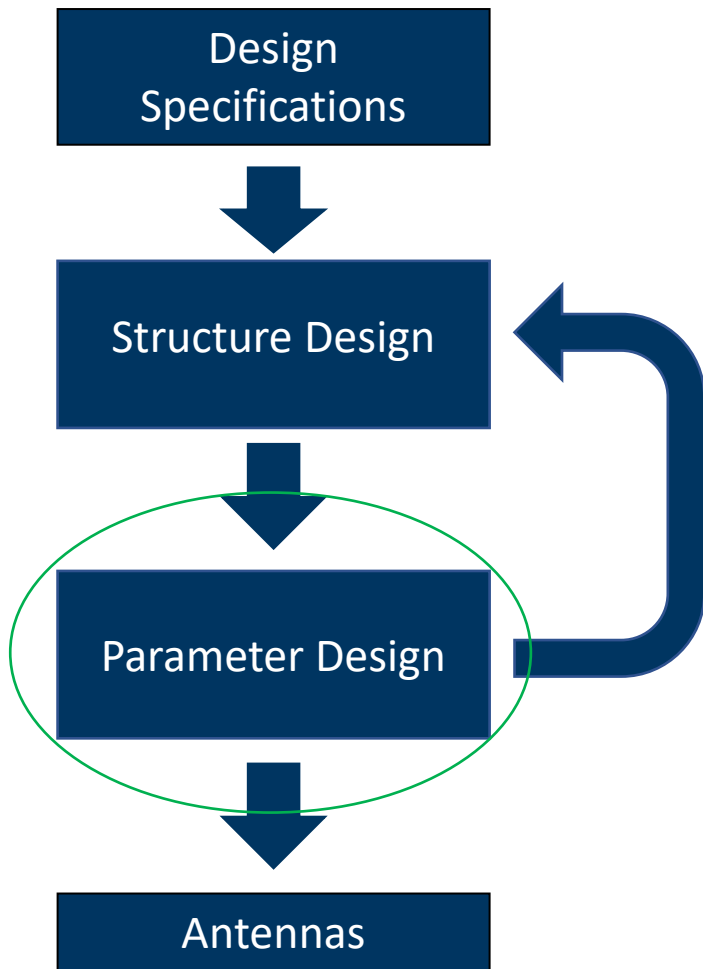
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1. Background introduction
2. Current status
3. Reflections
4. How can the government help

Developing AI Tools for Electronic Design Automation

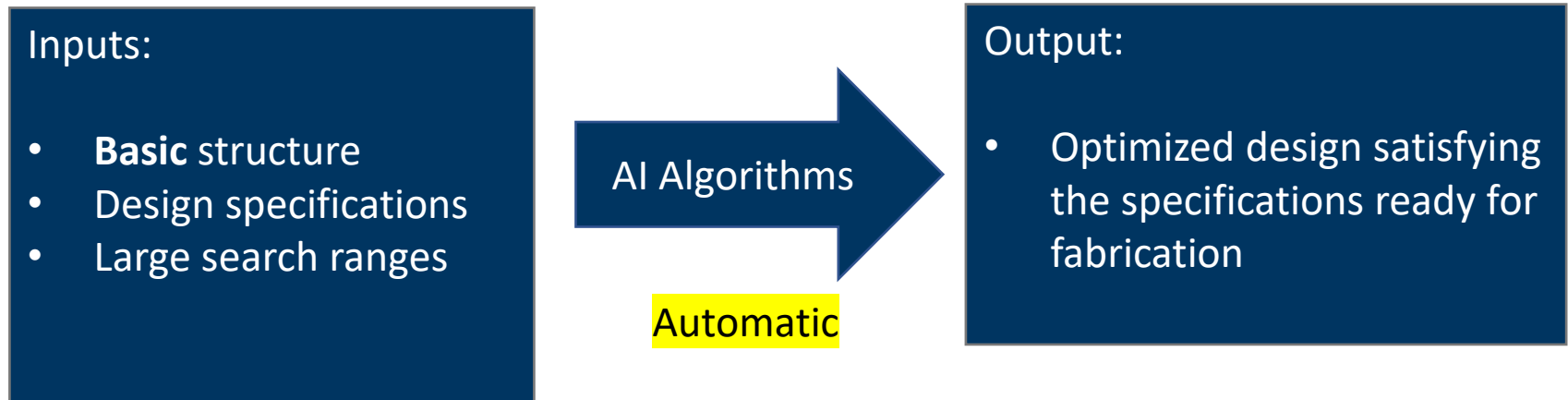
- Integrated circuits and electromagnetic devices are essential in the society.
- The design of integrated circuits and electromagnetic devices still follows a trial-and-error approach, costing a long design time and obtains suboptimal design solutions.
- My group invented AI techniques for the AI-driven design of integrated circuits and electromagnetic devices, addressing the current bottlenecks.

Example: AI-driven Antenna Design



- **Parameter design**
- **Rule of thumb:**
 - Only for simple cases
- **Parameter study:**
 - Only for antenna experts
 - Cost a long time of trial-and-error
 - Difficult when the number of design variables becomes a lot
 - Often obtains suboptimal results

What Is AI-driven Antenna Design?

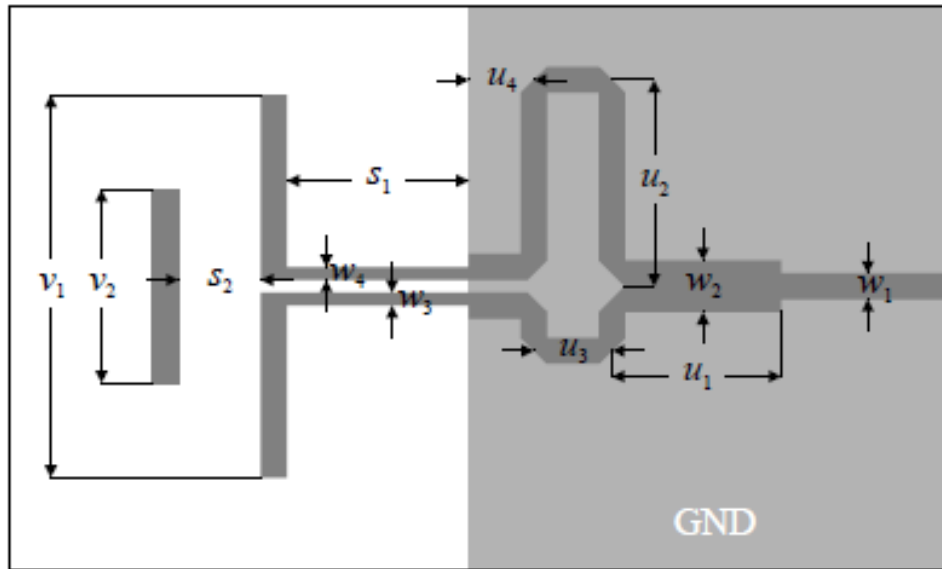


Aims:

- Obtain high-quality designs that manual design methodologies are not able/difficult to
- Significantly save the design time
- No need initial design
- Can be operated by average-level engineers

Example Antenna

Example: Yagi-Uda antenna 10 GHz – 11 GHz
Rogers RT6010



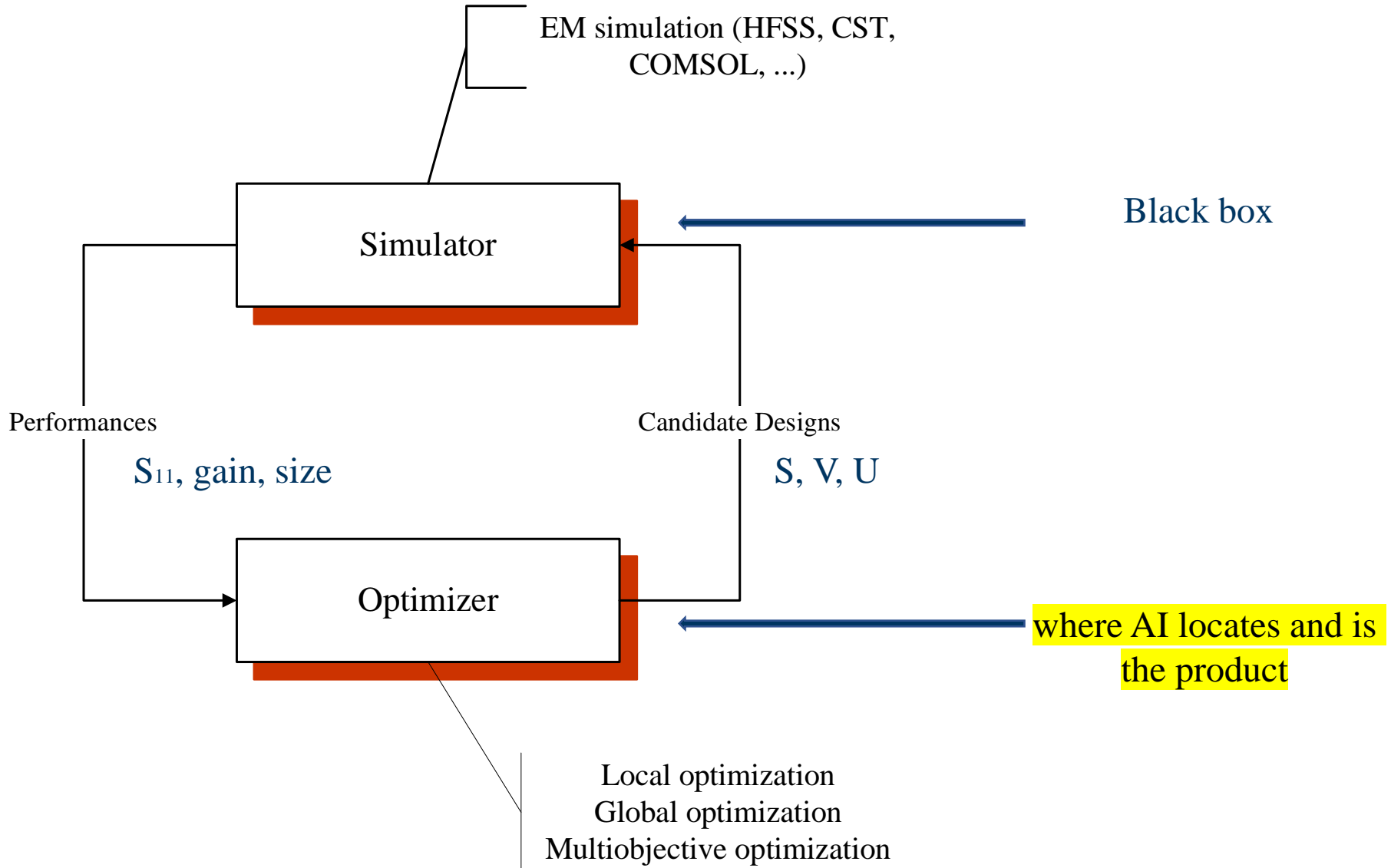
Un-optimized structure

Designer's task:

Given the structure (left), find the design parameters that:

- The maximum of the return loss should be smaller than -10 dB in the operating band
- The average gain in the operating band should be larger than 6 dB
- Given that, the size should be as compact as possible

The AI-driven antenna design software tool



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Current Status (1)

- Product development: UK EPSRC IAA funding
 - 70% finished
- Looking for customers:
 - Sony, Nokia, Airbus show interest and are asking for test and validation
 - MathWorks embedded the key algorithms into MATLAB Antenna Toolbox
 - ANSYS and COMSOL agree to sell the tool via their market place.

Current Status (2)

- Launch the spin-out:
 - Writing business plan
 - Seeking initial funding from GU Holding (University funding)
- Looking for enthusiastic CEO with experience

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Reflections (1)

- Academics are the source of creation. Some of them also have business ideas, but most of them are lack of business experience.
- Commercialization team has business experience but they are insufficient in understanding of the particular high-tech market and how AI can play a significant role. It should still be the academic to plan the direction of the business.
- It often costs the academic tremendous time to explain the idea to the commercialization supporters. There is a gap between them.

Reflections (2)

- When developing the product, the university software development team is the main force to develop the software. This is necessary due to their in-depth knowledge considering AI-related development.
- However, university software development team is insufficient in industry/business way of working. The organization way of academics cause delay of product delivery.

Reflections (3)

- CEO is important to support the academics for building the spin-out.
- However, the route to find the CEO is unclear for academics.

Reflections: What Do We Need?

- Commercialization supporters with science and engineering background linking academics and supporters only with business experience.
- Software is an important media to support AI-based products. Software engineering team with AI and science and engineering knowledge, who is also trained by industry way of working, is needed.
- A network of potential CEOs with science and engineering background and business knowledge.

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How can the government help?

- Including business training into the education program of science and engineering students.
- Invest more to universities for commercialization of AI-based product.
- Special funding for software teams for AI-based product development.
- Support to build the network of experts who play a role in transforming AI techniques to products.

Thanks for listening!