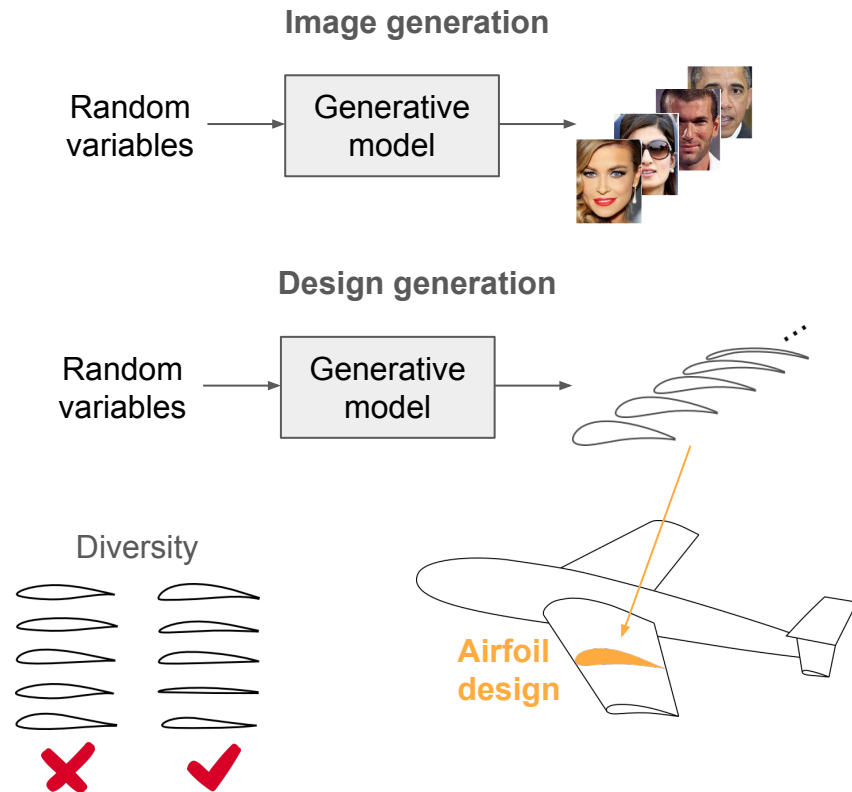
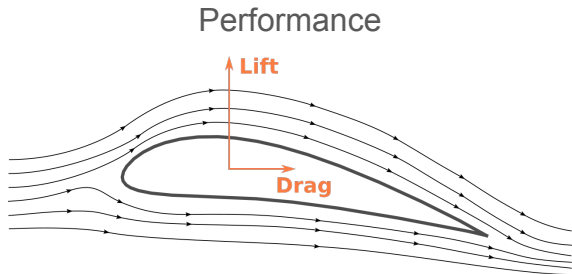


MO-PaDGAN: Generating Diverse Designs with Multivariate Performance Enhancement

Wei Chen (chen.wei@siemens.com) and Faez Ahmed (faez@northwestern.edu)

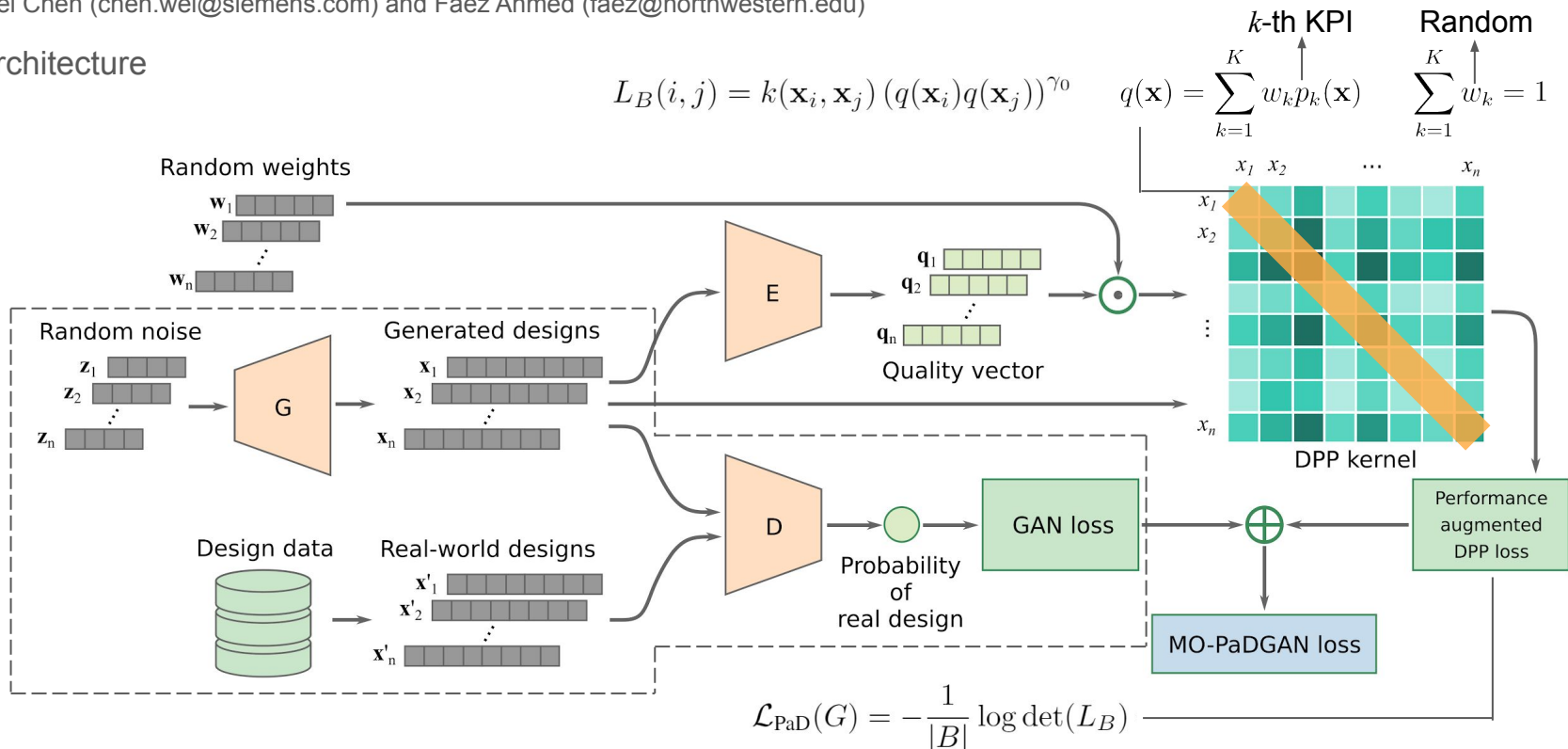
- Generative model for design generation (airfoil design as an example)
- Unlike image generation, design generation has performance requirements
- The performance can be indicated by multiple factors (multivariate)
- Use DPP to enable **diverse** and **high-performance** design generation



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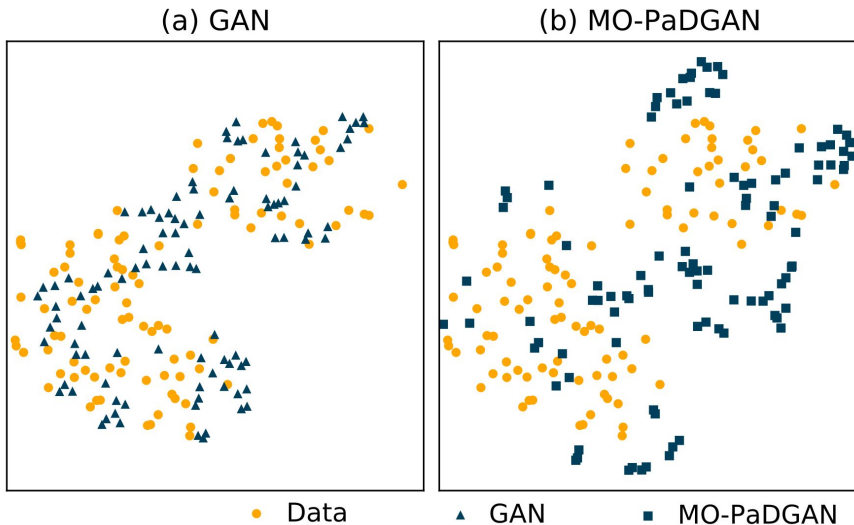
Architecture



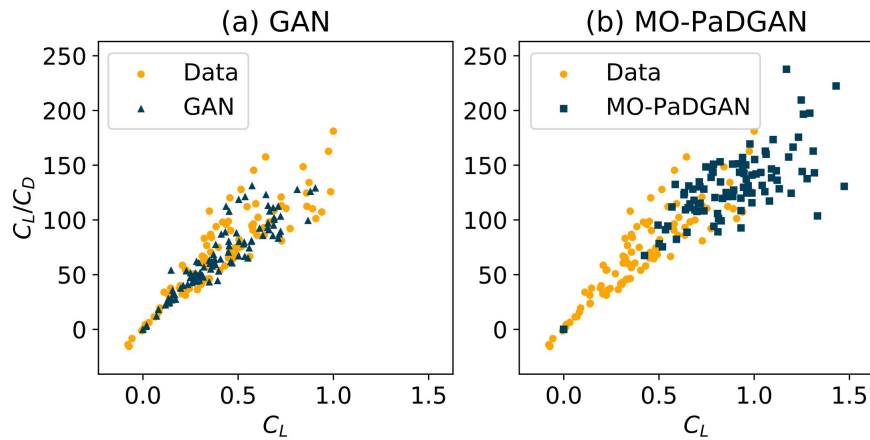
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Design space



Performance Space



- MO-PaDGAN can generate novel and high-performance designs
- Future work: learn DPP kernel

Rank	Data		GAN		MO-PaDGAN	
	C_L	C_L/C_D	C_L	C_L/C_D	C_L	C_L/C_D
1	1.00	181.14	0.91	131.42	1.47	237.68
2	0.99	162.69	0.88	129.33	1.43	222.40
3	0.97	157.56	0.87	127.99	1.33	209.56
4	0.94	148.59	0.81	126.17	1.32	197.55
5	0.91	145.38	0.72	123.32	1.31	196.59