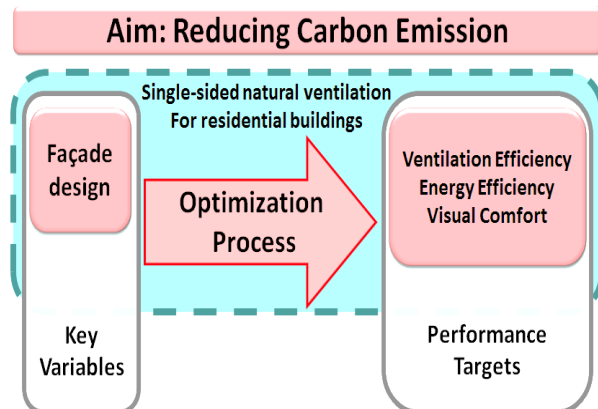


AN EVOLUTIONARY APPROACH TO SINGLE-SIDED VENTILATED FAÇADE DESIGN

RESEARCH QUESTION

How can single-sided façade design be optimised to decrease energy consumption and improve indoor environment while not adding to carbon emission?

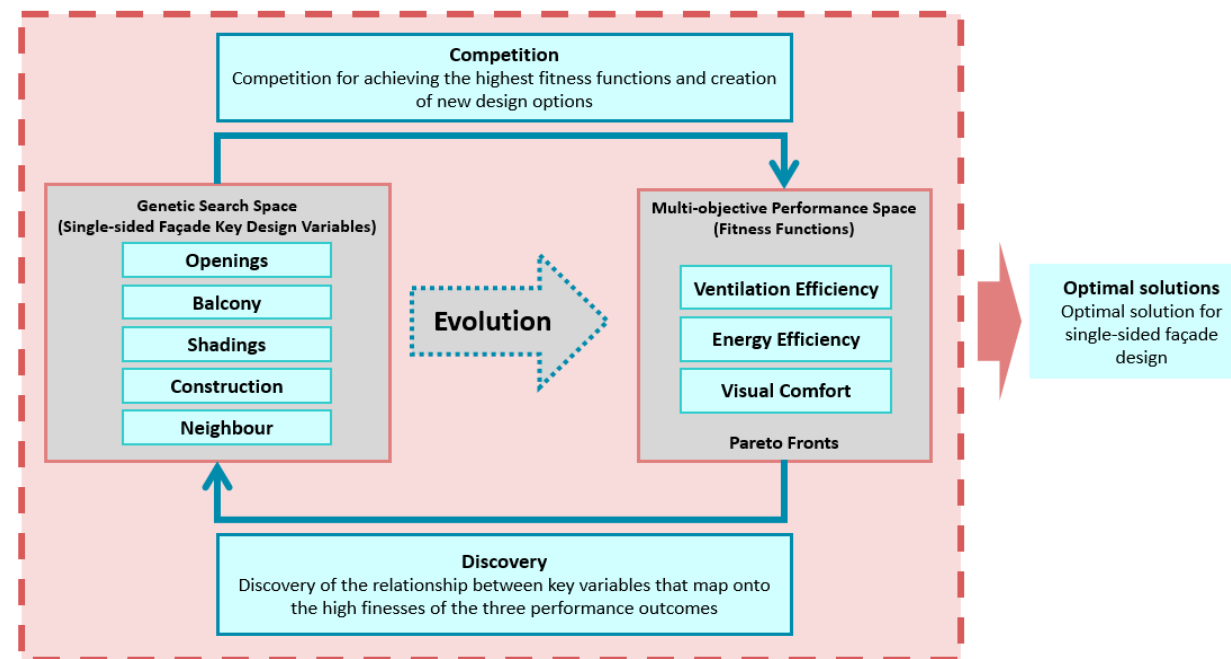
How can a high-level and innovative façade optimization algorithm be developed to investigate the best façade designs?



METHODOLOGY

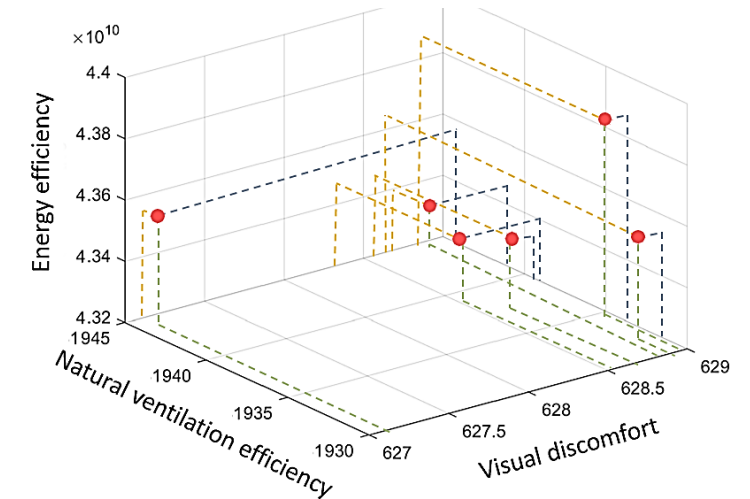
An Evolutionary Process Model based on Genetic Algorithm (GA)

EnergyPlus is used to evaluate the performance targets, and Matlab is used to run the evolutionary process.



RESULTS

The final result of this optimization is a set of optimal façade designs all satisfying the objectives of natural ventilation efficiency, energy efficiency and visual comfort in the acceptable range.



CONCLUSION

- An evolutionary method which can be used by architectural practices to optimize façade designs
- A set of optimal façade designs which map onto high performance of natural ventilation efficiency, energy efficiency and visual comfort

ANTICIPATED IMPACTS

- Design support for single-sided ventilated façade design
- Decreasing carbon emission in residential building sector

FURTHER INFORMATION CONTACT

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SCOPE



BY USING THE EVOLUTIONARY MODEL, WE CAN DESIGN LOW CARBON, COMFORTABLE AND HEALTHY RESIDENTIAL BUILDINGS