

Himoto Laboratory

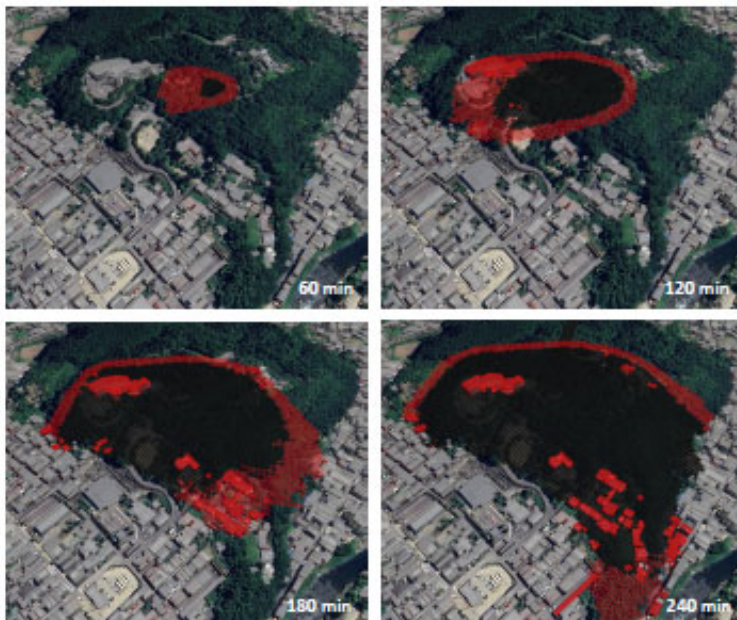
Methodologies for designing the built environment resilient to fires and other disasters

Multidisciplinary Resilience Research Center

<http://sites.google.com/view/himoto-isct>

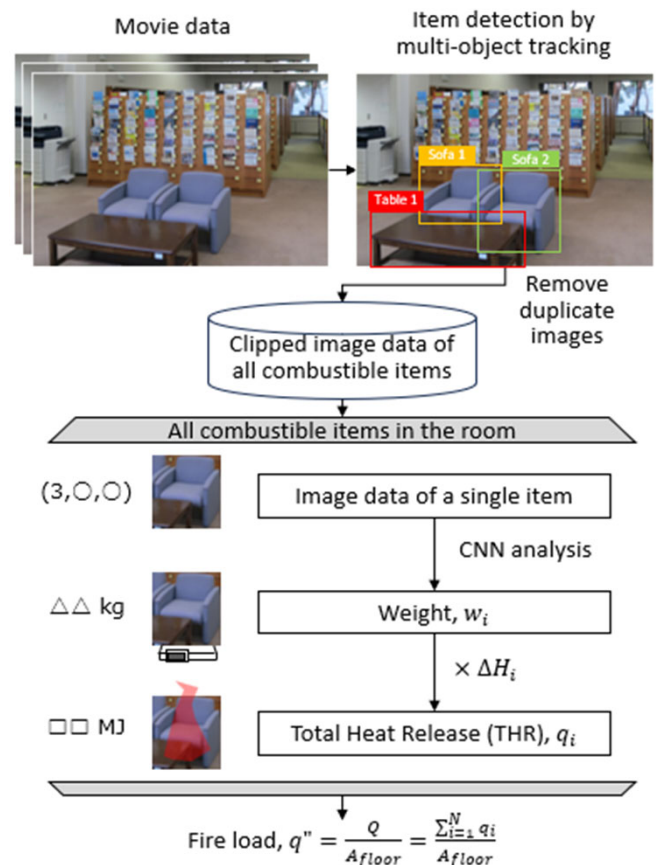
- Physics-based fire spread simulation models for large outdoor fires
- Performance evaluation methods for functional continuity of buildings damaged by fire
- Efficient fire load survey methods using image analysis techniques
- Verification methods for fire protection management systems of historic buildings

Methodologies to design resilient built environment by integrating new analytical technologies with our core knowledge of fire safety engineering



Example of fire spread simulation at WUI

The fire that occurred in the forest of Ofunato City in March 2025 involved many buildings and caused unprecedented damage. Quantitative assessment of the risks posed by such large outdoor fires is essential for designing countermeasures. We are developing physics-based models to predict fire spread at wildland-urban interface (WUI).



A procedure for efficient fire load survey

In fire safety design of buildings, fire risk is assessed based on fire load of individual rooms (the weight of combustibles or total heat release per unit area). Design fire loads are established based on the results of past field surveys, but their actual conditions continue changing. To maintain and improve the reliability of the fire safety design framework, fire load database needs to be updated regularly. We are developing efficient fire load survey methods by using image analysis techniques based on deep learning.