ARCS
AUTONOMY RESEARCH CENTER FOR STEAHM
Autonomy For Manufacturing and Construction

AI in Construction Code Compliance

Synopsis

- Automate Building Information Model (BIM) checking processes.
- Use SPARQL queries and rule-based systems to extract and analyze building data.
- Aimed at improving accuracy and efficiency in the BIM validation workflow.

Research Objective

- Develop an intelligent system for automating BIM validation.
- Focus on creating a system independent of specific BIM software by using IFC files.
- Implement rules from the International Building Code (IBC) to validate building designs.
- Generate comprehensive reports accessible via a website.

Research Approach

- Utilize IFC files for universal compatibility across BIM software.
- Convert IFC to RDF format to query using SPARQL.
- Use **SmartReview** as a research tool to guide the generation of accurate reports.
- Leverage Jupyter Notebooks for advanced rule visualization and HTML report generation.

Research Results and Products

- Automated BIM validation using SPARQL queries and Python rules.
- IFC compatibility ensures the system can work with any software.
- Creation of HTML reports for easy review of BIM validation reports.

Commercialization and/or Societal Impact Opportunities

- **Application**: Universal BIM validation tool applicable across multiple platforms via IFC standardization.
- **Key Values**: Automation reduces manual errors, accelerates compliance checks, and enhances review efficiency.
- **Potential Customers**: Developers, building authorities, and BIM software users looking to streamline validation processes.

Team Names & Collaborators

ARCS Students:
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Faculty:
Dr. Shawn Sun, Civil Engineering & Construction Management; Dr. Bingbing Li, Manufacturing Systems Engineering and Management

Collaborators:
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Citations

International Code Council. (2021). *2021 International Building Code (2nd ed.)*. https://codes.iccsafe.org/content/IBC2021P2

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