

Project Title: REGBASE: A Distributed Information Infrastructure for Regulation Management and Compliance Checking

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Project Description

This research is to study the regulations for assuring, for the handicapped, accessibility to buildings. The accessibility regulations are federally enacted by the Americans with Disabilities Act (ADA). The intent of the accessibility regulations is to provide the same or equivalent access to a building and its facilities for disabled persons (for example, persons restricted to a wheelchair, persons with hearing and sight disabilities) and persons without qualifying disabilities. To fulfill this intent, the Americans with Disabilities Act Accessibility Guide (ADAAG [1]) has prescribed measures such as various clearances and reach thresholds for building components. Furthermore, the guidelines are continuously being updated and new rules are proposed (and commented by the public). There are two basic research objectives: (1) to develop a design-aid framework to support disabled access analysis for building design; (2) to develop a framework for the management of accessibility regulations.

A Framework for Disabled Access Analysis and Design

Utilizing motion planning techniques, we have developed a simulation-based approach for performance evaluation of the provisions as specified by the intent of the disable accessibility guidelines [2]. To illustrate, Fig. 1 shows an accessibility analysis of a floor layout. In addition, the simulation tool can be used to provide appropriate evaluation (and possibly critics) of the sufficiency and performance of the regulations. Fig. 2 illustrates the potential use of simulation tool to evaluate new guidelines and analyze non-standard configurations.

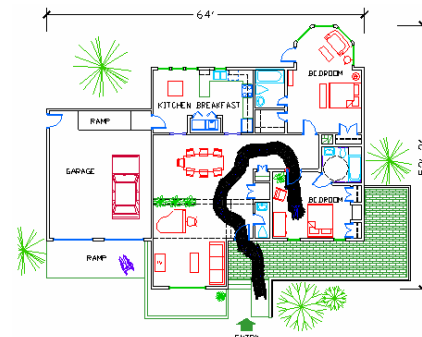
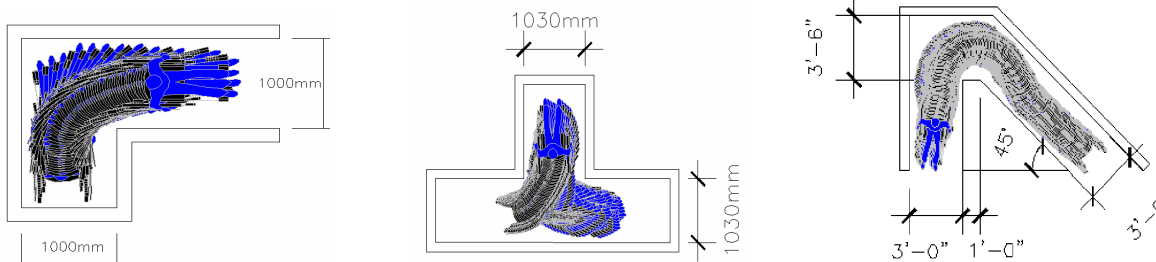


Fig 1. Accessibility Analysis



(a) Evaluation of Proposed ISO Guidelines for Class A Powered Wheelchair on Angled Corridor [3]

(b) Evaluation of Proposed ISO Guidelines for Class C Powered Wheelchair on T-Cross [3]

(c) Evaluation of Non-standard Corridor not specified by ADAAG [1]

Fig 2: Performance Simulation for Evaluation of Proposed Rules and Non-Standard Components

A Framework for Regulatory Information Management

One objective of this research is to develop a regulatory information management framework [4,5]. First, a repository is designed to include a suite of concept hierarchies that enable users to browse

regulations and related documents according to the terms they contain. The second is an XML framework for representing regulations and associated metadata. The XML framework enables the augmentation of regulation text with tools and information that will help users understand and comply with the regulation. The third is a demonstrative prototype for comparative analysis of regulatory information from multiple sources. To illustrate, as shown in Fig. 3, we have applied the comparative analysis tool to link drafted rules with public comments. In this example, the US Access Board released a 15-page long drafted chapter for the ADAAG, titled “Guidelines for Accessible Public Rights-of-way.” Over a period of four months, the Board received over 1400 public comments online. The prototype tool is able to link relevant public comments to specific drafted provisions. This result illustrates the potential of information retrieval techniques in parsing public comments in an E-rulemaking process.

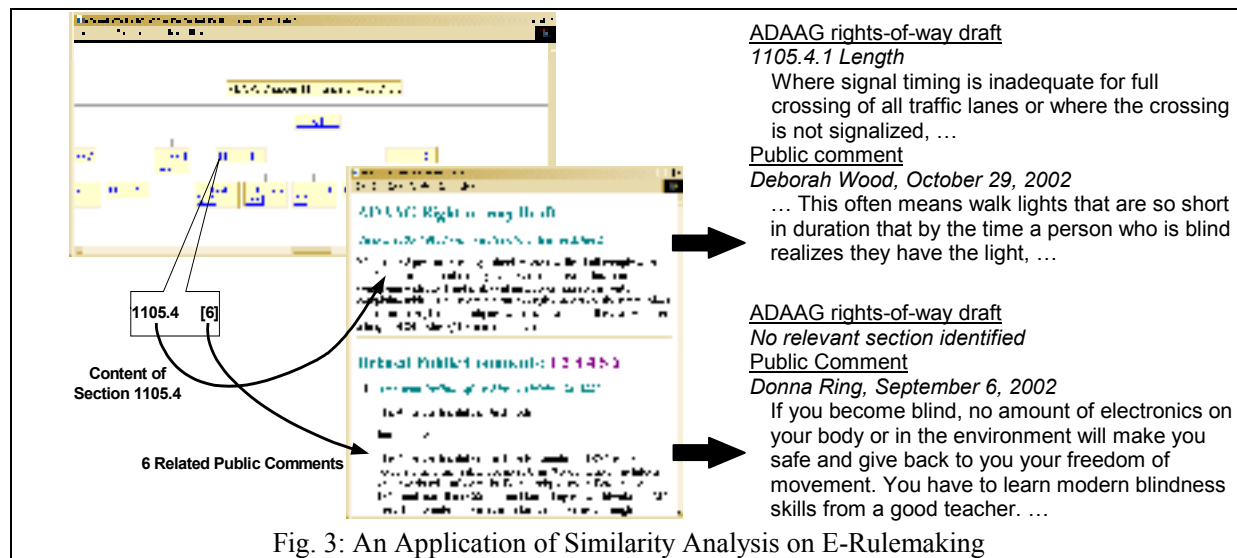


Fig. 3: An Application of Similarity Analysis on E-Rulemaking

Collaboration and Outreach

In this project, we have worked collaboratively with a number of government agencies, industrial consortium and private companies. We have worked closely with the building officials in the Silicon Valley and the US Access Board. We are also working with Accela Inc. (a company focusing on E-permitting) and Autodesk, Inc. (a CAD vendor). Autodesk, Inc. and Intel Corp. have provided software and hardware grants, respectively, in support of this project. We are now participating in a demonstration effort, initiated by the International Alliance of Interoperability (IAI's) committee on Codes and Standards, on automated compliance assistance of accessibility regulations.

References

1. *Americans with Disabilities Act Accessibility Guide*. Access Board, U.S. Architectural and Transportation Barriers Compliance Board, Washington, D.C., 1999.
2. Han, C.S., J. Kunz and K.H. Law, “Compliance Analysis for Disabled Access,” *Advances in Digital Government Technology, Human Factors and Policy*, William, J. McIver, Jr. and Ahmed K. Elmagarmid (eds.), Kluwer, 2002.
3. Ziegler, J., Working Area of Wheelchairs Details about Some Dimensions that are specified in ISO 7176-5, *International Workshop on Space Requirements for Wheeled Mobility*, Center for Inclusive Design and Environmental Access, SUNY at Buffalo, October, 2003.
4. Lau, G.T., Law, K.H. and Wiederhold, G., “Similarity Analysis on Government Regulations,” *Proceedings of the Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, Washington, D.C., pp. 111-117, August, 2003.
5. Lau, G.T., Law, K.H. and Kumar, B., “A Regulatory Information Infrastructure with Application to Accessibility Codes,” *INCLUDE 2003*, Royal College of Art, London, March 2003.