# III: Small: A System for Accessing Online Screenshot Instructions using Keywords and Screenshots

Online screen instructions refer to web pages or web videos whose visual contents are screenshots and text contents are instructions. They are numerous and play a key role in the sharing and propagation of computer related knowledge across a large population of users. However, current text-based information systems do not pay attention to visual contents and can be less effective for users to search for screenshot instructions when they need to learn how to use a computer application.

The project aims to improve the process in which users search and access online screenshot instructions. The key innovation is the inclusion of an application’s screenshot in the process. Users can capture the screenshot of an application and use it to retrieve web pages or videos containing matched screenshots, to search within a web page or video for the location of a matched screenshot, and to automatically scroll a web browser or pause/play a video player to synchronize its content with the application window over multiple instruction steps. In addition, users can use keywords to further refine the search by indicating the desired topics.

The project also develops the technology necessary to implement the improvements, which includes algorithms to aggregate, index, search, and rank screenshot instructions. Since these algorithms need to consider both visual and textual features, they require synergetic research on computer vision and information technology led by PI. Prof. Larry Davis and co-PI. Prof. Bo Xie respectively.

We believe screenshot instructions not only help users in general but also provide even stronger benefits to seniors in particular. Thus, the project involves the Old Adult Team in a participatory design process. The goal is to build and evaluate a specialized version of the system to meet their specific needs and abilities.

**Intellectual Merits:** This project seeks answers to the following research questions: (1) what is the role of online screenshot instructions in the life cycle of knowledge related to the user of computers and the Internet, (2) what are the different usability requirements for an information system that address the needs and abilities of general users and older adults, (3) what are the defining characteristics of screenshot instructions that a machine classifier can use to automatically identify them on the Web, and (4) how can we deal with the technical challenges in indexing and screenshot instructions using both visual and textual features?

**Broader Impacts:** This project creates a new information system optimized for screenshot instructions that can positively affect the way of a broad range of users share and access knowledge about computer use. It pays special attention to the needs of older adults that are often underrepresented in modern technology. In terms of research and education, it encourages cross-disciplinary participation of researchers and students from information science, computer vision, and HCI.

**Keywords:** video and image retrieval; e-learning; computer literacy; older adults; multimodal IR