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Multiple-Mode Communications Environments With IRI-h

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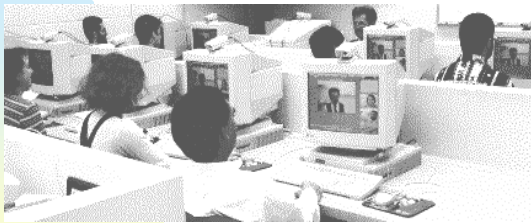
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Outline

- Introduction
- History of IRI & IRI-h
- Primary IRI-h Functionalities
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IRI-1995



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Introduction

- IRI-h (Interactive Remote Instruction-heterogeneous) is a multi-platform, multi-network environment scalable system (available from <http://www.cs.odu.edu/~iri-h>).
- IRI-h prototype successfully used to teach a semester-long computer science course across 2 sites 30 km apart.
- Fully implemented in JAVA (multi-platform)
- Multiple operating system versions (Windows & UNIX) interact freely
- Audio and video based on Java Media Framework (JMF)
- Tool sharing based on Interactive Program Video IPV

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History

- Funded by U.S. National Science Foundation
- First used in real semester-long class in 1995
 - Has been used in many different classes
- Current version is third redesign/implementation
 - Originally written in C for speed
 - Used XTV (an environment for distributing simultaneous X applications to multiple workstations) on Sun workstations.
- Reoccurring design problems:
 - System manages too much (e.g. people's interactions)
 - Interfaces too complex

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Primary IRI-h functionalities

- Everyone can:
 - Send video
 - Receive up to 4 simultaneous videos
 - See one or more remote site videos
 - Control/share most any tools
 - Windows, UNIX
 - Control
 - Pointer
 - Whiteboard
- Session activities (audio, video, annotations) recorded for later review
- Support for reduced-bandwidth participants

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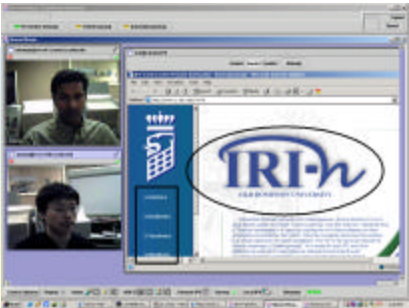
IRI-h Interface, Discussion Mode



A shared view snapshot illustrating a discussion scenario

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IRI-h Interface: Presentation Mode



A shared view snapshot illustrating a presentation scenario

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IRI-h user functionality details (1/3)

Functional	Description
Online management	Class & Internet configuration from Web
Initiation	a) Web-based auto start b) Command line start
Late join	"Session State" delivered to late arriving participant
Presenter control	Controls everyone's window layout and available services
Pointer	Option: cursor attached, click activated
Annotation	Share drawings, text Options: pencil, text, clear, others

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IRI-h functionality details (2/3)

Audio	Listen to audio from other sites Options: mic on/off; speaker on/off Kill/restart sender; kill/restart receiver
Video	View audio of participants Options: activate/deactivate video Kill/restart sender; kill/restart receiver
Tool sharing	Share applications on user's with others
Survey	Conduct instantly tabulated surveys/ quizzes Replay an earlier class sessions
Replay	Names displayed on pointers & videos
Feedback	Video image of remote classes

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IRI-h functionality details (3/3)

Problem/situation awareness	Identify problems related to class member understanding; audio/video/network
Notebook	Create & store notes, snapshots during class for later review
Site video	Control image of entire class
Call student	Control IRI-h services for students including turning on their video/audio
Monitor	Participant monitor, service monitor
Bandwidth control	Control transmission rates for non-multicast users

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- ## Current status
- Stable system with significant use history
 - Provides administrative support for instructional use
 - ⚡ Class roles
 - ⚡ Automatic start-up on a collection of machines so ready when students arrive
 - Available for download
 - ⚡ But no support
 - ⚡ In present form, it requires experienced technical support
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Strong support for "lecture-like" class situations

Prepared materials	Slides, simulations, software tool demos
Presenter audio & video	Audio only if presenter in another room
Class members	Attendees names and locations
Identification of questioner	Names displayed on videos and pointers
Feedback to presenter	Video of remote rooms Instantly tabulated surveys Participant initiated feedback
Notebooks	Private notes available after class
Recorded sessions	Used for student review of class material

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- ### Alternative uses of IRI-h
- Our primary experience has been classroom use
 - Replacing conventional TV-delivered courses
 - We believe it is well-suited for situations with:
 - Presentations of prepared material, e.g. slides to a group of people
 - Tutorial sessions for interactive tools
 - Anyone can control, everyone sees responses to control
 - Active free-flow use participant/interaction on a when-desired basis
 - Discussions where participation is primarily managed by a moderator
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- ### Example new IRI-h possibilities:
- Commercial
 - Attorney/client meetings
 - Lawyers/experts report generation
 - Sales meetings
 - Contract negotiations
 - Proposal writing
 - Advantages
 - Access to multiple tools, audio, video
 - Free participation of all members
 - Recorded session of what happened (audio, video, annotations)
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More educational possibilities

- Student-scheduled project meetings
- Student-scheduled group review for exams
- Instructor help sessions with individual or small groups of students
 - Code debugging
 - Consultants with students on their drafts of papers, etc.
- Student advising

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Minimal System Requirements

- Any reasonable modern computer
 - 1.8 GHz Windows or Sun Blade 100 workstation
- Microphone
- Camera (USB works fine)
- Good network connection (56k modem; works well with cable modem)

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Future Work

- "IR-lite" and specialized reduced functionality versions
- Reduced capability versions
- Goal: reduced complexity
 - Complexity of use during sessions now seems acceptable
 - Complexity of configuration, set-up, trouble shooting needs to be addressed
 - Eliminate need for configuration files
- Automatic actual rate adaptation for video and tool-sharing gateway servers

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