

Be Quiet?

Evaluating Proactive and Reactive User Interface Assistants

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Research Focus

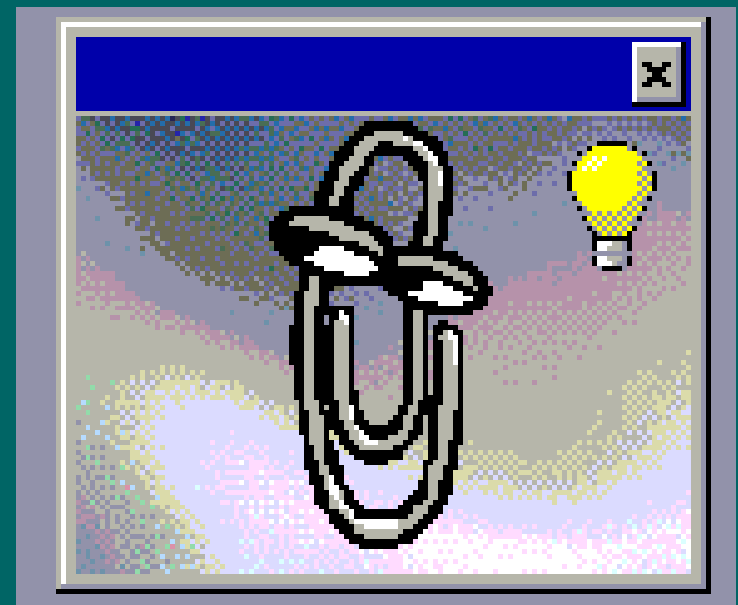
- UI Assistants
 - Both anthropomorphic and personified



Vision vs. Reality



VS



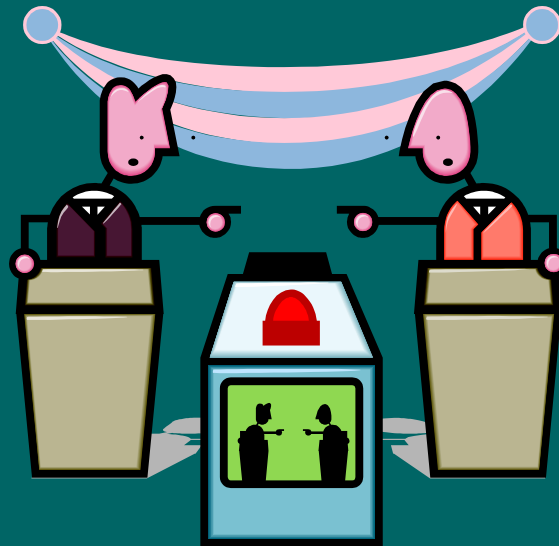
Terminology

- Anthropomorphic
 - Having human-like appearance
- Personified
 - Giving human-like qualities to something that's not human
- Agent
 - For us, not necessarily autonomous



Raging Debate in CS/HCI

- Are anthropomorphic/personified agent interfaces a good thing?



Pro

- Overwhelmed by information – need assistant to help
- Conversational interfaces are more familiar and natural
- Human face a powerful communicator of information



Con

- Disempower users, cloud responsibility for system's actions
- Mislead users about capabilities
- Increase user anxiety
- Unavailable, impractical



Reflection

- Lots of opinions and rhetoric, relatively little empirical study

“First, it must be acknowledged that in spite of the popularity of the agent metaphor, there is remarkably little research on how people react to agents.” - Erickson

“Rigorous evaluations of the benefits to the user are rare, and even when performed are subject to considerable criticism owing to the difficulty of finding objective measures of success.” - Isbister & Doyle

“Please, please, please do your studies---whether they are controlled scientific experiments, usability studies, or simply observations, and get past the wishful thinking and be a scientist and report on real users doing real tasks with these systems.” - Shneiderman



Research Objectives

- Is an agent-based UI an interface paradigm/metaphor worth pursuing?
- If there is some merit, inform agent designers to improve their work



Framework

Agent

- Appearance
- Competence
- Degree of proactivity
- “Personality”
- Presence

User

- Background knowledge
- Personality
- Age

Task

- Objectiveness
 - Editing a document vs deciding what to bring on a trip
- Goal
 - Learning vs task completion
- Time frame



Experiment Focus

- Examine the effect of an agent's initiative
- Agent acts as a help assistant
 - Answer questions
 - Make unsolicited suggestions
- How people perform
 - Learning
 - Using
- How people react
 - Liking and satisfaction
 - Role of personality



Experiment Design

- Document editing task
 - Learn new command-based text editor
 - Video tutorial
 - Can they remember all commands?
 - Marked-up document with 25 modifications
 - Make changes in order as fast and accurately as possible
- Participants
 - 49 non-cs undergrads



Conditions

- Paper manual
 - Control group
- Reactive agent
 - Spoken inquiry
 - Answers chosen from stock responses
- Reactive & Proactive agent
 - Reactively answer questions as well
 - Detect inefficiency
 - Predict next operation



Wizard of Oz
methodology



Editor Interface

The spring and autumn and Warring State periods, though mark by disunity and civil strife, witnessed an unprecedented era of cultural prosperity - the "golden age" of China. the atmosphere of reform and new ideas was attributed to the struggle survival among warring region lords who compete building strong and loyal armies and in increasing economic production to ensure a broader base for tax collection. To effect these economic, military, and cultural developments, the regional lords needed ever-increasing numbers of skilled and literate officials and teachers, the recruitment of whom was based on merit.

So many different philosophies developed during the late Spring and Autumn and early Warring States periods that the era is often known as that of the Hundred Schools of Thoughts. Chinese practices were based on writings. From the Hundred Schools of Thought came many of the great classical writings on which Chinese practices were to be based for the next two and one-half millennia. Many of the thinkers were itinerant intellectuals, who besides teaching their disciples, were employed as advisers to one or another of the various state rulers on the methods of government, war, and diplomacy.

The body of thought that had the most enduring effect on subsequent Chinese life was that of the School of Literati (ru), often called the Confucian school in the West. The written legacy of the School of Literati is embodied in Confucian Classics, from which the period derived its name), which were to become the basis for the order of traditional society. Confucius (551-479 B.C.) Master Kong, looked to the early days of Zhou rule for an ideal social and political order. He believed that the only way such a system could be made to



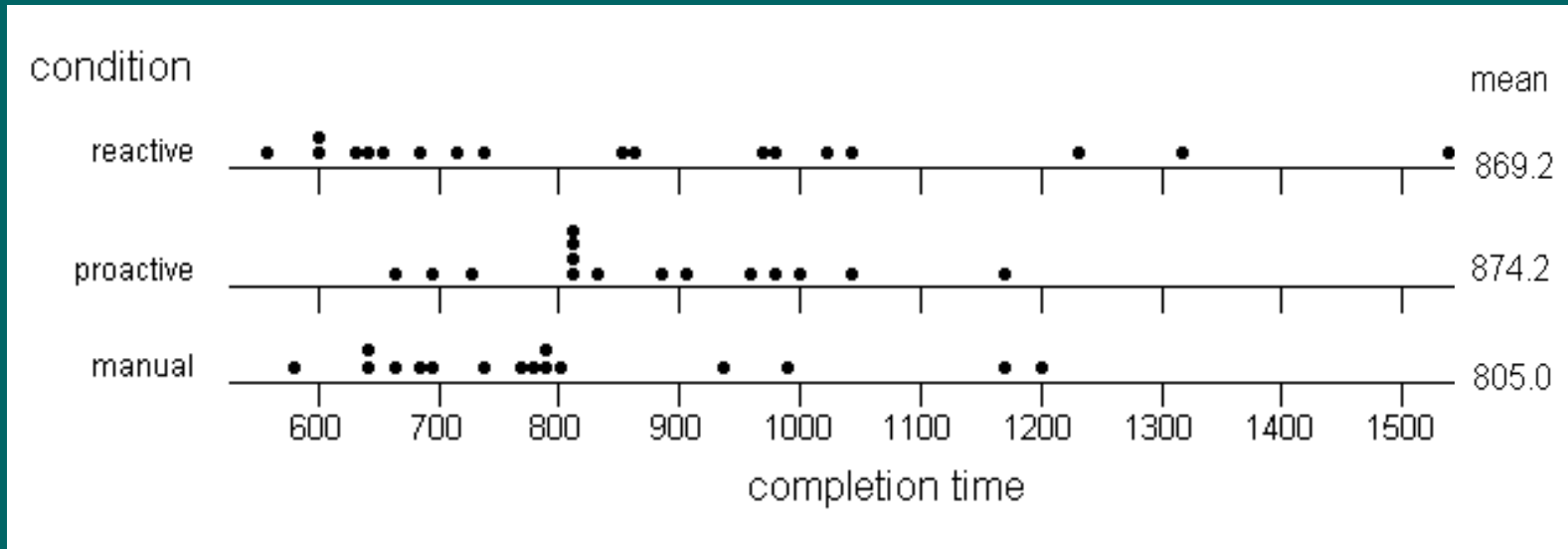
Measures

- Objective performance
 - Time to complete
 - How many commands were issued
 - How many times help was requested
 - Score on command recall quiz
- Subjective assessment
 - Personality inventory responses
 - Responses to likert-scale questionnaire
 - Open-ended interview

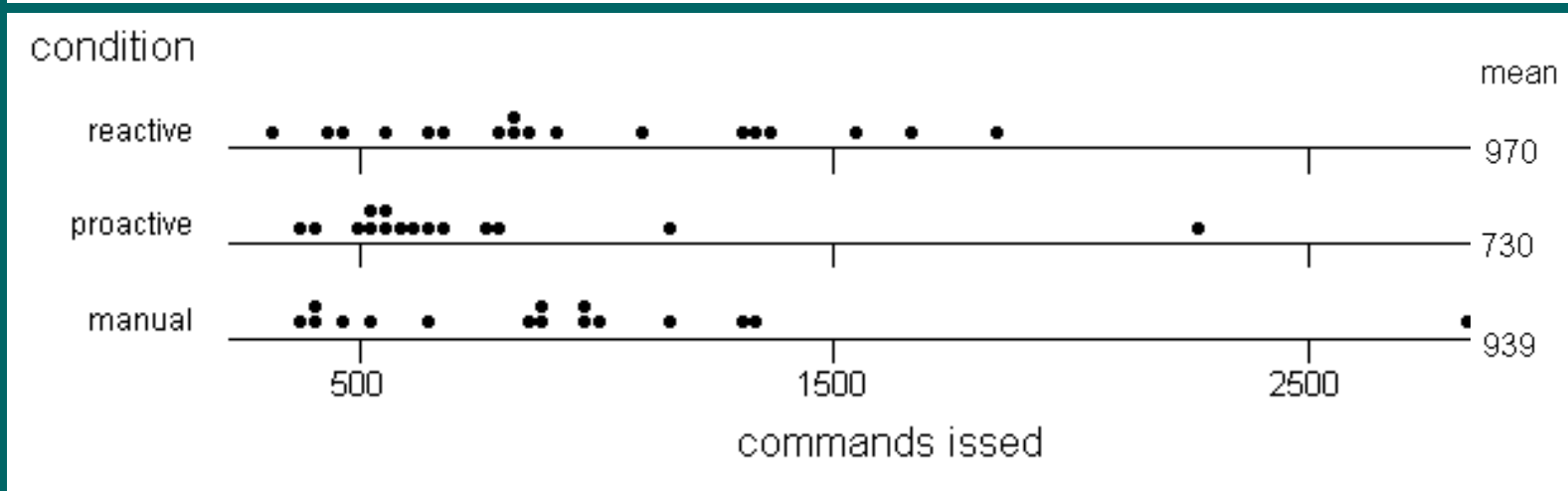


Results: Performance - 1

Not significant



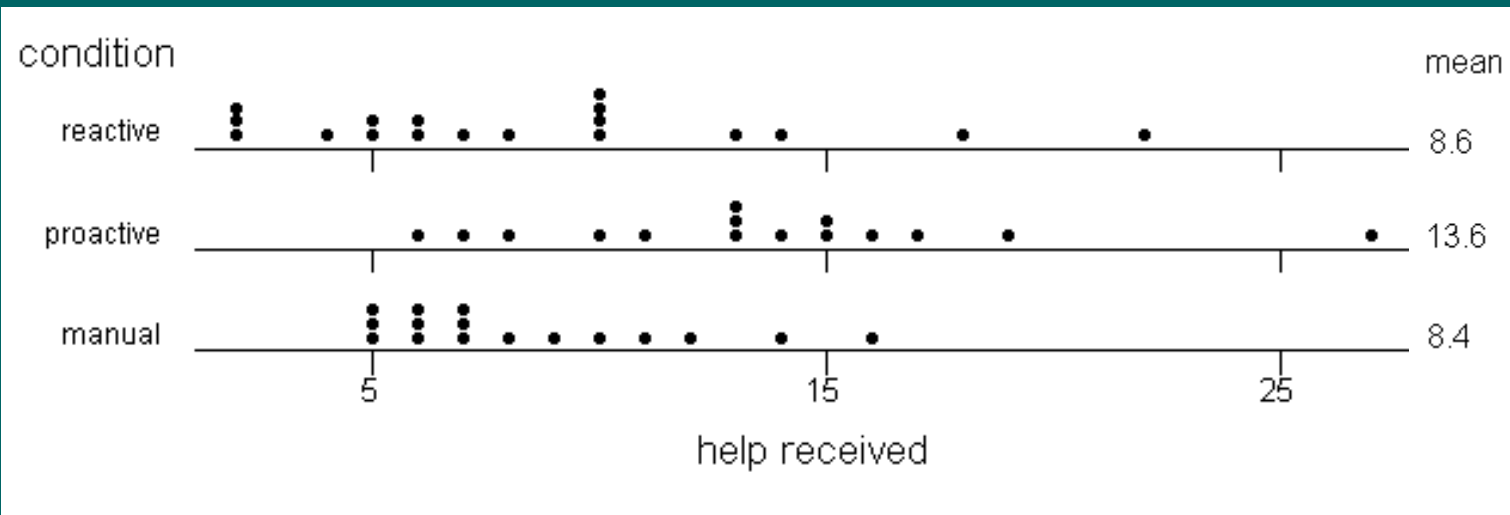
$p = .59$



$p = .36$

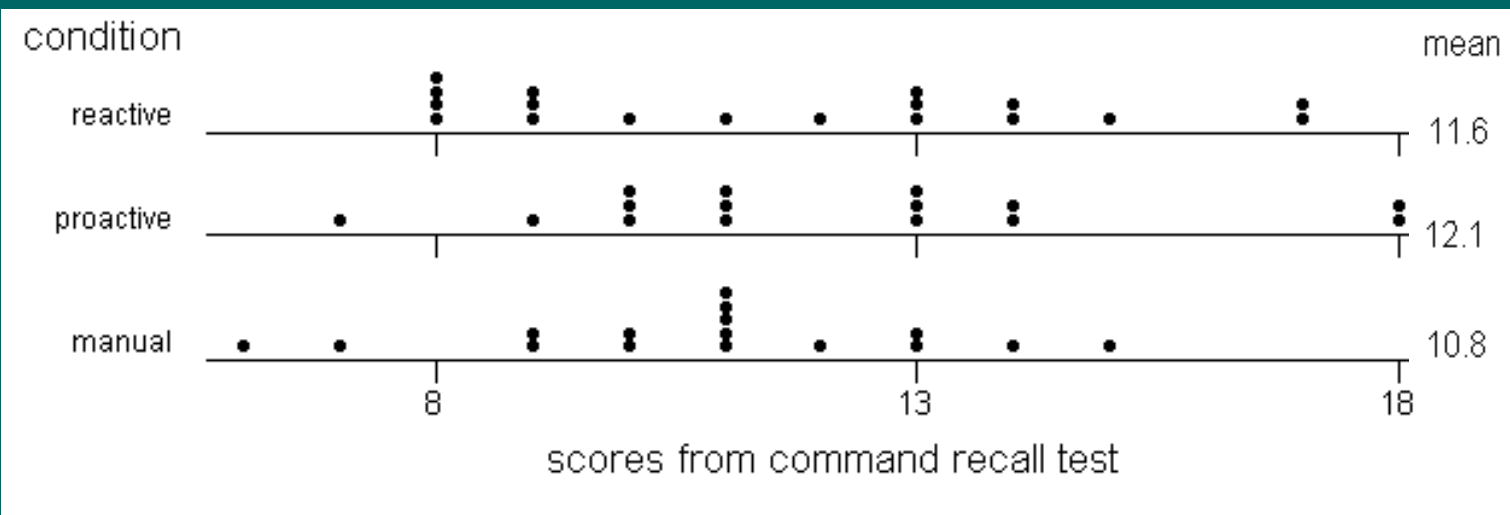


Results: Performance - 2



Significant

$p = .006$



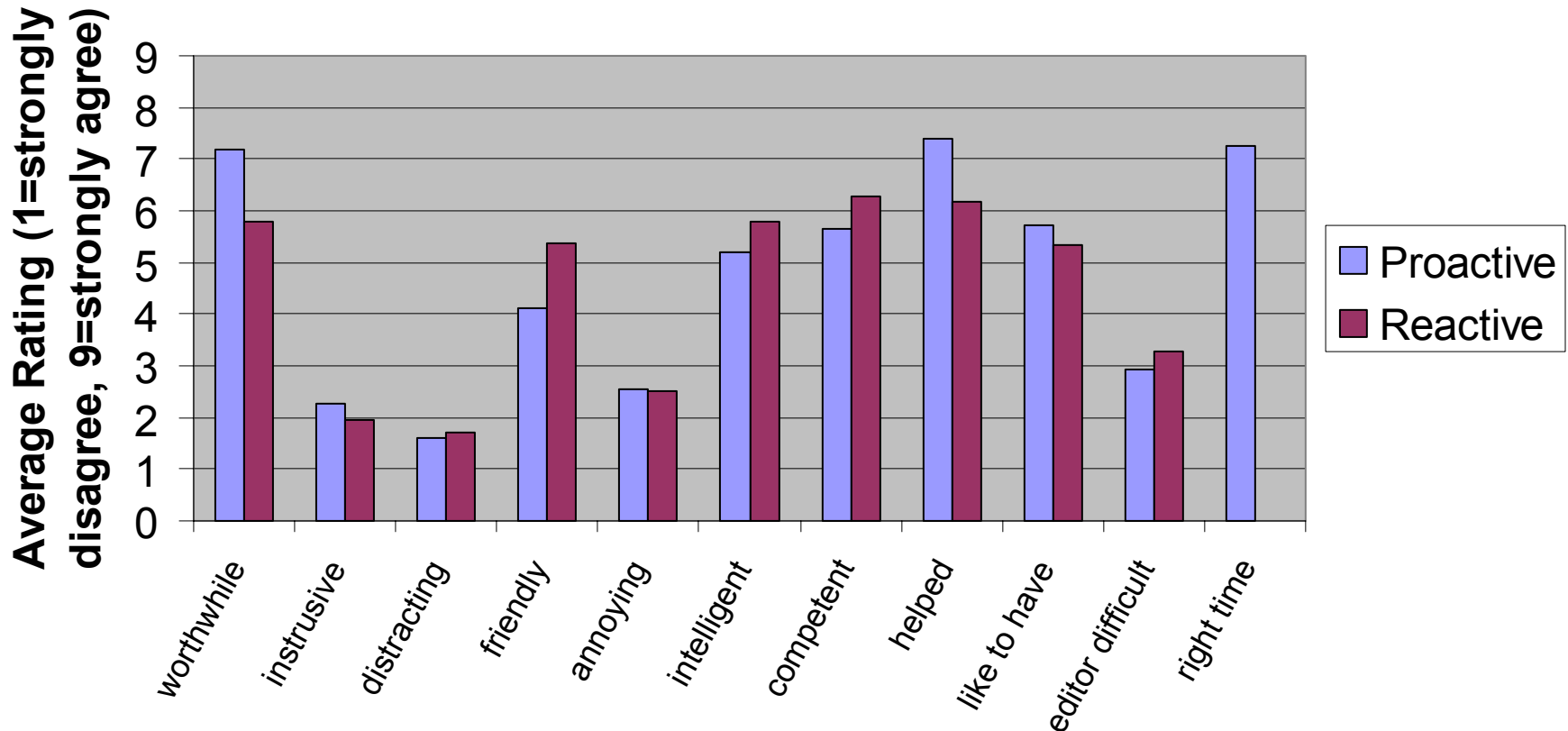
Not significant

$p = .44$



Results: Satisfaction and Preference

Responses to Questionnaire Items as a Function of Type of Agent






Results: Personality Ratings

- People felt the agent did not have a personality
- No relationship between the self and the agent personality ratings
- No relationship between agent condition and the agent personality rating
- No relationship between self-rating and questionnaire responses



Results: Interview Feedback

- Was the agent helpful?
 -  All but two (both in reactive condition)
- Would unsolicited suggestions be helpful?
 -  4/18 in reactive condition
- Were unsolicited suggestions helpful?
 -  12/15 in proactive



Results: Interview Feedback (cont.)

- How to improve the agent?
 - Speech quality
 - One size does not fit all
 - More engaging vs. shorter responses
 - More animated, expressive appearance vs. no face at all
 - Whole body vs. only the face
 - Pop up vs. stay on screen



Results: Interview Feedback (cont.)

- Opinions of Clippy?



—     

“I close it as fast as I can.”

“It’s not very helpful. You’ve got to stop what you’re doing and click on it.”

“I hate that thing. I make it go away. It dances and is distracting.”

“It’s not really helpful. It doesn’t pop up at the right times.”

“I don’t like it at all. It’s like a stalker.”

—  cat or dog



Discussion

- Agents performed as well as state-of-the-art
- Proactivity itself is not problematic
 - Competence may be the key
- Prior experience influences opinions
- Individual preferences hint toward different styles of agents



Current Experiment

- Determine how changes in quality affect people's performance and liking
- Degrade the quality of the agent's competence
 - Reactive
 - Proactive
- Make both agent and manual available



Conclusion

- One experiment in an ongoing study
- Early beliefs
 - People use/like speech interfaces
 - Agent becomes more important as task becomes more challenging
 - Competence is key



For More Information

information interfaces

About The Information Interfaces Group, an HCI research group in the GVV Center at Georgia Tech, develops computing technologies that help people take advantage of information to enrich their lives. [More about the lab approach](#)

People

Projects

Publications

Talks

■ Projects

- InfoCanvas**
Developing Information Art: Virtual paintings that peripherally convey information to people. **ACTIVE** **DOWNLOADS** **PAPERS**
- QuickSpace**
Designing new techniques and operations that help people manage tasks and screen space on their computers. **ACTIVE** **PAPERS**
- Talking Heads**
Exploring the use of anthropomorphic interface agents who assist people with daily tasks. **ACTIVE** **DOWNLOADS** **PAPERS**
- NetVizor**
Visualizing network topologies to assist network designers and analysts. **ACTIVE**
- iShop**
Exploring how PDAs could be used in shopping at grocery stores and other retail environments. **PAPERS**
- Software Visualization**
Helping people understand software through visualization of programs, data structures, algorithms, and executions. **ACTIVE** **DOWNLOADS** **PAPERS**
- What's Happening?**
Enhancing the sense of community in a geographically separated organization via software applications. **ACTIVE** **PAPERS**
- SunBurst**
Developing circular, space-filling visualizations for depicting information hierarchies and trees. **PAPERS**

■ Hot News

Presentation of our [UI assistant research](#) at the [Interact 2003 conference](#) in Zurich

[Tech report](#) on understanding space and window management

[News article](#) about the InfoCanvas and Information Art project

[CS 7450 - InfoVis Class](#)
[II Lab - Visit our lab](#)

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<http://www.cc.gatech.edu/gvu/i/index.html>

information interfaces

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Projects

Publications

Team Members: [Jun Xiao](#), [John Stasko](#), [Richard Catrambone](#)

Talks

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■ PAPERS

["Be Quiet? Evaluating Proactive and Reactive User Interface Assistants", INTERACT '03](#)
["Be Quiet? Evaluating Proactive and Reactive User Interface Assistants", Tech Report GIT-GVV-03-03](#)
["Anthropomorphic agents as a user interface paradigm: Experimental findings and a framework for research", CogSci '02](#)
["Anthropomorphic agents as a user interface paradigm: Experimental findings and a framework for research", Tech Report GIT-GVV-02-10](#)

Agent-based interfaces, particularly those with anthropomorphic appearance, promise a new paradigm for user interfaces. The traditional view of computers as a tool for functional purposes is challenged by human-like assistants that answer questions and perform tasks through conversational, natural language-style dialogs with users. However, although such assistants have been developed in many applications, little careful empirical evaluation on anthropomorphic interfaces is actually being performed, and the results from this research have been contradictory or equivocal. The goal of our research is to gather a set of experimental data in order to understand the conditions under which users could best benefit from such social interaction.

Our particular foci are two: evaluating this style of interface for its utility/usability and examining ways to build toolkit for such interface. The very long term goal is to generalize our findings and incorporate what we learned into computer systems that we will interact with in our everyday life of near future.

Last Updated: 05/30/2003

<http://www.cc.gatech.edu/gvu/i/myagent/intro.htm>

www.cc.gatech.edu/gvu/i



Thanks for your attention!

