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Comments
This is exciting.

Declaration

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GBAT 9115 03-158
Information Technologies for Managers
Assignment 2 (Alternative)
Emerging Technology studied:
'Responsive Virtual Human Technology'
by Colin Wee

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“Granted, it can work a thousand, a million times faster than the human brain, but it can’t make a value judgment, it hasn’t intuition, it can’t think.”

- Kirk to Dr. Richard Daystrom, on the M-5 computer
TOS / “The Ultimate Computer” (Sherwin 1999 p257)

“Arthur C. Clarke’s vision of HAL as portrayed in the film *2001: A Space Odyssey* was clearly wrong, as that type of computer intelligence is almost certainly still more than 50 years ahead of us.”

Remenyi D 2002 p4

What is Responsive Virtual Human Technology?

At conversive.com, a synthesized voice invites you to “click on a ‘Conversive agent’ if you need help.” The Conversive agent delivers far more than a pre-recorded message. Within two minutes surfing the site, the talking head named ‘Julia’ is able to verbally respond to most company-oriented questions, can take you on a guided web surfing trip, is able to tell you where you can download a white paper on Conversive’s technology, and can even raise her eyebrows when asked politely.

Julia, first launched commercially in 2001 (conversive.com/html/news.php), says she is “a combination of artificial intelligence, natural language processing, and real-time animation” (conversive.com). Julia, apparently, is even able to “escalate the session” (conversive.com/index.html) and connect users directly to a human operator by Internet phone.



Figure 1 Conversive’s AnswerAgent GUI Chat Window

Julia is an example of Responsive Virtual Human Technology (RVHT). RVHT is “cross disciplinary” technology research that “brings together cognitive psychology, computer science, graphic artistry, software engineering, ... with the aim of realistically simulating human interaction” (rti.org).

Julia is different from the synthetic humans we are starting to see in movies. Such synthetic humans are really only animations that “are currently much more like puppeteering” (Coin 2002); see Appendix: Related Sites: Final Fantasy Technology Demo. Some RVHT-oriented software in comparison, have avatars capable of “lively and informative interaction” (RTI.org 2002 p2). Able to display “256 human emotions” (RTI.org 2002 p2), these might in fact be the next wave of “intelligent search agents” that Dick was referring to that could reduce the “overhead of human intervention” (GBAT9115 2002 u4 p15) for efficacious information searches.

Conversive markets the solution as decreasing the cost in handling customer inquiries and highlights improvements to the web interface. The downloaded white paper details how such Agents, hosted on an application server platform, can front existing knowledge management software to provide dynamic information in real time.

Product Design

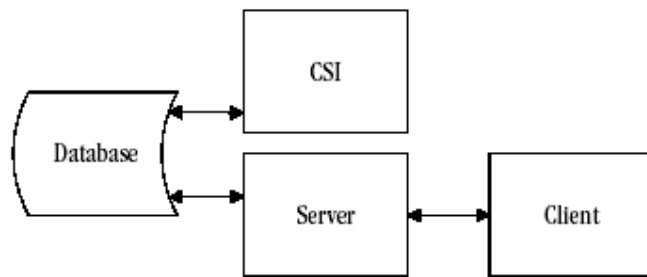


Figure 2 Conversive's Technology Platform (conversive.com)

The Conversive database is able to collect information from the customer; so detailed logs can then be used to help update the company's knowledge base. Like other web-centric servers, the web server can generate dynamic responses when accessing remote databases.

'CSI' or Conversive Scripting Interface runs on an Apache web server. The CSI is used to manage the knowledge base, and maintains rules to guide Julia's conversations. As with other n-tier architecture, the described client can represent a host of media channels from http to SMS (Conversive 2003 pp1-2).

For their use in employee training, RTI recommends the technology be deployed nominally on just a standalone 750-MHz Pentium platform with only 256MB RAM (<http://www.rti.org/>). "The graphics will display a bit slower than commercial video games on older computer systems and laptop PCs" (dcmilitary.com).

Major RVHT Organizations

Conversive, Inc. www.conversive.com

Conversive markets Conversive Agents, which are natural language agents capable of interfacing with internal and external knowledge bases. Conversive aims to facilitate access into the client's knowledge base in real time. Their technology can dredge through up-to-the-minute marketing status reports, or to facilitate and escalate customer inquiries from a communication channel.

EjTalk www.etalk.com

EjTalk aims to build “build engaging conversational applications ... [for] end users of speech technology [that have] come to accept, expect, and soon demand, more natural interaction” (ejtalk.com/Company/technology.htm). Their website has a demo of two agents having a ‘variable conversation’ about Cars and Coffee.

RTI www.rti.org

RTI, has over 2100 scientists and is one of the premier research institutes in the world. RTI develops training simulations for the end user allowing scenario-based exercises and virtual role-plays that traditional training cannot provide. They have successfully rolled out software for medical and emergency response training, and for telephone survey data collectors.

A Related Virtual Networking Organization

Biota www.biota.org

Biota aims to “promote and assist in the engineering of complete, biologically-inspired, synthetic ecosystems and organisms” (biota.org/org/vision.html). An

interesting project is 'Nerve Garden'. Nerve Garden I (NG1) “was a project to allow many users ... to generate virtual plants ... and populate ‘islands in the net’”. Nerve Garden II has “plant models that grow ... and evolve coping strategies” (biota.org/projects).

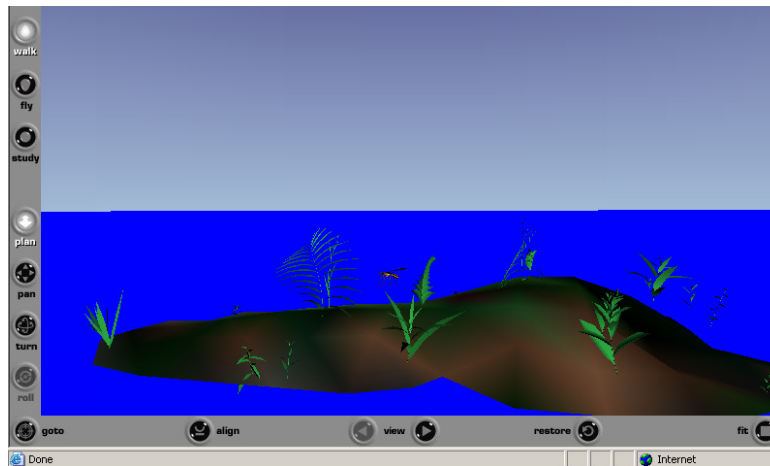


Figure 3 Snapshot of Sample Virtual 'Island in the Net'

Technology Benefits

As an intelligent tool, RVHT may not really measure up to “cyber services that completely satisfy our needs” (Matsuo 2000 p117). But it may be fallacy to expect such given current technology constraints, and market readiness.

The closest analogy of RVHT is that of an “expert system” (GBAT9115 2002 u7p7) which makes knowledge available to others. However unlike expert systems that might require an otherwise ‘dumb’ interface that presents graphs, data fields, and numbers, RVHT’s interface in itself enhances the value proposition of information contained in data warehouses.

According to Link et al. (2002), in brief, RVHT can

- “Offer advantages in reliability, repetitiveness, flexibility, throughput, and distribution that lead directly to overall cost-effectiveness of training” (p4; Field, et al, 1999).
- Provide virtual humans to represent conversational partners that a normal human training partner could not simulate. This includes training for “mentally disturbed patient” or someone of a different gender or ethnicity (p5).
- “Simulate a ‘real’ environment ... in conditions that are as close as possible to what [trainees] will encounter on the job” (p11).



Figure 4 Just-Talk's Scenario Window showing Mentally Disturbed Avatar

RTI's Just-Talk Scenario Window shows RVHT in action training law enforcement

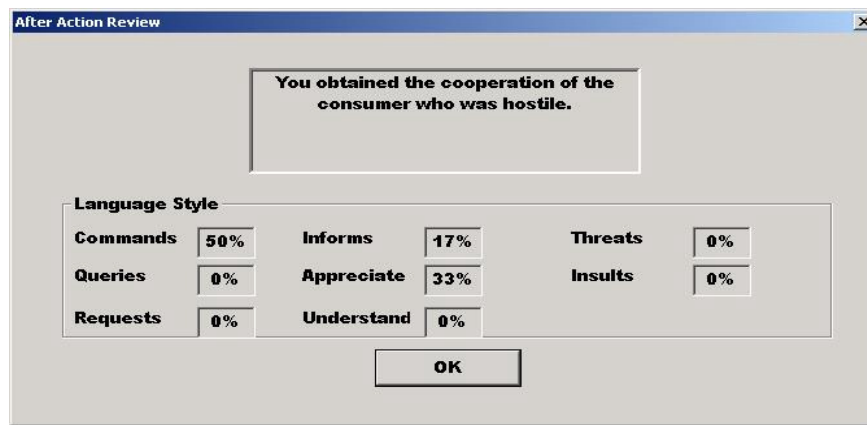


Figure 5 Just-Talk After Action Review Window

officers in assessing mentally disturbed people. Situations can escalate if the trainee uses “authoritative ... language” inappropriately with “[avatars] who are paranoid, distrustful, or afraid” (p5).

Beyond providing the necessary training, RTI’s software is able to display quantitative and qualitative measures to evaluate the student’s grasp of the subject matter. These measures are able to collate and integrate “instructor evaluation,” “in-class observation,” “post-test questionnaire,” and “qualitative [group] feedback” (Frank et al. 2002 p7).

Drawbacks of RVHT

Link et al.’s study used RVHT to prepare operators to better deal with difficult-to-handle survey respondents on the telephone. Their study showed that one of the main issues of dissatisfaction with RVHT was slowness of the technology, and the other was the limited number of “objections raised by the virtual survey respondent, [making] the session less realistic” (2002 p13).

Similar to Link et al.’s study, the Just-Talk student experience was “somewhat artificial” as participants had to be “seated and speaking in a normal tone of voice into a microphone” (Frank et al. 2002 p8). Students felt that their RVHT session had to be more “realistic” and less “game-like” (2002 p8).

Continued Deployment

Link et al.’s (2002 p15) study provided feedback from participants stating that a majority (73-83%) would not only recommend RVHT as a training tool, but would use it again. Link et al. however, does state that they “do not anticipate RVHT-based

training will replace instructor-led training, but ... expect that combinations of RVHT-based training and instructor-led training will significantly reduce training delivery costs” (2002 p16).

The Business Need

Small businesses defined as “businesses in the private sector which employ less than 20 people” (smallbiz.nsw.gov.au) often require marketing expertise in dealing with business risk. Maintenance of this marketing expertise at other times is difficult to cost-justify, and is less value-added. Furthermore, dealing with marketing experts is challenging as consultants are not usually familiar with the business at hand.

RVHT Value Proposition

The benefits from RVHT are derived by forming a synthetic environment in which to test out marketing strategies. The feedback from an intelligent agent for marketing strategy allows the business owner to judge the completeness of a plan. The software should deal with financial projections, fine-tuning of strategy, and feedback on approach used. As an ancillary service, software can ‘escalate’ sessions to pair business owners with marketing experts who can be briefed by intelligent agents.

We propose that RVHT is the technology to resolve the business need since it allows users to build a custom scenario, rather than dealing with a simulation of a ‘real’ environment that has been packaged. This custom scenario would act very much like a business case study in which users can interrogate the scenario window using a combination of direct queries, agent dialog, and multi-user discourse.

As an added benefit, RVHT would alleviate any information overload that “impedes the managers’ ability to make timely decisions” (Dewitt et al. 2000 p323).

Viability of Solution

In 2000-1, “there were 372,500 small businesses in NSW” (smallbiz.nsw.gov.au). If this software was targeted by major industry sector, it could mean that the target market could very well amount to 350,000 small businesses in NSW alone. This is a sizable group of potential clients, and despite a soft economy, can justify the rollout of this tool in NSW and other similar regions worldwide.

Given the ever-present need for expert advice, the ability of this “strategic system” (GBAT9115 2002 u8 p8) to:

- a) provide inexpensive relevant real-time feedback,
- b) “mechanisms ... [that] support the acquisition of firm-specific IT knowledge” (Nambisan et al. 1999 p373), and
- c) RVHT decreasing “the uneasy relationship with information technology” (GBAT9115 2002 u1 p5),

business owners should have little difficulties recognizing that this a solution which delivers incredible value-for-money through a non-intimidating interface.

Development Methodology

Most of the technology overviewed indicates that RVHT requires a multi-disciplinary approach, so we might require the factors detailed in Appendix: Development Requirements to drive such development. The development requirements do resemble that of a generic business plan template. However, the major difference in our deployment is for RVHT to ensure the ability to present, analyze, or resolve myriad

differences in expert opinions using intelligent agents. This means endowing the software with the ability to *autonomously* interact with the user and managing the debate that is necessary to produce a resolution for the user's marketing questions.

Is this Plausible?

There is a real difference asking Julia to raise her eyebrows and then expecting RVHT to have multiple avatars that debate marketing theory. Such a proposal needs to endow Julia with Biota's "coping strategies" (biota.org/projects), EjTalk's character and human conversation (http://ejtalk.com/Demos/TTS_Bench/MMPlayer.html), and the Coven Project's crowd model.

The COVEN Project's "crowd model" (Normand et al., 2003 p9) describes multiple synthetic humans in a virtual environment that can react autonomously or be led by an avatar. Apparently, a "more realistic sense of crowd can be formed when we mix both kinds of crowd models" (p10). With the current ubiquity of the Internet, it is not inconceivable to have a central organization of marketing experts that may in turn influence the group dynamics associated with each client copy of the software.

Hubal believes that "a character can be controlled and then released from control to follow character-specific or crowd models" (2003). Thus RVHT can eventually be used to overcome the shortfall of marketing expertise. This makes marketing expertise less of a rival asset, and overcomes the argument that a computer has a shortfall of 'intuition' and 'can't make a value judgment'.

When asked on whether it is conceivable that RVHT produce a multi-agent environment where agents can interact amongst themselves on

a specific topic and with users, Conversive's CEO says: "Absolutely. Not only conceivable, but possible even now" (Rappaport 2003). RTI's Senior Research Engineer however thinks "the design to make agents behave intelligently using ... specific knowledge is complicated and not well understood" (Hubal 2003).

While there is disparity between these two proponents of RVHT, it is heartening to note Conversive's positive attitude towards this potential deployment, especially given that Julia seems to be a precursor of our proposed solution.

Conclusion

Can RVHT provide "knowledge and personal perspectives in such a way that novel insights are gained" (Bruce 1999 p41)? Can intelligent agents reduce the 'overhead of human intervention' so we can extend human expertise through technology?



Figure 6 Julia, don't close your eyes to the possibilities!

The answer may lie not in the provision of real time responses; we're not asking the intelligent agent to *think* intelligently. The challenge is however to acquire and examine real-time, and contextual information since "small organizations will have ... less opportunity to modify the application to suit the business" (GBAT9115 2002 u8 p8).

In conclusion, this author believes it is a matter of time before users will start an odyssey of interrogating the intelligent agent, and valuing such conversation, rather than focusing only on mining the database it fronts.

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Appendix

Development Methodology

Producing an avatar in place of or complementing a marketing expert may require:

1. Expert help to guide formation of marketing objective(s) and to help form the marketing problem statement
2. Theoretical marketing frameworks for formation of marketing strategy
3. Tactical marketing expertise (like Guerrilla marketing or direct mail)
4. Cultural differences in response to marketing (for regional deployment of software)
5. Worldwide industry-specific marketing information
6. Expert rules in the choosing of different frameworks and tactics
7. Expert rules in the choosing of different marketing consultants for the specific problem at hand
8. Expert opinion in the political ramifications of marketing plans, in terms of stakeholder acceptable and employee support
9. Methods of evaluating effectiveness of the plan, which can include a marketing audit or balance scorecard system
10. Methods of generating financial projections for marketing plans

Related Sites

Final Fantasy Technology Demo
http://www.nvidia.co.uk/view.asp?IO=final_fantasy