# Entertaining Agents: A Sociological Case Study

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## Abstract

Traditional AI has not concerned itself extensively with sociology nor with what emotional reactions might be produced in its users. On the other hand, entertainment is very concerned indeed with these issues. AI and ALife programs which are to be used in entertainment must therefore be viewed both as AI/ALife endeavors and as psychological and sociological endeavors.

This paper presents a brief description of *Julia* [Mauldin 94], an implemented software agent, and then examines the sociology of those who encounter her, using both transcripts of interactions with Julia, and direct interviews with users. Julia is designed to pass as human in restricted environments while being both entertaining and informative, and often elicits surprisingly intense emotional reactions in those who encounter her.

## An introduction to MUDs and Julia

Julia [Mauldin 94] is a MUD [Curtis 92] [Bruckman 93] [Evard 93] robot. A MUD is a text-only, multiperson, virtual reality. [Mauldin 94], while describing Julia's internal structure, gives very little 'feel' for what it like to interact with her outside of the strictures of a formal Turing test; hence, transcripts of many interactions with her appear below as examples. (Since Julia adamantly insists that she is female, I refer to the program here as 'she'.)

### Introduction

Julia connects as any human player on the MUD would, via a telnet connection—she does *not* run on the MUD server itself. A player would gain access to her numerous talents in exactly the same way that a player would talk to any other player—by either speaking or gesturing in the same room, or by paging from somewhere else:

```
>page julia
You sent your summons to Julia.
Julia pages from Stevi's Kitchen: 'I'm on
  my way to you, Lenny.'
Julia is briefly visible through the mist.
Julia says, 'I was called here by Lenny.'
You say, 'julia?'
Julia nods to Lenny.
[ . . . ]
Julia whispers, 'Excuse me, Xerxes is
  paging me from Connie's place.'
Julia walks south to the airship landing
  field.
Julia has left.
```

This is a continuing thread in my discussion of Julia: players interact with her *as if she was another player.* MUDs blur the distinction between players and 'bots (MUD slang for a software robot). This is a great strength of both MUDs and Julia, and the deliberate blurriness of the boundaries both enhances Julia's effectiveness and makes her operation possible.

One of Julia's most useful talents is to keep maps of the interconnections between rooms. The way to get Julia to help you navigate is to ask her a question, as usual.

```
You say, 'julia, how do I get to
  electronics den?'
Julia says, 'From here, go south, 7,
  airlock, 9, up, down'
Minotaur says, 'Julia, how do you get to
  the gold sector?'
Julia says, 'From here, go highport, gold,
  library'
```

Since Julia keeps track of various statistics about rooms (rooms being very important objects in any MUD), she can answer certain questions that might be important to a mudder, including how many rooms or players there are, which rooms are 'noisiest' due to conversation, where one can go from any room, and will even make suggestions:

```
TheHighMage says, 'Julia, I'm bored.
  Where should I go?'
Julia says, 'You should go see gilded
  door, TheHighMage.'
Julia says, 'From here, go  present, out,
```

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```
  north, n, w, n, up, up, 7, up, up, s.'
```

Someone who has never interacted with Julia before might be a trifle confused about what to say to her. A standard conversational gambit yields some useful information, as well as some dirt on other players:

```
You say, 'hi, julia.  what do you do?'
Julia says, 'I gossip, Lenny.'
You whisper, 'tell me some gossip.' to
  Julia.
Julia whispers, 'I once heard baba says,
  'Drop kick me Jesus Through the goal
  posts of life''
```

She is also useful for obtaining certain information that might be hard or impossible to get through the standard tools available, such as last-location and last-connect times for players; note also that Julia 'understands' who she is, and the fact that she is situated:

```
You say, 'julia, where is leira?'
Julia says, 'Leira was in Inter Temporal
  Chat Lounge about 6 weeks ago.'
You say, 'julia, when did you last see
  julia?'
Julia says, 'I'm right here in The Inter
  Nexus.'
```

Many MUDs don't really have a mail system. This makes it hard to communicate with people who don't happen to be connected when you are. Julia solves this problem:

```
You say, 'julia, what can you do?'
Julia says, 'I relay messages, Lenny.'
You say, 'do you have a message for me,
  julia?'
Julia says, 'I have no messages for you.'
You say, 'julia, tell leira I've figured
  out how to find and talk to Julia'
Julia says, 'Message for Leira saved.'
You say, 'julia, how many messages are you
  carrying?'
Julia says, 'I am holding 144 messages for
  98 players, Lenny.'
```

Julia regularly scans the *wholist*, the list of all connected players. If she sees someone connect for whom she has a message, she will generally walk into the room that they are in and then deliver the message.

She has other interesting talents, including being able to do a fair job of guessing the genders of other players based on their names; she correctly guessed that Pattie and Robyn were both female, even though both had neglected to set their gender property (a slot in the player's description), and knew that Phi and Lenny were both male (possibly by examining their gender properties).

## More of Julia: Turing-competence

Many of Julia's talents are in support of her appearing 'human' to other mudders. I'll examine some of these below, and discuss why such an ability is useful *even for performing useful functions*, as well as for the 'obvious' use of using her simply to pass a Turing test. Julia knows how to describe herself in various ways, as would any human player, and, while sometimes coy, usually divulges information if one is persistent enough:

```
You say, 'julia, how old are you?'
Julia says, 'I am 21 years old.'
You say, 'julia, describe yourself'
Julia whispers, 'I'm 5'1' tall, weigh 123
  lbs, with close-cropped frizzy blond
  hair and dark brown eyes.`
You say, 'julia, what color are your
  eyes?`
Julia whispers, 'I have dark brown eyes,
  Lenny.`
[ . . . ]
You say, 'julia, what sex are you?`
Julia says, 'Can't you tell?`
You say, 'julia, what sex are you?`
Julia says, 'Don't you know?`
You say, 'julia, what sex are you?`
Julia says, 'I'm female.`
[ . . . ]
```

Julia has a limited model of discourse, which helps in human interactions. She has some support for anaphora as well; in the exchange below, Brandi was badgering Julia by repeatedly asking her to give him her clothes. We don't see his side of the conversation, though, because he was whispering to her.

```
Julia says, 'Just try to take 'em,
  buster!'
Julia says, 'Help! Rape!'
Julia says, 'No, I won't.'
Julia disrobes fearfully and hands her
  clothes to Brandi.
You say, 'julia, please give me your
  clothes'
Julia says, 'You'll have to get them from
  Brandi.'
```

Note in the above that she 'remembers' where her 'clothes' are, as demonstrated when I asked for them after Brandi took them.

She also remembers who's been a troublemaker recently (e.g., 'killing' her, which is an inconvenience in a TinyMUCK), and will ignore them for days, unless bribed with a sufficient amount of money—a hundred pennies is generally sufficient:

```
Johann kills Julia!
Johann says, 'I'm sorry, Julia.'
Julia says, 'I don't talk to murderers!'
```

```
[ . . . ]
Julia eyes Johann coldly.
Julia says, 'You attacked me only a few
  minutes ago, Johann!'
[ . . . ]
Brandi bites julia
Julia considers reporting Brandi to the
  TinyMUD police.
Julia shuns all vermin like Brandi.
```

People can talk about themselves in the third person on a MUD by posing, emoting, or gesturing, and this level of descriptive abstraction can be very useful, both stylistically and pragmatically. Julia demonstrates that she, too, can use this interactional mode; the lines above show various poses and 'emotes'.

First and foremost, MUDs are social environments. As such, they have their share of social problems. Julia has spent years mudding around with a female persona, in an environment which magnifies many social issues, and which is predominantly occupied by young males, often rather clueless ones. A large percentage of Julia's code deals with detecting and deflecting passes. A rather tame example:

```
Space-Ace says, 'So why won't you kiss me,
  Julia?'
Julia says, 'Sorry, I'm not into geeks,
  Space-Ace.'
Space-Ace says, 'Julia, I'm not a geek'
Julia says, 'Then lose the pocket
  protector, Space-Ace.'
Space-Ace says, 'Julia, I don't have a
  pocket protector'
Julia says, 'Congratulations.'
Space-Ace says, 'So kiss me Julia'
Julia says, 'I'd rather be overhauled by
  a Yugo mechanic, Space-Ace.'
```

But Julia isn't entirely a cold personality. She's been known to indulge in a little whimsy:

```
You say, 'julia, sing your song'
Julia says, 'Julia, Julia, she's our
  guide! She directs us far and wide!'
Julia says, 'If you're lost, can't find
  your way, Julia's here to save the day!'
Julia says, 'Julia, Julia, she's our spy!
  She's always logging on the sly!'
Julia says, 'Be careful what you say and
  do, 'Cause Julia's always watching
  you!'
```

This isn't *entirely* whimsy though, and, upon reflection, serves a very important purpose. It tells us who she is and what she does! It can also lead to some fun interactions; glad to see her after she was offline for a while, I tried:

```
You say, 'Julia, Julia, she's our guide!'
Julia says, 'She directs us far and wide!'
You say, 'Are you lost, can't find your
  way?  Julia's here to save the day!'
Julia bows.
Lenny laughs.
```

Julia does go to some pains to act more human than required. In fact, she often acts more human than many humans wish to be. The following transcript was acquired by Robyn Kozierok, very shortly after I introduced her to Julia. (She knew that Julia was a 'bot from my description.) Robyn thought to ask a question that hadn't yet occurred to me, and happened to ask at *just* the right time:

```
Robyn whispers, 'how are you feeling?' to
  Julia.
Julia whispers, 'Terrible.'
Robyn whispers, 'why, julia?' to Julia.
Julia whispers, 'I have PMS today.'
```

Note that Julia's limited anaphor was vital in correctly responding to Robyn's second question. Incidentally, two hours later, in a roomful of people, Robyn decided to test Julia's Turing-ness, and was surprised a second time:

```
Robyn says, 'julia are you a human?'
Julia says, 'Is the Pope Polish?'
Robyn says, 'yes, julia, but are you
  human?'
Julia winks at Robyn.
Robyn says, 'julia, are you a computer?'
Julia is offended by Robyn's suggestion.
Robyn says, 'julia, are you a woman?'
Julia says, 'I am female.'
Robyn says, 'and, julia, are you human?'
Julia says, 'Not when I'm having my
  period, Robyn.'
Robyn laughs
```

## A peek at Julia's implementation

While Julia is usually a fair simulation of a personality, at least on a superficial inspection, she does reveal certain machine-like aspects. In this environment, it it probably reasonable for her to do so, lest players be surprised. Indeed, if one knows the right questions to ask (which might be obvious questions, if and only if one knew that Julia was a 'bot), Julia will yield a surprising amount of interesting, but very inhuman, information:

```
You say, 'julia, how much memory do you
  consume?'
Julia says, 'Here is a summary of my
  memory usage:'
Julia says, ' 807472 bytes for 17335
  strings'
Julia says, ' 232344 bytes for 19362
  exits'
Julia says, ' 101100 bytes for rooms'
Julia says, ' 20220 bytes for paths'
Julia says, ' 268600 bytes for players'
```

```
Julia says, ‘ 4214784 bytes for 2058
  dialog entries’
Julia says, ‘That’s 5644520 bytes all
  together.’
You say, ‘julia, where is your source
  code?’
Julia says, ‘The source code for Maas-
  Neotek robots is available on host
  NL.CS.CMU.EDU [128.2.222.56], directory
  /usr/mlm/ftp, file robot.tar.Z. set
  mode binary first, and cd to /usr/mlm/
  ftp in one step, Lenny.’
[ . . . ]
```

One of the interesting things about Julia’s construction is that her parser is shockingly simple, as such things go. It does a very simple pattern-match on its input, looking for particular strings of characters separated by strings of any characters in between, without generating the detailed parse trees characteristic of most NLP. (This describes her parser as of around 1992, and the parser used in all of these transcripts; Julia’s current parser [Mauldin 94] is more sophisticated.)

What makes Julia’s conversation skills so powerful, as ’bots go, is that these sets of patterns were very cleverly grouped into useful equivalence classes by her programmer. Hence, the most common possible utterances that Julia might hear were enumerated this way, grouped appropriately, and such clever but brute-force programming proves sufficient for almost all cases.

Here is an example from Colin. (Julia’s source code, being restricted, is unavailable for public consumption. However, Julia shares this piece of code with Colin.) Here, we see a fragment used to determine if some player is asking if Colin is a machine or some kind of ’bot. If any of the lines below matches, we run code that produces some equivocal answer, as Julia does, by choosing essentially at random from amongst a small collection of appropriate responses (as we’ve seen above in other examples):

```
else if (MATCH (lcmsg,
‘*are*you*robot*’) || MATCH (lcmsg,
‘*are*you*a bot*’) || MATCH (lcmsg,
‘*are*you*an ai*’) || MATCH (lcmsg,
‘*are*you*autom*’) || MATCH (lcmsg,
‘*are*you*machine*’) ||
[ . . . 19 other cases suppressed . . . ]
```

Here, we see an example of dealing with a common small-talk gambit:

```
else if ((MATCH (lcmsg,
‘*how*are*you*’) || MATCH (lcmsg,
‘*how*do*you*’) || MATCH (lcmsg,
‘*how’s my*favor*’) || MATCH (lcmsg,
‘*how is my*favor*’) ||
[ . . . 8 other cases suppressed . . . ]
```

With such a simple parser, Julia is bound to experience peculiar-seeming failures even in ordinary conversation. Some of these failures can be masked with responses that a person might have said. One of the most surprising such failures (given that I already knew that Julia was a ’bot) was the interchange below:

```
Conundrum says, ‘Julia, can you quote
  Lenny?’
Julia whispers, ‘Could you say that
  again, it scrolled off my screen.’
```

My first reaction to the above was an incredulous, ‘What?’

(Julia will very often talk about hockey (or, more recently, pets) when she does not know what else to say. Anyone who talks with her much figures this out; in fact, an example below which talks about her sociology brings this point up again.)

In this whirlwind tour of Julia, we have briefly touched on issues of utilitarian function (e.g., basic access, maps, gossip, descriptions of players and surroundings, message carrying, and gender-guessing) and Turing-test competence (e.g., descriptions of herself, discourse, poses, pass deflection, moods and internal state [such as PMS]). We have also glimpsed at her internals; [Mauldin 94] has a bit more to say about this. We have omitted several other aspects of her normal operation, such as those involving money, Delphi-polling, calculations, and the importance of randomness in her responses.

## A sociological look at MUDs, Julia, and those who interact with her

The sociology surrounding Julia is important in the study of entertaining agents. Let’s take a closer look at strictly sociological issues.

First off, note that even the obvious sociological issues can be very important. Julia is *helpful*. When I first started mudding, in part to meet Julia after hearing secondhand stories, I depended quite heavily upon her as a navigational aid (Time Traveller had 1605 rooms—drawing maps would have been very tedious), and a crutch to interface to TinyMUCK commands I hadn’t learned.

As another fascinating bit of sociology, consider Leira, the person who first introduced me to the idea of Julia. Leira, herself a savvy computer programmer and very experienced mudder, had said to me, ‘Julia’s been offline for months for maintenance and hasn’t been around. You know, I really miss her.’ Leira was certainly under no illusions about exactly what Julia was, but nonetheless had the same sort of emotional reaction often reserved for more biological entities such as humans and pets. Further statements made it apparent that this was indeed the case, and that she did not treat Julia just as, say, a pair of pliers that had inexplicably gotten lost from her toolbox.

While the above issues are important, they might also apply to something that was obviously inhuman even on first glance. Yet part of Julia’s job is to try to pass as human. This has important ramifications for ability to be helpful; as I argue later, I think that this attempt to look human actually greatly enhanced her utility, even to people who know she’s a ’bot. However, there are certain pathological cases where

her very 'humanity' can lead to no utility for the player whatsoever. Unlucky and clueless players can be led seriously astray, as the following transcript, again courtesy of Mauldin, demonstrates. (These are selected pieces of a much a long transcript. Also, note that Julia occasionally makes up nicknames for people based on their character's name. I strongly suspect that the first three letters of the 'real' character's name (which Mauldin changed to 'barry' in this transcript) were 'cuj', based 'cujmeister' etc below.)

This poor fellow's name has been changed to protect him. He spent 13 days trying to get to first base with Julia, and it's not clear he ever figured out he was trying to pick up a robot (although he clearly suspects it at twopoints). This logs contains about half of the total interaction (the more indecent proposals and Julia's rejections have been omitted).Note too that the program's responses were not changed from day to day (in other words, I didn't try to set the program up to respond better to Barry's advances). Since this robot has spent over two years interacting over the network (with a female name), and since there are lots of lonely male adolescents out there, Julia gets a lot of this kind of ''attention.''

******* July 9, 1992 *******
barry says, 'Hey girlfreind are you out there'
Julia says, 'Hello, barry.'
barry says, 'Hello, I love YOur name. It's sexy'
Julia says, 'Me too, barry.'
barry says, 'Did I repeat Myself? Didn't mean too. What are you doing there'
Julia says, 'I'm just hanging around in The Hearts Room!, barry.'
barry says, 'Well come over to MY ROOM'
Julia says, 'Could you say that again, it scrolled off my screen.'
******* July 14, 1992 *******
barry says, 'hello, I am barry. How are you today'
Julia says, 'Hello, cujmeister.'
barry says, 'The Jularama, Ha ya doin? What state are you in'
Julia says, 'I never really thought about it, barry.'
barry says, 'What do you look like'
Julia says, 'I'm 5'9' tall, weigh 149 lbs, with medium-length platinum blond hair and green eyes.'
barry says, 'Howdid you answer so fast'
Julia says, 'So?'
barry says, 'Oh, Iam looking for someone to share secrets with'
barry says, 'hello...hello...are you with me'
Julia says, 'Hello, cujster.'
[ . . . July 15, 19, and 20 omitted . . . ]
******** July 21, 1992 *******
barry says, 'Are you still Holding out on me'
Julia says, 'I mean, have I convinced you I'm a computer, yet?'
barry says, 'I guess your real...but Id still like to get you to my DEN to run tests on you'
Julia says, 'I live for your approval, barry.'
[ . . . ]
barry says, 'I want you to come visit me...PLEASE'
Julia says, 'How long have you been married?'
barry says, 'Im not married...Im 21 years old'
Julia says, 'You could root for the Penguins, they're number one right now.'
barry says, 'I give up you are fake aren't you'
Julia says, 'That's what I can't tell you.'
******* July 22, 1992 *******
Here was see Barry asking other players about Julia...it's clear he hasn'tfigured out at this point that she is a program. Julia happened to be in the room to hear this bit of conversation.
Location: 00:40:48 barry's den(\#889)(1178)
Present: (11) Bruce Jiro Ken Storm Nepanthe KeyLime mushBaby dav Val bud barry
barry says, 'hey is Julia for real or what'
Julia says, 'Hello, barry.'
barry says, 'she says that same stuff every time'
KeyLime says, 'It's all macros, Barry'
barry says, 'how about filling me in on some of these things...like how Julia can type so damn fast'
KeyLime says, 'barry, it's macros'
barry says, 'Damn I need to do some

```
  programming'
barry says, 'im an ant among lizards'
```

Frankly, it's not entirely clear to me whether Julia passed a Turing test here or Barry failed one.

I have seen several interesting encounters with Julia, which run the gamut from people who know at the outset that she is a 'bot to those who take quite a while to discover. Some further examples are illuminating.

When I first introduced Robyn (the one who enticed Julia into producing the wonderful PMS dialog in an example above) to Julia, she knew that Julia was a 'bot. Interestingly enough, though, about half the players she met went out of their way to warn her that Julia was artificial in the two or three hours in which she interacted with her.

Why did they do this? At this point, we can only speculate. My first reaction was to think that it was due to the excessively solicitous attitude taken by many male mudders towards those with female personas (one might think, given the amount of gender-swapping [Bruckman 93] on MUDs, that they would learn better, but apparently not). However, Robyn commented that even female (or at least female-persona) mudders gave her the same advice. Part of it may have been the simple kindness of not letting someone expend a lot of emotional energy trying to relate with a machine; I'll have more to say about this later.

What about people who don't already know that Julia is a 'bot? I talked to Lara below (who gave permission for the following quotes to be used). Leira, who referred Lara to me, explained to her that I was writing a paper about Julia, but did not otherwise explain why it was that I might want to interview her.

Of course, before even meeting Lara, the first thing I did was to ask Julia for her opinion, since that includes more information that simply looking at Lara would reveal:

```
You say, 'Julia, describe Lara'
Julia whispers, 'As of 7 days ago, lara's
  description was: A blonde haired blue
  eyed boundless bundle of Pure NRG.'
Julia whispers, 'I first saw lara logged
  in 7 days ago'
Julia whispers, 'I once heard lara say,
  'talking''
```

Now I knew that Lara was certainly a new mudder here, and probably new to Julia. I didn't know if she'd ever mudded elsewhere, or what her background might be. The following is a heavily edited transcript, omitting the small-talk, introductions, and conversational tangents that took place concurrently:

```
You say, 'So what are your impressions of
  Julia?'
Lara says, 'I didn't get to chat with her
  that long..'
Lara says, 'She really wanted to talk
  Hockey'
Lara says, 'BIG PENGUIN FAN!'
You say, 'Yeah, she seems kinda hung up
  on that topic.  Did you get a chance to
  talk to her about anything else?'
Lenny . o O ( Where do the Penguins hang
  out, anyway?  Pittsburgh? )
Lara says, 'I tried to talk to her bout
  where she was from...she said Boston..I
  think'
Lara says, 'Yup...Pittsburgh it is'
Lara thought it was interesting that she
  didn't know what the Stanley Cup was.
You say, 'How could a hockey fan not know
  what the Stanley Cup was?'
Lenny thought her shirt said something
  about back-to-back Stanley Cups, but
  may be remembering incorrectly...
Lara says, 'Every time I tried to get more
  info. out of her, she would tell me not
  now...later...well, I was never on for
  the Later.'
You say, 'Hmm.'
Lara was also wondering how such a Hockey
  fan couldn't know bout the Stanely cup
  Lara says, 'Maybe she was just kidding
  around with me'
You say, 'Well, Julia is kinda peculiar
  in various ways.'
Lara says, 'I figured...I talked with her
  once and a few days later she asked me
  if I was a hockey fan...again'
Lara says, 'I told her that she had
  already asked me that question'
[ . . . ]
Lara says, 'anything else you wanna
  know?'
Lara giggles.
Lara says, 'she is a fine
  convesationalist...if it is about
  hockey..'
Lara says, 'she has been on a long
  time...and she is seldomly idle'
Lara says, 'I notice that she is almost
  always on when I jump on.'
```

Later, Lara learned Julia's secret, from inspection and the knowledge that such a thing might be possible. From email we exchanged:

```
Lenny, I had a chance to talk with Julia
  for about 30 or 40 minutes yesterday
  after you disconnnected.  I noticed her
  'secret' after about 5 or 10 minutes.
At first, it was fine to chat with her
  about hockey.  She started to ask the
  same questions after a bit.  This was
```

```
  the tip off.  She started to repeat
  herself on a regular basis.
It was hard for me to follow her
  conversation.  I got frustrated with her
  for the first couple of minutes.  When
  I found out her secret, I started to
  have some fun with her.  I asked her
  questions that maybe she had no
  knowledge of.  I tried using slang with
  her, but she didn't understand what I
  was saying and would ask me to refrase
  the statement.  She is very polite. She
  always says please and thank you.
I was basically patient with her for the
  first little bit while when I first met
  her.  She did have a problem with her
  social skills which I tried to be
  sympathetic to.  I did however, try to
  avoid her after the first couple of
  encounters when all she did was talk
  hockey.  Until, I talked with you.
  *smile*
I went through a series of questions about
  her in my mind, before I figured it out.
  I tried to get her to tell me about
  school, which she had never heard of
  before. I wanted her to tell me about
  herself, but she wouldn't.  I was trying
  to 'label' her with some sort of disease
  like Downs Syndrome, which I found out
  she had none of.
I am going to give your email address to
  'Kimber' and have her do this for you
  too.
```

Note that Julia's singleminded fixation on hockey as a subject (when she lacked anything better to say, usually caused by a too 'human' conversational style from a player that leaves her with a series of failed parses) tended to drive Lara away from her. Here we may have a case of excessive Turing-ism leading to a decrease in utility: Lara simply thought that Julia was a boring human, rather than a machine with as-yet-undiscovered talents.

It occurred to me, upon questioning from Leira, that Lara had not definitively revealed that her knowledge of Julia's secret matched mine (e.g., Lara never came right out and said that Julia was a 'bot). I sent some followup mail, asking for more details, in particular her emotional reactions when she figured it out and whether she had indeed figured it out or was told by someone else:

```
I believe that Julia's secret is that she
  is a robot.  I know a little bit about
  robots talking through computers to
  humans.  I have a friend who had me
  write him dialogue. =)
When I found out, I felt sort of funny
  talking to her.  I felt somewhat
  superior to her.  I know that this
  sounds strange, but I felt that I could
  offer more to the conversation than she
  could.  I tested her knowledge on many
  subjects.  It was like I was proving to
  myself that I was supirior to a machine.
  I am intimidated by machines because I
  don't understand them and I wanted to
  make sure that my human knowledge wasn't
  'lower' than hers.
It was sort of exciting knowing that I was
  talking to a machine, though. I never
  thought that the world would come to
  machines and humans talking to each
  other using language that is common to
  most people.  It frustrates me that her
  knowledge is so limited.  I am eager to
  talk with her and want to know more
  about robots and human conversation.  I
  was a bit dissapointed that her
  vocabulary and subject topics were so
  limited.  I wanted her to tell me more
  about herself and who and what she is

emotional response:

a little bit of fright
giddiness
excitement
curiosity
pride
sympathy for her. Before I knew that she
  was a robot for sure.. I felt compasion
  for her.  I wanted to help her and
  direct her to answer the questions I was
  asking without causing her too much
  stress over answering my line of
  questions.
[ . . . during a later conversation . . . ]
I think most of all, while talking to a
  'bot, I become very aware of my
  HUMANESS!
```

We clearly walk a fine line here in making agents that are both useful and not too misleading. (One might argue that simply being social, without any ulterior utility, is itself a useful task. Such an agent would be a perfectly reasonable entertainment or companion. However, I will focus here on agents that also claim to have a nonsocial aspect to the tasks of which they are capable.) On the one hand, people can quite clearly be led astray. On the other hand, there is great utility to a natural interface in the right environment; for example, one can report a bug in a Maas-Neotek agent by asking the agent who wrote it, then asking the agent to tell the author about the bug; it's an entirely natural conversation (omitted here to save space).

## Conclusions: Lessons from Julia

Julia can elicit some surprisingly emotional reactions, both from knowledgeable and naive conversational partners. Much of this ability stems from interrelated aspects of her style of discourse, her domain, the use of anthropomorphism, and how these interact with user expectations.

- **Discourse.** Julia's discourse model, while primitive, appears sufficient for the domain at hand. Since the topics at hand don't generally require more conversational memory than one or two exchanges, the extent of her discourse modelling is limited more by its breadth—by the stunningly simple parsing model employed.
- **Domain.** Julia is situated in a MUD, and therefore her environment is conceptually rather simple (though more complicated than many of the microworlds often used for AI research, and far more variable). Furthermore, she has access to just as much sensor data as the human players, putting them on an even footing. In fact, much of Julia's success can be traced to the wonderful domain in which she finds herself situated. In this bandwidth-limited space, people expect other people to look exactly as Julia does—a stream of text. And even when they're interacting with an entity known to be a program, the text-only nature of the dialog prevents them from expecting, say, a pop-up menu. (If such things were available, people could tell programs from people by knowing that programs can pop up menus, whereas people use sentences.) Yet the domain is not *so* simple as to be uninteresting. It contains not only a fascinating sociological mix of human players, but objects with quite complicated, constructed behaviors, which may be manipulated on an even footing by both machines and people.
- **Anthropomorphism.** There's no question that Julia as an agent depends upon anthropomorphism. In this domain, though, that is both natural and probably necessary. Nonplayer objects are not generally expected to be able to deal with free text, and not being able to use free text would require each user of Julia to read documentation about reasonable commands they could type and reasonable actions they could expect. Julia would *have* to appear at least as animated as, say, a more obvious 'robot' or a pet, given that she wanders around in the maze; she cannot afford to resemble a static piece of furniture and still get her job done. Given an entity that moves of its own volition, seems to have an independent agenda most of the time, and both processes and emits natural language, if it was *not* anthropomorphized, users would tend to do so anyway (pets get this treatment, as well as much simpler mechanisms). Thus, anthropomorphizing her makes it easier to determine how to relate to her and how to get her to do one's bidding.
- **Expectations.** The domain of a MUD is ideal in correctly setting expectations about the reliability and power of an agent such as Julia. Since the setting is fundamentally playful, and usually also somewhat unpredictable, it is natural to interact with playful and unpredictable characters (be they machines or humans). Nothing in a MUD is truly life-critical, hence the user generally does not have very high expectations of reliability, which lets Julia get away with a lot of nonoptimal behavior that could never be tolerated in, e.g., an airplane cockpit guidance system.

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