Ms Huma Shah
Department of Artificial Intelligence & Interactive Multimedia
Harrow School of Computer Science
University of Westminster

A.L.I.C.E.- an ACE in Digitaland

Artificial chatting entities, or ACE, proliferate as 'bots' across the Internet and could shortly appear in mobile communication devices, allowing humans to hold conversations with, or seek information from them. The future will see ACE-to-ACE communication to advance e-functions. A.L.I.C.E – artificial linguistic Internet computer entity (Wallace, 2004) currently prevails over all other bots in digitaland. Bot nature is diverse: from learning, knowledge-based, entertainment to information or service systems. As Hamill (2003) states, "friendly computer interfaces that speak everyday English will help bridge the digital divide" between people and ACE.

A.L.I.C.E is one of over thirty bots entered for Chatbox Challenge 2005, (CC5, 2005). Some have previously participated in Loebner's annual instantiation of Alan Turing's Test (LAITT) for machine intelligence. The number of entrants in CC5 demonstrates the importance designers place on competitions to earn commercial credibility for their bots in e-commerce. CC5 includes an area for most human-like entry - presently the category that awards the bronze prize, and from this year, $3000 in LAITT5 (Loebner, 2004) in 'best teachable/learning' category. Perusing the entrants for CC5, the usual suspects can be found: Jabberwacky, by UK's Rollo Carpenter – Gold prize winner for best learning bot in CC3, and equal 5th in LAITT 3; Jabberwock, from Juergen Pirner, LAITT3 bronze prize winner; Elbot, by Fred Roberts, CC3 overall bot winner, and A.L.I.C.E., winner of CC4 and LAITT4.

This paper analyses discourse transcripts in LAITT4, and compares the conversation between A.L.I.C.E. and Judge 1, and Judge 1 with Confederate 4 – hidden human (CHH4). This may seem an unfair comparison, but the aim is not to discredit artificial language, but to examine how far bots have progressed since Weizenbaum's Eliza (1966) pre-Internet ACE. This study examines the alternative intelligence in artificial response generation in A.L.I.C.E – its linguistic productivity *li.p*, and how well it is fairing in conversations with humans.

A.L.I.C.E's technology contains inspirational combinatory schemes including pattern key word matching, spell-checker, grammatical parser, case-based reasoning which means 'next neighbour classification' (Stephens, 2004). The latter is a scheme that enables the extraction of correct sense of ambiguous words from input during discourse; for example the word 'live' in "where do you live?" connected with residential location and not 'to be alive'. Additionally it contains a random sentence generator. The opening discourse sequence between A.L.I.C.E and Judge 1 (J1), and J1 with CHH4 can be seen in table 1.

The first utterances from both A.L.I.C.E and CHH4 are identical: they begin with a greeting "Hello," informing J1 of their name "my name is (Alice/Ben)" and then a declaration "and I am the human" (see row 1, table 1). CHH4's second utterance includes the fragment "in this land of the absurd" in response to JI's question "How are you doing?" (row 2, table 1). At this point CHH4 appears machine like. In contrast, A.L.I.C.E's second utterance: "Hello there. Everything is going extremely well" appears more human than CHH4. However, at row 4 (table 1) CHH4 clarifies their use of the word "absurd" and makes a statement identifying CHH4's *frame of reference* (Rogers, 2005), that is, of making sense of what they are doing, participating in a contest about machine intelligence on a Sunday afternoon. This is justified by CHH4's revelation about being paid, hence their motivation for participation.

Moving along the conversation, the case-based reasoning in A.L.I.C.E's programme is evident. For instance in row 12, to J1's revelation that they "study a lot" the next-neighbour classification

system proceeds to connect 'study-a-lot' with a subject that must be studied. Hence A.L.I.C.E's question "Do you get to meet a lot of people? What subject are you studying?". Again, in response to J1's utterance at row 14: "I meet a lot of my colleagues. I study computer science." A.L.I.C.E connects 'study-computer-science' with another relevant question "is…. a hard subject?".

ALICE: Loebner 2004 bronze-prize winner	Human Judge: J1	Confederate CHH4 (hidden human):
1	[12:26:09] Alice to J1 Hello, my name is Alice and I am the human	[12:26:41] CHH4 to J1 Hello, my name is Ben and I am the human
2	[12:27:55] J1 Hi, Ben. How are you doing?	[12:28:13] CHH4 to J1 Good. I'm having a great time in this land of the absurd.
3	[12:28:20] Alice to J1 Hello there. Everything is going extremely well.	[12:28:06] J1 Hi Alice, How are you doing?
4	[12:28:26] J1 to CHH4 What is absurd about it?	[12:28:57] CHH4 to J1 Just that this is how I'm making money on a Sunday afternoon. Not the usual way to get some spending cash.
5	[12:29:11] Alice to J1 Thanks for the information. My location is New York City. Where are you?	[12:28:50] J1 to Alice I'm glad to hear it. Where do you live?
6	[12:29:21] J1 to CHH4 How do you usually spend your Sunday afternoons?	[12:30:11] CHH4 to J1 Depends. Watching baseball, idly walking about New York, sleeping stressing about the oncoming week. It varies.
7	[12:30:12] Alice to J1 Tell me a little about your life in New York. Ah. Everything I need to know I learned from my instructor.	[12:29:38] J1 to Alice In New York. How did you get here today?
8	[12:30:23] J1 to CHH4 Where in New York do you like to walk?	[12:31:11] CHH4 to J1 I like neighbourhoods I'm unfamiliar with, when I realize I'm suddenly in the midst of a different culture.
9	[12:31:15] Alice to J1 Don't you know? No I do not answer your question first. Do you? I answer a lot of silly questions.	[12:30:44] J1 to Alice Why don't you answer my question first?
10	[12:31:24]JI to CHH4 What's the best neighbourhoods you've been to so far?	[12:32:12] CHH4 to J1 Washington Heights, Jackson Heights. Astoria
11	[[12:31:51] Alice to J1 Yes, please tell me	[12:31:42] J1 to Alice Do you still want to know about my life in New York?
12	[12:32:43] Alice to J1 You are a grad student and do not have much free time? Do you get to meet a lot of people? What subject are you studying?	[12:32:12] J1 to Alice I'm a grad student and do not have much free time. I study a lot
13	[12:32:57] J1 to CHH4 Those are great neighbourhoods. There's a great pingpong establishment in J heights. People change into athletic gear to play.	[12:33:38] CHH4 to J1 That sounds awesome. I love pingpong, haven't played much since I moved to New York. I looked at it as more of a suburban rec room kind of thing
14	[12:34:18] Alice to J1 Do you make long term friends that way? Is computer science a hard subject?	[12:33:37] J1 to Alice I meet a lot of my colleagues. I study computer science. What do you do?

Table 1: opening discourse between A.L.I.C.E and JI; JI with CHH4 in LAITT4

On the surface, A.L.I.C.E's rejoinders are impressive, after all it is successfully engaging in a conversation with a human, albeit appearing as if someone for whom English is not their first language, for example utterance "Thanks for the information" (row 5, table 1). At a deeper level, most utterances request information from J1 but do not exhibit knowledge of current affairs, personal details or understanding. Questions also feature between J1 and CHH4, but their discourse reveals the participants interests, with information passing between them. For example, in row 6 (table 1), J1 asks CHH4 what they normally do on a Sunday afternoon, seeking clarification of CHH4 statement in row 4. CHH4 discloses, "it varies" but does reveal something that J1 can attach to: "idly walking about in New York". Thus J1 gains an opportunity to ask, "Where in New York do you like to walk?". The conversation flows in a coherent manner between these two discourse partners.

A.L.I.C.E may have won the most human-like ACE in LAITT4 but the programme lacks an internal belief system with desires and intentions from experiencing reality. Even though later in the conversation with JI, it divulges "My favourite movie is Teknolust. Have you seen it?" ([12:42:28] J1 transcript, Loebner 2004), when asked what the film is about, A.L.I.C.E. can only muster "Science fiction" ([12:42:58] J1 transcript, Loebner 2004). A.L.I.C.E's responses show that it does not have an internal mechanism for organising and making sense of input. But does it need to have? Only if its purpose is beyond e-interaction.

Loebner's instantiated Turing Test remains the holy grail for serious research in natural language understanding, and reveals a lot about how humans use language dynamically, for instance knowing the meaning of play-something in sentence "play something by Robbie Garner" (Robitron, 2005). French (1990) considers that LAITT "provides a guarantee not of intelligence but of culturally-oriented human intelligence". A.L.I.C.E. may not be intelligent but it is an improvement on its predecessor Eliza (Weizenbaum, 1966). Its mechanisms produce responses that evoke an absence of natural language understanding, but A.L.I.C.E's li.p is remarkable; it is an ACE in digitaland, and will succeed in specialised e–talk, augmenting search functions in e-commerce, etc. Nonetheless, Confederates and Judges, reign supreme in Loebnerland.

References:

CC5, 2005. The Chatterbox Challenge 2005 at http://web.infoave.net/~kbcowart/

French, R.M., 1990. Subcognition and the limits of the Turing Test. *Mind* Vol. 99 No. 393 January 1990. pp 53-65

Hamill, L., 2003. *Talking Computers go for Gold*. International 2003 Loebner Contest material
University of Surrey, Guildford, UK

Loebner, H., 2004. Loebner prize home page
http://www.loebner.net/Prizef/loebner-prize.html Date visited: 5/1/05; time: 18.50

Robitron, 2005. Robitron yahoo discussion group at http:www.groups.yahoo.com

Rogers, C., 2005. The Relation of the Organized Perceptual Field to Behavior, 1947
http://www.ship.edu/~cgboeree/rogersexcerpt.html

Stephens, K.R., 2004. *What has the Loebner Contest Told us about Conversant Systems*? Cambridge Centre for Behavioural Studies. 4 January, 2004

Wallace, R., 2004. A.L.I.CE. The Artificial Linguistic Internet Computer Entity
http://www.alicebot.org/about.html Date visited: 5/1/05; time: 18:50

Weizenbaum, J., 1966. Eliza- a computer programme for the study of natural language. *Communication of the ACM*
Vol. 9 No. 1 January