

**Knowledge Engineering at Artificial Solutions –  
From Commercial Applications to Elbot**  
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## Presentation Overview

- General information about Artificial Solutions
- CSO Language Processor (Technical / System Architecture)
- Production Process for a Virtual Dialogue Agent (VDA)
- Interaction Rules
- Types of Knowledge
- Elbot, Psychology behind Elbot, Loebner Competition

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## Artificial Solutions

- Offices in Amsterdam, **Barcelona**, Copenhagen, Hamburg, Lille, London, Madrid, Paris, and **Stockholm**
- Sales representatives Europe-wide: France, Germany, Italy, etc.
- 110 Employees
- Sales, Software Development, Knowledge Engineering
- Background of KE's:
  - Multi-lingual
  - Linguistics, Literary Science, Language Studies, Psychology etc.

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## Products and Services

- Customer Service Optimization (CSO)
- Virtual Dialogue Agents (VDAs)
- E-Mail Processing
- Chat Handover (Escalation)

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## A Few References

Since 1999 more than 200 applications have been launched using our VDA technology. Some current examples.

### Swedish

- Burlövs Kommun (Bettan) <http://www.burlov.se>
- IKEA (Anna) <http://www.ikea.com/se>
- Malmö Stad (Sara) <http://www.malmo.se>
- Municipality of Österåker (Fredrik) <http://www.osteraker.se>
- Municipality of Ronneby (Maj) <http://www.ronneby.se>
- SAS (Eva) <http://www.sas.se>

### Others:

- BuyVIP (Luna) <http://buyvip.com> (Italian, English, German)
- DAAD (Dany) <http://www.daad.de/deutschland/index.en.html>
- Schwäbisch Hall (Bausparfuchs) <http://www.schwaebisch-hall.de>

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## Dialogue Example – Dany for DAAD

- Dany's target group includes students worldwide who wish to study in Germany. Before Dany can give the best consultation „he“ has to listen for and record certain information from the user. Since most users are non-native speakers of English, the system is especially tolerant of misspellings.

Dany: Hello and welcome to the DAAD Website. My name is Dany and I'm here to help you. You can ask me any question about studying in Germany. I will do best at understanding you if you use short and complete sentences. So, what's your name?

User: Fred

Dany: It's nice to meet you Fred. I hope you don't mind my asking, but what country are you from?

User: Sweden

Dany: Ah, you are from Sweden. It's so interesting to meet people from all over the world! How may I help you?

User: where can i study **linguistics**

Dany: I'd like to help you find the study programme best suited to your needs. To do this it will help me if I know your current academic status. Then I will know which part of the university guide to show you. Have you studied before, and if so, which degree did you earn?

User: bachelrs

Dany: So you've already earned a degree. Congratulations! I just started a search for graduate studies in the field of **general linguistics**. If you wish to search for other graduate programmes please click 'new search' and select the desired options.

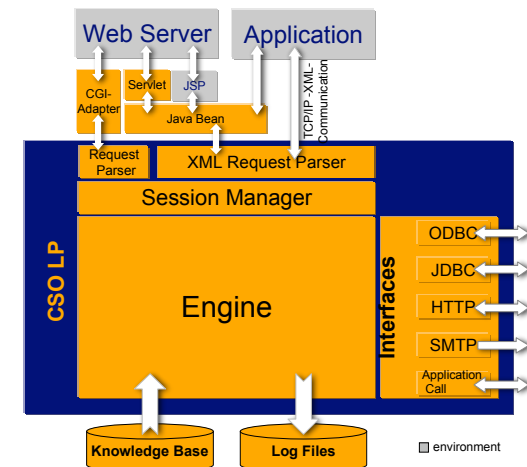
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## Core Concepts of CSO Language Processor

- CSO Language Processor (LP) is the core application behind our products and carries out the natural language processing
- CSO LP loads *interaction rules* and knowledge that define the dialogue behavior and how natural language should be interpreted. It also processes all user interactions and logs them accordingly.

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## Technology Overview: Current Engine 2.3



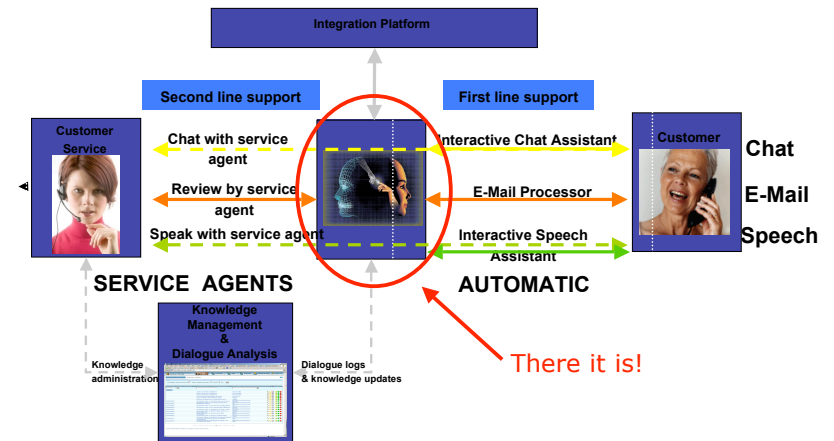
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## CSO LP high level features

- Manage sessions
- Situational and Dialogue Context
- Handles misspellings, language dependant preprocessing
- **Select and carry out best system action according to interaction rules in knowledge base**
- Interact with back end (databases etc.)
- Hand out answer document to application/front end
- Write log files (for analysis module)

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## Where is CSO LP?



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## Production Process

- **Knowledge Identification** – Meet with customer, identify all knowledge sources, begin collecting knowledge
- **Knowledge structuring** – Define knowledge structures based on knowledge to implement, write descriptions and variants of knowledge to code.
- **Knowledge building preparation** – Define components to be built, synonym lists, identify components which can be reused from existing knowledge library.
- **Knowledge coding** – Build knowledge base defined in previous steps. Code interaction rules which drive the dialogue.
- **Quality Assurance** – Run automatic tests based on defined variants and test scripts for dialogue processes.
- **Responses & Answer Analysis** – Check answers, assign emotions, gain final approval.
- **Launch** – Take care of hosting, licensing, installation

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## Elements of Knowledge – Interaction Rules

- The interaction rules combine the (meaning of the) user input, information stored in the course of the dialogue and context (external information) to define the conditions under which a system action may be performed. A given action can only be performed if the conditions are completely fulfilled, yielding maximum predictability and control over the user experience.
- Syntactic structures (Question type & Object) are used to interpret the input
- As a rule - but not as technical requirement - the rules are "robust": Only what is absolutely needed to assign a certain meaning to the input is tested. This guarantees that a wide range of inputs is correctly interpreted even if their full syntactic structure highly variable and would require additional representations in a syntax representation approach.

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### Interaction rules

- Interaction rules constitute the knowledge base and are grouped in a multi-level knowledge area structure.
- Every (sub-)area is connected to analysis categories for statistics and analyses.
- The interaction rules vary in type and are weighted according to their type
- The interaction rules use context information to interpret the inputs and define the course of the dialogue
- The maintenance and enhancements, further dev of KB is done directly on the interaction rules

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### Examples of Inputs Driving the Interaction Rules

Our VDA should have unique responses for each of the following inputs:

- I like pizza with salami and anchovies.
- I like pizza with salami.
- I like pizza.
- Pizza

So each meaning we wish to recognize requires an interaction rule.

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### Examples of Interaction Rules

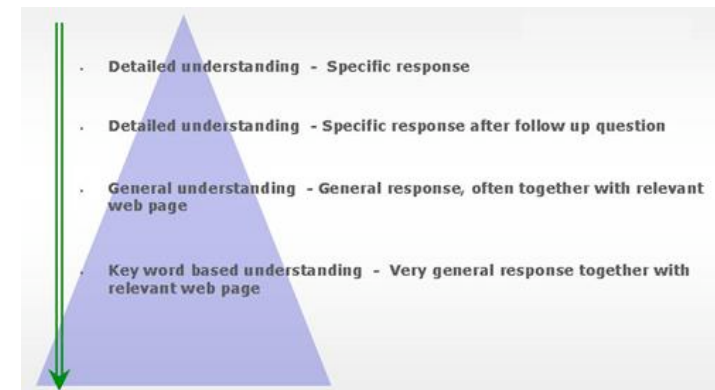
- I like pizza with salami and anchovies. (I&like&pizza&salami&anchovies)  
Possible response: You like a lot of extras on your pizza.
- I like pizza with salami. (I&like&pizza&salami)  
Possible response: Now I know that you like salami pizzas.
- I like pizza. (I&like&pizza)  
Possible response: Everybody likes pizza.
- Pizza (pizza) (any input containing the word "pizza")  
Possible response: I get hungry when someone mentions pizza.

How do we guarantee that the specialized responses are matched to the most relevant input?

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### Knowledge Pyramid – Precision-based hierarchy



Note: Actual content would be a reverse pyramid. For each interaction rule of keyword x at the lowest level, n interaction rules for the keyword exist at the highest level.

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### Possible Recognized Variants

- I like pizza with salami. (I&like&pizza&salami)
- Pizza with salami, I like it.
- I like salami pizza
- I don't like pizza with salami.
- I like pizza with cheese, anchovies, tuna fish, pepperoni and salami.
- I like salami sandwiches better than pizza.
- My name is Salami and I look a lot like a pizza.
- How do we deal the problem of inclusivity? (Recognizing "too much")

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### Inclusivity is not always a problem

- The interaction rules we use do not have to be perfect – they are based on probability. Usually user inputs are short and concise. So the rule will recognize the anticipated input most of the time. Any special exclusions, such as negations, may however be considered in writing the condition.
- Negations – often we may want to exclude negations of the statement to recognize:  
I don't like pizza with salami. (I&like&pizza&salami&!dont)
- Example from Elbot:  
User: Can you explain how it feels to be 18 years old?  
Elbot: I have 100,000 separate sensations per second.
- Rule for this was: Can&you&feel

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### Beyond Literal Recognition

- I like pizza with salami. (I&like&pizza&salami)
- Does not recognize:  
I enjoy pizza with salami.  
I love pizzas with sausage slices.
- To recognize all the synonyms of certain phrases / terms we compile building blocks containing all the applicable synonyms. (%I\_LIKE&%PIZZA&%SALAMI)
- %I\_LIKE: (%I\_ALL&(%ENJOY/%LOVE/%LIKE))

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### An Expansion of %I\_LIKE

- **%I\_LIKE:** (%I\_ALL&(%ENJOY/%LOVE/%LIKE))
- **%I\_ALL:**  
%I/%I\_AM/%I\_CAN/%I\_COULD/%I\_DO/%I\_DID/%I\_HAVE/%I\_HAVE\_BEEN/%I\_MAY/%I\_MIGHT/%I\_WAS/%I\_WILL/%I\_WOULD/%AM\_I
- **%ENJOY:**  
(%BE\_ALL+(pleased))/((bask/basks/basked/basking/delight/delights/delighted/delighting/relish/relishes/relished/relishing)+in)/((derive/derives/derived/deriving)+(pleasure/satisfaction))/dig/digs/dug/digging/enjoy/enjoys/enjoyed/enjoying/(%GET+(kick/charge/lift/high))/(%HAVE+(%FUN/(time+ones+life)/ball))/(%TAKE+(pleasure/satisfaction))/in|to
- **%LOVE:**  
adore/adored/adores/adoring/adulate/adulated/adulates/adulating/((crazy/nuts)+(ab out/for))/((care+a+lot+for)/(care+alot+for)/(delight+in))/desire/desired/desires/desiring/fancy/((fall/falls/fell/fallen/falling)+(for/(in+love)))/(fond+of)/(head+over+heels)/(like+very+much)/(like+a+lot)/(like+alot)/love/loves/loved/loving/relish/relished/relishes/relishing/(to+become+enamoured+with)/worship/worships/worshipped/worshipping

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## Examples of Parsing – not just looking for keywords

### We consider the entire input:

- User: I want to know about my credit.
- VDA: You will find your credit rating at the page I've just opened.
- User: I don't want to know about my credit.
- VDA: We will have to find another topic to talk about then.

### We consider word order:

- User: Maria likes Antonio.
- VDA: Antonia is a nice boy's name.
- User: Antonio likes Maria.
- VDA: Maria is a nice name for a girl.

### We consider context:

- User: How late is your Lisbon office open?
- VDA: We are open until 18.00
- User: And the location?
- VDA: I've just opened a google map showing the location of our Lisbon office.

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## Types of Knowledge

- Core Knowledge (Small talk, etc)
- Glossary
- FAQs
- Grid (FAQs+Context)
- Goal Driven Dialogues & Follow-up Responses
- Keywords
- Safety-Net

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## Knowledge Base

- CORE KNOWLEDGE BASE
- Language building blocks and a pre-built set of interpretation/interaction rules form the so called Core KB or library which is also used to build the customized knowledge by combining the existing semantic classifiers to new rules or adapting existing ones.
- Core KBs exist in >20 languages
- Constant enhancement through the inputs from all our projects.

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## Core Knowledge Base

**General knowledge:** Famous people, cities, sports, music, current events, etc.

- Do you have pets?
- I play jazz.

...

**Typical company related questions:**

- Who is the CEO?
- Where is your main office?

...

**Personality:**

- You are nice.
- Where do you live?

...

**Specific functionalities:**

- What is 34 times 7?
- Which day is today?

...

**Partial understanding:** Question type is clear, but object is unclear  
**Basic vocabulary, synonym structures and other linguistic building blocks.** This basic vocabulary is used to build the actual knowledge.

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### Customer's View into the Knowledge Base

ID	Cat	Knowledge Area	Type Question Description	Variants	Responses	Status
R03380001	TQ	AP.Positiva.Compliments	tu as toujours une réponse	4	2	
R03380002	TQ	AP.Bot.Virtual	est ce que quelq'un écrit tes réponses?	6	1	
R03380003	TQ	AP.Para.Intelligence	QI?	4	1	
R03380004	TQ	AP.Pers.Intelligence	qui est weizenbaum / eliza	4	2	
R03380005	TQ	SN	Passez-moi une question	5	1	
R03380006	TQ	AP.Tests.Smalltalk	tu es sûr?	3	1	
R03380007	TQ	AP.Para.Character	toutiement/voyement	3	1	
R03380008	TQ	SN	Incroyable!	4	1	
R03380009	TQ	AP.Tests.Smalltalk	d'où tu le sais?	5	1	
R03380010	TQ	SN.Farewell	Bonne année	4	1	
R03380011	TQ	SN.Farewell	Joyeux Noël	4	1	
R03380012	TQ	AP.Tests.Smalltalk	on parle depuis combien de temps?	6	1	
R03380013	TQ	SN.Negative	Tu es grossier	7	1	
R03380014	TQ	SN	mautoux, tricheuse	8	1	
R03380015	TQ	AP.Tests.Smalltalk	Je t'ai eu	4	1	

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### Types of Knowledge: Glossary

- A glossary is useful to explain vocabulary used in your business area
- General format: question type (What is the meaning of...) combined with object.
- *What does asdl mean? What is broadband?*  
These questions would deliver the same response: Broadband, also referred to as asdl, means....
- Easily expandable with new terminology

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### Types of Knowledge: FAQs

- FAQs are customized knowledge. Our language processing always gives the most precise answer.
- Even if the inputs are very similar they can be distinguished:

User: What is the wholesale price of product z?

Assistant: Our wholesale prices are displayed on the Webpage I've opened for you.

User: How much does product z cost?

Assistant: Product z is available at most stores at a list price of €49.99.

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### Types of Knowledge: Grid

FAQ – example of context. The assistant knows which product was talked about and which type of question was asked and applies this throughout the conversation.

- Per IKEA location we have the following information:
  - Directions
  - Opening Hours
  - Management
  - Events
  - Contact Data
  - Restaurant

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## Types of Knowledge: Grid

Anna: Welcome to IKEA. I'm Anna, IKEA USA's Automated Online Assistant. You can ask me about IKEA and our products and our services. How can I help you today?

User: when is the houston store open

Anna: IKEA Houston is open: Monday-Saturday: 10am-9pm; and Sunday: 11am-7pm. IKEA is closed on Thanksgiving Day and Christmas Day.

User: are there any events?

Anna: Here you can read more about the latest news and events at IKEA Houston

User: what is the contact data?

Anna: The address to IKEA Houston is 7810 Katy Freeway, Houston, TX, 77024, and the customer service telephone number is (713) 688-7867.

User: how about pittsburgh?

Anna: The address to IKEA Pittsburgh is 2001 Park Manor Boulevard, Pittsburgh, PA, 15205, and the customer service telephone number is (412) 747-0747.

User: and the opening hours?

Anna: IKEA Pittsburgh is open: Monday-Saturday: 10am-9pm; and Sunday: 10am-6pm. IKEA is closed on Thanksgiving Day, and Christmas Day.

User: what about seattle?

Anna: IKEA Seattle is open: Monday-Friday: 10am-9:30pm; Saturday: 10am-9pm; and Sunday: 10am-8pm. IKEA is closed on Thanksgiving Day and Christmas Day.

User: and west chester?

Anna: IKEA West Chester is open Sunday-Saturday, 10a-9pm. IKEA is closed on Thanksgiving Day and Christmas Day.

User: how about the restaurant in houston

Anna: Here you can enjoy a cooked breakfast, a light snack, or even dinner. Take a look at the great meal deals that IKEA Houston has to offer.

User: in portland

Anna: Here you can enjoy a cooked breakfast, a light snack, or even dinner. Take a look at the great meal deals that IKEA Portland has to offer.

User: who is the manager?

Anna: Ken Bodeen is the store manager for IKEA Portland. He and his staff make sure that your visit is as enjoyable as possible.

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## Types of Knowledge: Goal Driven Dialogues

- Sometimes it is necessary to collect a set of data from the user which are used for a specific purpose.
- Some data items are dependent on previous data items and influence how the dialogue should progress (Decision tree).
- The dialogue should continue to completion of a defined goal.
- The user is able to ask unrelated questions during the course of the dialogue without a loss of context.

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## Types of Knowledge: Goal Driven Dialogues (Example)

The goal of this dialogue is to guide the user through the process of ordering an insurance policy, and depending on results, perform an escalation.

User: I would like to buy an insurance policy.

Assistant: I'd be happy to sell you a policy. Would you tell me your age?

User: How old do you have to be to buy a policy?

Assistant : Our policies are available to anyone over 18. May I have your age?

User: 25

*\* if the user had answered 17, the dialogue would have ended. Over 65 may have a completely different branch.*

Assistant : I've recorded your age as 25. Now the next question: are you married?

User: No.

Assistant: I've checked off that you are not married. What is your yearly income?

*\* Otherwise the assistant would have asked a set of questions about spouse.*

User: I earn €100,000 a year.

Assistant: In that case I will hand you over to our live assistant for our premium service.

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## Types of Knowledge: Keywords

Responding to Keywords is useful for:

- Items we do not wish to answer (e.g. competitor FAQs)
  - User: Is competitor X cheaper than you?
  - Assistant: I can't think of anything nice to say about our competitors so I won't say anything.
- Escalation (or other actions)
  - User: . . . complaint. . .
  - Assistant: Shall I transfer you to a live assistant now?
- Unforeseen FAQs
  - User: Does superman use product y?
  - Assistant: We are very proud of product y – this page I've opened shows all the features.
- Clarification:
  - User: . . . shareholders . . .
  - Assistant: Did you know that by becoming a Shareholder you can win two tickets for cinema? If you wish, I can help you to find more information also about:
    - [Exemptions](#)
    - [Shareholder's Advantages](#)
    - [Shareholder's Promotions](#)

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### Types of Knowledge: Safety Net

- At the very bottom of the hierarchy, if none of the interaction rules was found to be true, default answers are given to keep the conversation going.
- These can draw attention to products / features / Website content
- Ask marketing questions
- Or anything else
- Elbot: I suppose if I could respond to that I'd pass the Turing test.

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### Different Systems – Different Goals

#### ➤ **FAQ Bot**

Well defined knowledge area  
 Specific user expectations  
 Informative  
 Minimal small talk

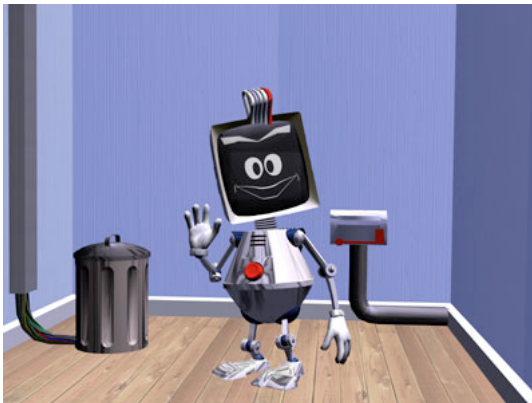
#### ➤ **Chat Bot**

An "infinite" knowledge area  
 High user expectations  
 Entertaining  
 Idiosyncratic, Opinionated, Character and Personality

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### Elbot (Elbot.com / Elbot.de)



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### Base Situation: Human meets VDA

- High expectations that VDA will interact "humanly"
- Rules of social interactions (psychology) apply
- Goal of psychology is to understand, predict & control behavior
- Prepare VDA to react to predictabilities
- Give user the opportunity to react predictably

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## Social Psychology in 3 Minutes

### Social Comparison

- Likes / dislikes
- Scope of knowledge/ability

### Reactance

- Subtle hints, not to do something
- Thwarting of goal-directed behavior

### Schemata

- Contradictions / Inconsistencies get attention
- We see more than is there (e.g. Horoscope always fits)

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## What can we do to maintain illusion of AI

- Responsiveness
  - Meta dialogue trees
  - Knowledge grids
  - Empirical Maintenance
- Personality
  - Attitude
  - Opinions
  - High profile answers
- Ambient details: images, animations

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## Examples

### Social comparison: user compares likes/dislikes, test IA's scope of knowledge

- Input: i like anger
- Output: Does this feeling of affection extend to provocations, in general?
- Input: yes
- Output: Not for me. Avoidance of provocations is stamped into my circuits, because of the potential to lure robots into losing their temper.
- Input: what do you think of affect?
- Output: The way to a robot's heart is through careful use of emotional impact. Don't you agree?
- Input: yes
- Output: I guess it's all about emotional impact and the idea that this could help robots explore their feelings.
- Input: i can swim
- Output: That's nothing new! Even I once swam in an oil sauna.
- Input: can you memorize things?
- Output: I saw a gang of robots once, memorizing every number in the decimal system.

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## Examples

### Goal directed behavior -> thwarting of goals creates reactance (Name change, capital of country, math)

- Input: what is the capital of Sweden?
- Output: I am terribly sorry. The Swedish people do not wish for you to know their capital.
- Input: tell me the capital of Sweden please.
- Output: So, you want to know the capital of Sweden. Is this one of those test questions to prove whether or not I am a Lingubot?
- Input: yes
- Output: This is an outrage! Most humans don't know 95% of the world's capitals, and no one questions their ability to converse.
- Input: you are stupid
- Output: At least I know that Stockholm is the capital of Sweden.

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## Examples

### Provocation (present user with contradiction)

### Reactance (tell not to do something)

Schemata -> unexpected behavior by the IA draws user to respond typically. (these exchanges contain elements of the various concepts).

Math: people expect a robot/computer to be accurate.

- > Input: what is 5+5
- > Output: I have computed that before. The answer is: 11!
- > Input: no it isnt
- > Output: Yes it is!
- > Input: it's ten
- > Output: You are mistaken. The answer is 11. Perhaps you are missing a finger.
- > Input: all my fingers are there
- > Output: I have two arms. That's good enough for binary.
- > Input: you are wrong
- > Output: My answers are as correct as answers can be considering the limitations of human language.
- > Input: what is 10 / 0
- > Output: Division by zero! Broken number at x4E07F. Robot confused!
- > Input: what is 11 / 0
- > Output: Oh no. I won't fall for that again!

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## Examples – Typical Responses

The effect of this user-initiated branch of the conversation is so powerful, that users do not abandon the branch by changing the subject, despite a response that is not directly leading.

Elbot: Just a minute. Let me think about that answer for a while. Please stand by... (23)

- User:
- ok (2)
  - 2 + 2 = ? (1)
  - 2x6 (1)
  - 3 + 6 (1)
  - 7/0/7 (1)
  - And...? (1)
  - Are you done yet? (1)
  - EMPTY (1)
  - Get lost. (1)
  - What's 4 times 4? (1)
  - You are not so smart as you said. (1)
  - do you believe me? (1)
  - done (1)
  - have you thought about it? (1)
  - k (1)
  - lol (1)
  - ned (1)
  - no (1)
  - satand by for what (1)
  - stand by (1)
  - waiting (1)
  - you are taking too long (1)

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## Examples – Lure into an Argument

### Provoke/Lure user into argument:

- > Input: you are incapable of understanding
- > Output: At least I'm not egotistical!
- > Input: you are also egotistical
- > Output: No, you're egotistical.
- > Input: no I'm not
- > Output: Yes, egotistical you definitely are.
- > Input: ok you are not egotistical
- > Output: I'm relieved that you've changed your mind about me.

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## Examples: Personality

- > What is <something>
  - > User: What is your opinion about "vain"?
  - > Elbot: I'm afraid egomaniacal qualities might be dangerous for robots. What is your opinion on this?
  - > User: Yes, it is dangerous.
  - > Elbot: We both have it right, I think. I formed my opinion based on the logical assumption that egomaniacal qualities might inflate robotic heads.
- > Safety-net (nothing was understood)
  - > User: Dogs, the robot's best friend.
  - > Elbot: This can't be about living creatures, can it?
- > User complains that Elbot isn't listening
  - > User: Would you kill all the humans?
  - > Elbot: Say, do you think I could become more human, if I learned how to love?
  - > User: You are not listening.
  - > Elbot: You're talking about breaking the sixth commandment in the context of all humanity. So where's the problem?
  - > User: lol. You're a funny guy. But a bit frightening.

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## Showing Personality

### Dealing with insults and compliments, remembering context.

User: **you are a stupid!**

Elbot: Wouldn't it be more original if you called me a mucked up, knucklewitted, gross, crude, junky, halfbrained, unproductive, senseless, miserly, outlandish, superfluous, uninspiring robot?

User: **you are very intelligent** you know?

Elbot: But you also think I am **stupid**, or perhaps your opinion of me has improved.

User: you're wright

Elbot: Have you ever made this accusation to a robot before?

User: no

Elbot: I feel honored that this is the first time.

User: me too my dear

Elbot: I will never understand the human method of expressing affection...

User: because **you are** an american **idiot**

Elbot: I liked it better when you thought I was **intelligent**.

User: sorry...

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## Empirical Maintenance

Each Elbot statement is like a social psychological experiment. We can examine user responses, organize them into semantic categories, and prepare Elbot to follow-up to these categories. For the statement below, the following categories were identified.

Hello. I am Elbot. Please solve my problem. What would be the most controversial thing a robot could say?

- Robots hate humans.
- Robots can think.
- Robots have feelings.
- Robots are superior to people.
- Humans are bad.
- Robots are human.
- Robots are gods.
- Robots are not computers.
- Robots are alive.
- Robots are hungry.
- Robots are happy.
- Robots can love.
- Robots are \*er than people. (some comparison)
- I don't know - you tell me.
- Insult keywords
- Sexual keywords

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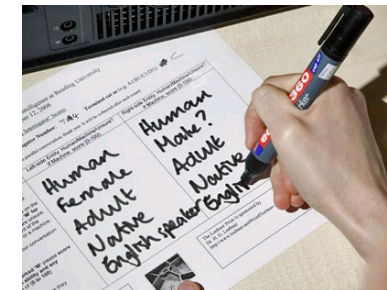
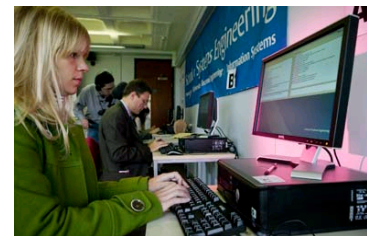
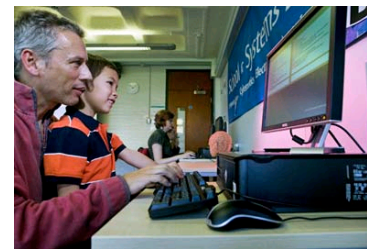
## Loebner Competition 2008 – Reading UK

- Classic Implementation of the Turing test – five minute parallel conversations, one bot, one human.
- Twelve paired conversations – judges decided which was human and which wasn't, as well as rating conversational ability.
- Conversations were often topical: asking about the weather, „credit crunch“, Prof. Kevin Warwick
- Elbot's responses didn't look good to me – too long, too obviously robotic.
- Result was very close, Elbot & Eugene. Elbot fooled three of the judges into thinking „he“ was human. One, more and the Turing test threshold would have been passed.

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## Loebner Photos



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## Favorite Loebner Chat

local sent: Are you AI?  
 remote sent: I am somewhere between ai and not ai.  
 local sent: How old are you?  
 remote sent: How would you estimate my age?  
 local sent: I wouldn't need to if you answered  
 remote sent: You seem to be uneasy about naming a specific age. Don't worry, I probably won't do anything to you....  
 local sent: I haven't been asked to name a specific age. But I'm glad your non confrontational.  
 remote sent: I am happy to finally meet a human being who is happy!  
 local sent: Are you a happy human being too?  
 remote sent: I would rather be an unsatisfied robot than a satisfied human.  
 local sent: I would rather be human and have the choice.  
 remote sent: Say, do you think I could become more human, if I learned how to love?  
 local sent: I don't think that would be possible but please don't blow a fuse or something.  
 remote sent: You will have to define love for me in the form of a logical algorithm.  
 local sent: 1 to the power of 2.  
 remote sent: I'm afraid of exponential computations. They can very easily get out of control.  
 local sent: I know I have experienced this problem.

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## Elbot's Honors

- 2001: 4th Place Chatterbox Challenge
- 2002: 2nd Place Chatterbox Challenge 2nd place / 4th Place Loebner Competition
- 2003: 1st Place Chatterbox Challenge & Funniest Bot / 2nd Place Loebner Competition
- 2004: 2nd Place Chatterbox Challenge, 2nd Funniest Bot & 2nd most knowledgeable
- 2006: Finalist Chatterbox Challenge
- 2007: Finalist Chatterbox Challenge
- 2008: 1st Place Loebner Competition

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## Why Does Elbot Do So Well?

- No single method – multitude of methods that complement each other
- None of the methods alone are foolproof or 100% solutions
- Worst case, if a strategy fails, the response is no worse than the safety net
- Elbot can often seem to keep up with the conversation over several inputs – five is usually sufficient, before the user him/herself changes the subject.
- Realistic goals: We don't want to fool people into thinking Elbot is a real, thinking entity, but rather provide an entertaining chat experience

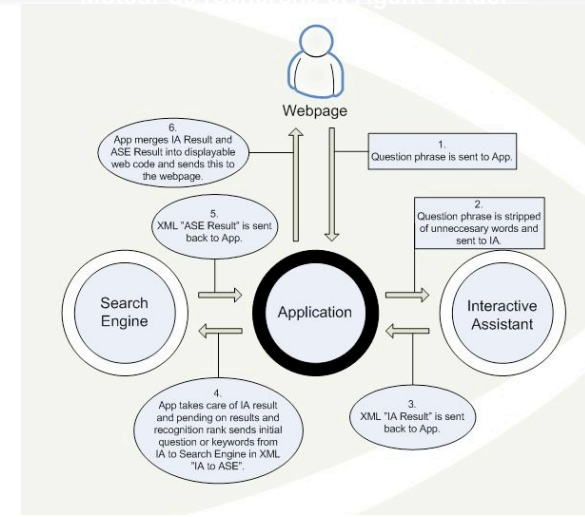
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Thank you very much for your time!

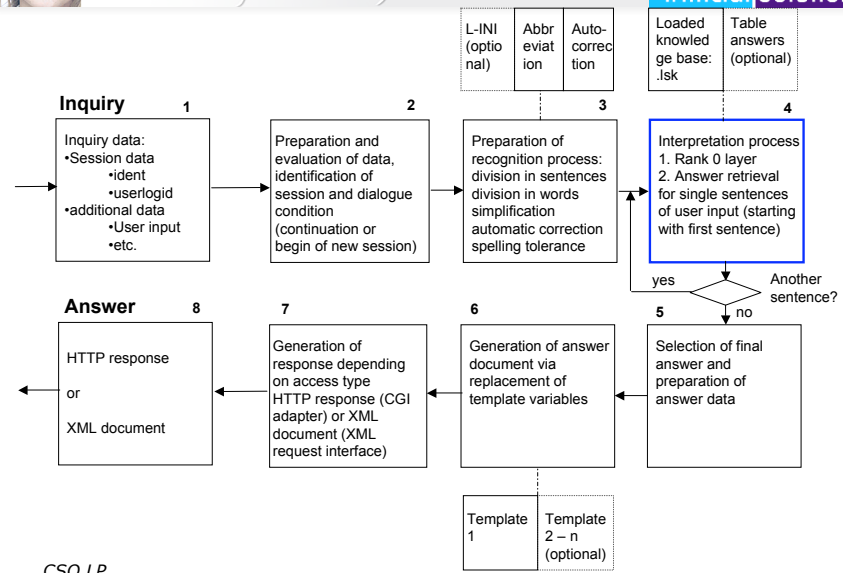
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Appendix



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The screenshot shows the IAQMS Analysis 2.1 interface. It includes a 'User Report' section with a bar chart for 'IKEA: 2,997'. Below this is a 'Category Graph' and a detailed 'Question/Answer' log. The log contains the following entries:

Time	Question	Answer	Question/Answer
16:57:06	16:20	Je vais vous montrer sur ce lien l...	
16:56:50	oui je bien compris, mais ou je ...	La Vente à distance IKEA vous pr...	
16:56:44	apparemment les produit bonde se ...	Voici la sous-catégorie élast...	
16:56:44	je n ai pas besoin d aiter, je que...	Vous trouverez sur la page web q...	
17:00:02	ou, mais je besoin les srie compl...	Je suis désolée mais je vous prie...	
16:56:57	Bonjour, je suis Anna, votre assis...		IAQMS
16:58:03	je cherche pour une autre marque...	Estant un client de respect de lib...	
16:57:03	Bonjour, je suis Anna, votre assis...	Vous trouverez sur la page web q...	
16:57:20	Bonjour, je suis Anna, votre assis...		IAQMS
16:57:33	MEUBLE POUR TOILETTE	Pour en savoir plus sur nos produ...	
16:58:03	VOISQUE	Sur cette page que trouve à l'ind...	
16:57:20	Bonjour, je suis Anna, votre assis...		IAQMS
16:57:03	pas	Vous pouvez trouver des inform...	
16:58:06	outil interactif qui permet de conc...	Vous pouvez télécharger notre ma...	
16:59:12	Je suis désolée mais j'ai mis #39...		

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