There's nothing about comput

Heard the one about the English computational linguist, the Irish computational linguist and the Dutch computational linguist? Chances are you haven't, unless you're one of the motley bunch of academics gathered in Enschede, arguably Holland's least prepossessing town, on a drizzly September weekend. Bizarrely, I have been sent here by the nice people at *Wired* to watch a comedy performance. More bizarrely, the comedy performance in question will be given not by any human, but by a computer. Titter ye not; if the aforementioned academics have their way, we will soon be witnessing the advent of the desktop comedian.

> "Do you have the Belgian Joke, too, in Britain?" I explain that we choose instead to foster more neighbourly international relations by means of the Irish Joke.

If there's one group of people who would never have anticipated their jobs being phased out thanks to new technology, it's comedy writers. Our art is (as my agent is under strict orders to inform potential employers) a highly complex creative process – far more difficult to simulate mechanically than, say, landing a Harrier Jump Jet in a 100-knot crosswind or coordinating smooth operation of London's Ambulance Service. How many other jobs require one to produce a finished product (the "joke") which complies with a standard ("it must be funny") that we still can't properly define? A standard which, if met for one user, may leave another as straight-faced as Archbishop Tutu at a Roy "Chubby" Brown gig. The task we're set is, in effect, like asking Van Gogh to paint a masterpiece, then complaining that it's just a vase of poxy sunflowers instead of a stag gazing majestically out across a Scottish glen.

So it sounds impossible. At least, I hope so. From my viewpoint – that of someone who makes a living peddling jokes to the glitterati of British Light Entertainment, not to mention Bob Monkhouse – news of even the vaguest attempt to computerise the manufacture of humour does not make for reassuring listening. Manufacturing anything else – food, textiles, even synthetic Hollywood actors – is fine, but stay away from comedy. Any funny stuff, buster, and the Compaq gets it.

But it seems my protests are in vain. This is a subject to which dozens of serious academics have seen fit to devote their finely-tuned cerebral matter. They write solemn and cogently-argued dissertations, quoting not Jung or Freud, but *The Penguin Crack-A-Joke Book For Kids*. And it's the motivation behind IWCH '96, the world's first International Workshop on Computational Humour here at Enschede's Twente University.

As surroundings go, these aren't the most conducive to a four-day funfest. Four days chained to a radiator in Baghdad would, in fact, rate higher on the old rictus scale. And I'm willing to bet that the food would be better. Nonetheless, some of the world's most distinguished cognitive-science gurus and AI researchers have taken the trouble to come here – this veritable armpit of Europe – in order to discuss their progress. It goes without saying that they must have developed some pretty bloody rib-tickling stuff – no?

Bring on the dancing girls

Well, no. I needn't have worried. Taking a seat at the back of the lecture theatre at the beginning of Day One, I survey the assembled company. If I was asked

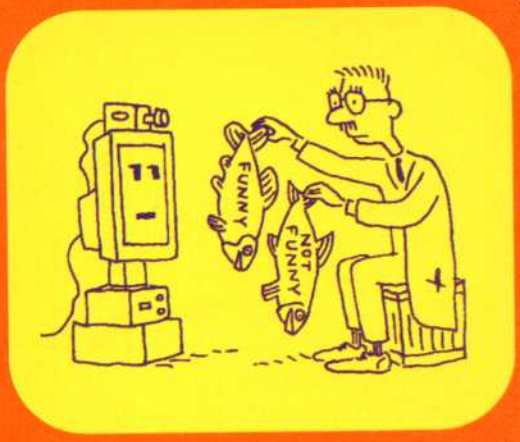
funny ational humour.

Except this article by D.A. Barham

to identify their trade by looks alone, the phrase "comedy professionals" would not spring irresistibly to mind. The phrase "care in the community" might. By the looks of it, this audience wouldn't laugh if you put 240 volts through its members. They could probably tell you what sort of step-up transformer and socket adaptor you would require to achieve this via the Dutch mains supply, but they wouldn't laugh. They've got more serious things in mind.

They're here to answer a big question. How can a mere machine understand – and more importantly, appreciate – the intricacies of a really good joke? If it could, it would be well on the way to a breakthrough in artificial intelligence – some might even say the breakthrough in creating computers like humans. It could be a great business breakthrough, too: imagine computers that indulge in light and witty banter as they spread your sheets, process your words and e your mail. Imagine the increased sales of baseball bats a week after said computers go on sale.

Big imaginings. But how can a mere machine emulate the astounding assortment of neuroses, morbid paranoiac tendencies, badly-disguised bitterness and creative new forms of sleep deprivation exhibited by even the most amateur humour merchants? Multitasking that little lot would reduce any CPU to a gagged-out pile of steaming circuitry. It's bad enough for humans. W. C. Fields once said that trying to understand humour is like trying to catch an eel in a bathtub. What he didn't say is that eel-catching is an infinitely more amusing pastime, practised only by people who don't take



themselves quite as seriously as these self-styled "computational humorists". That, though, is no deterrent to the delegates at IWCH.

"A robust-looking fellow in his 30s goes to the doctor. 'Doctor', he says, 'I've got a problem. When I was younger, every time I got an erection, I found I could bend it with my right hand. These days, whenever I try it, I can't bend it any more. What I want to know is – am I getting stronger or weaker?' "

The lecturer waits patiently for a laugh. It is not forthcoming. These people are serious about their comedy. They are busy writing the joke down on their standard-issue A4 pads.

"I'm not claiming it's the world's funniest joke. But I thought – let's try to summarise it. Find the essence of the joke. Here is what I came up with." He pauses and takes a breath. "Two ways of measuring the same personal attribute, but pitted against each other – so that one must win and the other must lose. The protagonist doesn't recognise the zero-sum aspect of the situation and takes a loss on either side as a negative indication. We can now restructure the joke in any other domain we choose. If a machine could do this, I think it would have something very close to a sense of humour."

Our friend W. C. Fields would, by now, be knee-deep in slippery anguillids, and sinking fast. This speaker, however, is made of sterner stuff. He is none other than Douglas Hofstadter – AI guru,

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ILLUSTRATION BY GREGORY NEMEC

allegedly renowned wit and idol of alt.fan.douglas-hofstadter.

Douglas looks remarkably cheerful – as cheerful as a man can look after having his component parts digitised, pumped down an ISDN line from several thousand miles away and reconstructed on a projector screen. It strikes me that his distance and his cheerfulness may well be related. Encouragingly, he seems to share my scepticism about the worthwhile nature of pursuing computer-generated humour.

"I would be extraordinarily upset," he says, wavering slightly and blurring at the edges as though to illustrate just how upset he would be, "if it turned out that humour – something I consider a very deep and mysterious property of the mind – could be captured in mere shallow mechanisms. Mechanisms that could be put into computers today."

He pauses, flickers a little, elaborates.

"A number of years ago, I was watching a circus in my neighbourhood. There was a group of high-school girls, dancing in a chorus line. And it was marvellous to watch their coordination – very complex, very fast motion of the bodies, about twelve girls, simultaneously."

This is all sounding ominously reminiscent of the picture I got when I turned on the TV in my hotel room. But Douglas has his mind on higher things.

"They coordinated with each other so beautifully. Take another situation. Travelling in Europe, I used to see posters advertising events. There would be twelve, maybe fifteen posters all in a line – and I always wondered, why? Why did they do that very boring thing of repeating the same, identical information? Contrast that with the twelve identical girls. There's something fascinating about them."

Ask a roomful of largely male students to contemplate twelve fascinating high-school girls and, in any other situation, you would have lost the room's collective attention within seconds. But these particular students are truly dedicated to their cause. For them, it is literally beyond a joke.

"What is it that is fascinating? You know that they're all independent and that the synchronisation comes from a great deal of practice. Every split second, there's the possibility of error. If, instead, you made a computer model of twelve dancers, the synchrony would not be a surprise – and it wouldn't be fascinating. That's the difference between human-generated humour and computer-generated humour.

"The obvious problem is – and I'm sure this will be addressed over and over again – 'what is a sense of humour?' and 'can we give a computer a sense of humour?' – not just 'can we make a computer able to construct jokes from databases?' The question is: 'what is humour?' "

How to make a Canadian turn red

Good question. Difficult question. First answer: it's something that you learn. Why do some people practically rupture their own urinary tracts at Vic Reeves blathering "Ulri-ka-ka-KA!", while others stand around bemusedly, shaking their heads and recalling the genuinely funny days of Frank Spencer and his cat's inevitable whoopsie in his beret? Why do Americans laugh at Benny Hill? Whether or not we find something funny is dependent on a million completely disparate factors – our upbringing, nationality, religion, age, familiarity with popular cultural references of the time. We are assured that Shakespeare's jokes were real rip-roarers with an Elizabethan audience – but from the perspective of most people today, they aren't a patch on those funny foreign newsreaders in *The Fast Show* who do the Boutros Boutros-Ghali thing.

We don't know how to build a machine that can learn things like that. So even if it disappoints Douglas, what we need to do is go back to basics; get a better handle on what constitutes a good joke; and then try to use that to make more jokes, without worrying about why they're funny. We need to ask if there is any common trait linking various forms of humour. Is there a First Principle of Funniness?

Some of the delegates think so. Bruce Katz, a researcher at Sussex University, puts it this way:

"At its most basic level humour can be summed up as the activation boost formed when two relatively incongruous interpretations are simultaneously active."

Or to put it another way (and in his printed paper Katz does):

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Form <predicted ending>
If <actual ending>=<predicted ending>
   Then no surprise
Else
If actual ending not resolvable
   Then puzzlement
Else humour
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This man is probably not destined for a career writing snappy one-liners for Hallmark Cards. But basic as it is, his theory does have substance. It suggests that there are two necessary conditions

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for humour: an ending which does not match one's expectation, but one that does make sense. So logically it should be possible mechanically to generate, in a very rudimentary form, some sort of "joke" within these constraints.

Kim Binsted, a slight, dark-haired woman wearing glasses and a disconcertingly keen expression, certainly thinks so. If you thought governmental lunacy didn't get much sillier than EU banana-curvature and courgette-girth restrictions, get this: Binsted has just received a grant from the Canadian authorities to develop her JAPE project – the Joke Analysis and Production Engine. A computer program that generates puns. This could explain a lot – not least, why Canada has never become a major force in world politics.

Kim Binsted stands out from the crowd here in two important respects. She is the only person in Enschede to show a sense of humour. And she is also pretty much the only person here to have actually implemented any of the theories mooted by her fellow academics. As an amateur stand-up, Kim recently made the final of *The Daily Telegraph*'s moderately-coveted Open Mic Award in Edinburgh. Was JAPE a big help?

"No. No way. Most of my set is cunt jokes, actually," she explains, in characteristically strident transatlantic tones. I wonder whether this could be another acronym – Comedy Using New Technology, perhaps. But no – it's merely the comedian's standard fall-back, a crude reference to one's genitalia. In almost any other gathering, a 26-year-old women saying the c-word rather loudly might raise at least the odd eyebrow. Here, though, everyone is far too deeply immersed in their earnest discussions of the finer points of Irony Theory to notice. JAPE has forced Binsted's fellow academics to sit up and take notice – not least, Hofstadter himself.

"The humour itself is not bad," he nods, proceeding to quote the following three examples, all of which an early version of Binsted's program generated:

What kind of pig can you ignore at a party? A wild boar.

What do you call a murderer with fibre? A cereal killer.

What kind of rain brings presents? A bridal shower.

"In JAPE, each joke was produced by means of combining two basic databases: one database of words that have the same pronunciation but two meanings, and the other database of sentence templates that allows you to take fragments of the two meanings and fill in the blanks, like 'What kind of ... blah blah blah.' You fill in the blanks with portions of the definitions of the two meanings – and thereby you get a riddle. Kim tells me that a fair fraction of the jokes are considered funny."

Kim is reddening in the audience.

"But I wanted to contrast JAPE's puns with what I call *bons mots* – clever quips made in real time in response to some remark. I've collected them for a long while; *bons mots* made by myself, my friends, my relatives.... I must have hundreds. Here's one."

He waves a piece of paper vaguely in the direction of the video link-up. This is what it says:

"Terry is having problems with his Sun computer. He finally gives up, saying, 'Son of a bitch!' Honor, standing next to him, says, 'You mean, bitch of a Sun!' "

The merest sparrow's-fart of a laugh ripples round the assembled gathering: by the standards of cognitive-science lecturing, Douglas is storming it.

"Okay – so there's nothing amazing about these remarks, except that they're real-time – there's a certain degree of wit and intelligence in them that seems characteristic of human humour. Like the dancing girls."

Oh yes. Them.

The wanton soup

There are few situations less socially stimulating than being stuck in a lecture theatre with various computational humorists of assorted nationalities. One of them is being stuck in a Dutch Chinese restaurant, with various computational humorists of assorted nationalities. Another is trying to get there.

There are six of us crammed into the taxi – a vehicle evidently designed with no more than five passengers in mind. The first day's presentations have been brought to a conclusion by no less a luminary than Marvin Minsky, godfather of AI from MIT, and our Dutch hosts are doing their utmost to show us all the diversions Enschede can offer.

It is beginning to rain. Not properly, but spitting and spurting, like a reticent athlete vainly trying to produce the requisite urine sample. Occasional dribbles of neon light sidle apologetically across the pavement as though they're slightly embarrassed to be seen out in Enschede at this time of night. Inside the cab, though, the atmosphere is warmer and more congenial than it's been all day. This is largely because we've moved onto the subject of racial stereotypes, an area in which I'm intrigued to discover that the seemingly placid and moderate Dutch could give Jim Davidson a run for his money.

"Most of my set is cunt jokes, actually," she explains. I wonder whether this is another acronym – Comedy Using New Technology, perhaps. No – it's merely the comedian's standard fall-back, a crude reference to one's genitalia.

"What do you call an intelligent Belgian?" poses one student, still resplendent in his IWCH '96 t-shirt. For people who've spent their entire academic careers analysing humour, the laugh that greets his response ("a tourist", as though you hadn't already guessed) is astonishingly hearty. Sadly, it seems to be interpreted as a call for an encore.

"And why does the Belgian never make ice cubes?"

"Because he's forgotten the recipe." Another, more moderate guffaw. He addresses me. "Do you have the Belgian Joke, too, in Britain?"

I explain that we choose instead to foster more neighbourly international relations by means of the Irish Joke.

"In America, it's the Polish Joke. What did the Polack say when he – "

The staff at the restaurant look surprised and not entirely overjoyed to see a 16-strong party of geeks descending on their semi-deserted eaterie.

"A Chinese restaurant? Dutch food is that bad?"

> Stick a laugh-track over footage of Kate Adie reporting on the carnage in Srebrenica, and at least 5% of the BBC1 early-evening audience would sit there chuckling away like Pavlov's dogs.

"Ah! I forgot, you are British. You would have preferred the mad beef, yes? Ha ha."

"Ha ha," I concur, having mistakenly assumed that we'd concluded the racial stereotype debate upon disembarking from the taxi.

Enschede being a fairly multinational sort of town, the menu was printed in three languages: Dutch, Chinese and something which bore some, but not much, relation to English. It had much to offer a roomful of people who had been debating pun generation a few short hours beforehand. The "chilly soup" and "crispy hole duck" sparked a whole new bout of alcohol-fuelled hilarity. I was especially taken by the "wanton soup", and was on the verge of inquiring how one would test a bowl of soup's capability to feel emotion when I realised that broaching the dreaded "consciousness" issue with Marvin Minsky a mere four seats away would be guaranteed to annihilate entertaining conversation for the remainder of the evening.

Marvin takes his humour pretty seriously. That afternoon he'd argued that jokes have a profound and important mental function; by provoking the involuntary physical reaction that we know as "laughter", the joke focuses our attention and aids learning. This fails to explain why so many of us are completely incapable of remembering the one about the three nuns in the sauna.

There is a second, darker part to his theory. "If you're telling a story and you have a sentence which can be interpreted either way, the punch line is usually that which informs you how the entire situation can be re-interpreted. It's humorous if one part of your brain knows this is the wrong way to represent it, because it leads to ridiculous or prohibited consequences – so something about the humour is stored in the 'negative' part of your mind. It's very easy to be seduced into thinking jokes are funny and pleasant, and that humour is generally a positive experience."

Not here it isn't. My vague hopes that the assembled company might slip out of its painfully analytical humour mode are quickly crushed. Witness the following exchange.

Bruce Katz: "Excuse the pun."

[A pregnant pause descends over the group as finely-tuned linguistic theories whirr into action.]

"What pun?"

" 'Bogged down'. I said – 'that first speaker was getting bogged down in his own argument' ".

[Another pause.]

"So where's the pun?"

"Bog. Dutch. You have lots of bogs in Holland."

"Ah."

[Contemplation.]

"That's not a pun."

"Forget it."

"Now I agree, there's a lexical association. If you displayed the architecture of the statement on a network model – if you established nodes representing each concept, you'd find there was a semantic relationship between the concept nodes–"

"All right. It's not a fucking pun. Forget it."

"Forget what?"

"The–"

"Aha! I was making a joke. You said 'Forget it'. I said 'Forget what?'. I've already forgotten what it was you wanted me to forget. Ha ha."

Dividing the bill for a Chinese meal up between 17 people is a bummer at the best of times. When at least one of the people is a founding father of modern computer science, the situation becomes frankly silly. Minsky finally contents himself with calculating the percentage error of each set meal for four, based on the ratio of number of diners to number of set meals ordered. After handing over his share of the bill he gets up to leave, offering to share a cab with anyone else heading back to the campus. My neighbour, Eljakim Schrivers, one of Twente University's CS students, breathes a sigh of awe.

"Sharing a taxi with Marvin Minsky," he intones. "What a dream!"

Not the precise word I would have chosen. Particularly if it involved splitting the fare.

Why this conference needs a laugh-track

It's generally accepted that the best comedians are not simply those with the best jokes. They're those with the most individuality, the most highly developed characters and quirks. Pull out a few names at random. Tony Hancock. Steven Wright. Reeves and Mortimer. Benny Hill. Steve Coogan. Each totally different in his style and approach, but each with his own comic genius. What the theorists would classify as a "joke" becomes almost irrelevant, certainly a secondary factor to the personality of the performer.

And those quirks are something we learn to appreciate. Good comedians and their producers are the ones who are best at helping us learn. It's possible that they may now be getting too good; we have arguably become so desensitised that we don't actually care what's funny any more. What is a canned-laughter track, if not an easy form of rote-learning? "This is a joke. Repeat 50 times. Ha ha." If we're told that *Friends* is funny, if there are 300 people in a studio at NBC convincing us that *Friends* is funny, then it goes without saying that *Friends* must be funny. QED. Stick a laugh-track over footage of Kate Adie reporting on the carnage in Srebrenica, and at least 5% of the BBC1 early-evening audience would sit there chuckling away like Pavlov's dogs and wondering if that was Su Pollard playing the widowed shrapnel victim.

If we're told that the anarchic, post-Generation-X surrealism of something like *Shooting Stars* is funny, then we'll watch it until we've conditioned ourselves to believe that it is. We will begin to appreciate it and then genuinely to enjoy it – even if we once found it impenetrable and obscure. Unfortunately, this does not apply to conferences. The rest of the IWCH conference proceeds in a similar vein, grimly trying to turn something learned, something social, into an abstraction of the intellect. The same few

arguments – what constitutes a joke, how do we define "funny", how will we know when we have invented a machine with a real sense of humour – circle the room relentlessly, time and time again, like a nervous young comic pacing round the stage but sadly never quite hitting her mark.

While the VIP speakers are busy stabbing animatedly at their pseudocode on the overhead projector, it's left to a lowly student to talk some sense about the practical applications of computational humour. Eljakim Schrivers, he who dreams of Minsky's taxis, is keen to see humour implemented in user interfaces, making systems more accessible, easier to use and, ultimately, enabling them to establish a more productive relationship with the user.

"Think. What if your computer could just 'lighten up'? Cheer you up when things aren't going the way they should? A machine can already observe the way you use input devices. So if, say, you are banging on the keyboard too hard, the computer might say 'Ouch! That hurts'. The humour would make it seem more human."

He senses that I am not yet convinced.

"An interface should guide you, instead of leaving you to figure things out. When you misspell a word in a command, say, D-U-R for D-I-R, the computer would typically respond with the message, 'Bad command or file name'. A friendlier, funnier response would be something like, 'DUR? I don't understand DUR. You probably mean FORMAT C:. No, just kidding! Here's your directory listing.' "

Would this computer also have a bullet-proof casing?

"It would obviously have to judge when it was appropriate to use humour. If the user has a deadline approaching, of course, he would not be interested in hearing jokes from his computer."

But wouldn't this soon become just as annoying and repetitive as any other kind of error message?

"User-friendly humour would also use the personal preferences of the operator to make humour that he appreciates. If the user is biased against Catholics, you can use anti-Catholic jokes in the error messages and the user will enjoy them. But if the user is a Catholic, even if you use a very good anti-Catholic joke, he will walk away from the computer."

I agree that it must be a tricky area. Perhaps the interface of the future will include a "Preferences/Humour" screen: "Select prejudice: Belgians/Irish/Women/Homosexuals/Macintosh Users."

In the long term, there will no doubt be a variety of ways in which humour infiltrates the emotionally barren world of computers. One delegate here has been attempting to use Kim Binsted's JAPE system to create a character in a MUD (Multi-User Dimension), although so far with limited success. The Internet could spread such bots far and wide. AOL

already has automated bot hosts running interactive online competitions. Giving them knowledge of simple joke structures to make them seem more human is surely the next logical step. But when was there anything recognisably human about a game-show host?

There are other areas in which computers that could understand humour would be of use. In automatic translation, for instance, being able to detect irony could avoid substantial misunderstandings. But machine-based translation has not yet reached a stage where "inability to understand jokes" is its main handicap. Inability to understand basic grammatical structures is surely a more significant drawback. In fact, at this stage in the game, auto-translators are probably the machines most reliably generating genuine humour. Consider, for example, the program being used to translate the technical notes for a high-speed remote server into English that dubbed its subject "fast frigid waitress".

In fact, it's precisely because computers don't understand things that they are sometimes funny. Give them artificial intelligence and they'd come up with nothing funnier than, well, artificial intelligence research. However, if you give up the idea that the computer has to know what's funny itself, its chances of finding a role in the comedy business increase exponentially. It's as if you'd given it three years in Cambridge getting drunk with potential future heads of light entertainment.

Take Ideascapes' Comedy Writer software. It sets itself up as a crude, mechanical "writing partner", helping the initial brainstorming procedure that goes into making a joke by drawing on a huge database of random, vaguely humorous words and phrases arranged in various categories. It's not really any more sophisticated than a spell-checker's search-and-replace facility – and incorporating AI technology into a program like this could dramatically reduce its effectiveness as a creative tool. The software works because it lets the computer do what computers do well – meaningless list crunching – and leaves the person to do what people do well – making weird connections. This makes it (a) practical and (b) of no interest at all to the luminaries of the computational humour fraternity.

Departure from Enschede comes as a blessed relief. Descending over Heathrow I'm not jet-lagged – I'm gag-lagged. My sense of humour will take a while to readjust to the norm.

After three days, departure from Enschede comes as a blessed relief. While descending over Heathrow, I even find myself giggling inanely at the crap cartoon in my complimentary British Midland copy of the *Daily Express*. I'm not jet-lagged, I'm gag-lagged – my sense of humour will take a while to readjust to the norm. And if there's one conclusion I've reached over the three days, it's this: computational humour is fine in principle, but it's got a long way to go. Unless there's a market out there for badly-constructed, semi-technical puns of a standard that would embarrass the average humour-impaired eight-year-old (and outside the commissioning editors at Carlton TV I don't think there is) then my job looks secure for a good few years yet.

Or I'm a Dutchman. ■ ■ ■