

She has her own personality, is capable of displaying positive and negative emotions and can even start up a conversation based on previous chats...

# Meet Nadine, the social robot that can keep you company

By Anna Pukas

**W**HEN we refer to someone as robotic we tend to mean the person seems machine-like, acting without independent thought or emotion. But the arrival of a robot named Nadine means we may have to rethink that definition.

Nadine, you see, has a personality. She can not only hold a conversation, exchanging pleasantries and greetings, but the next time she meets you she will remember that you've met before. When you talk to her she responds with sad or happy expressions depending on what sort of news you have shared. She will pay you compliments too. She can even jig along and mime to Adele's hit song Rolling In The Deep.

Should she take offence at something you say or do she will be quick to show her displeasure – for Nadine has quite a temper too.

While robots have been around for years carrying out tasks that are repetitive and, well, robotic, there hasn't been one like Nadine before. Nadine is designed not for mind-numbing production line work but for that most human of jobs: being a companion.

Scientists at Nanyang Technological University in Singapore say they have designed her primarily to carry out the job of personal assistant at home or in the office and they have already got her working at the university as a receptionist. But in the future she could also function as company for children and the elderly.

"As countries worldwide face the challenges of an ageing population social robots can be one solution to address the shrinking workforce by becoming personal companions for children and the elderly at home," said Professor Nadia Thalmann, director of the university's Institute for Media Innovation.

**F**OR THE past four years she and her team have fused together research in diverse fields including engineering, computer science, linguistics and psychology. The result is Nadine, a robot powered by sophisticated intelligent software that is capable of interacting with humans.

"This is somewhat like a real companion that is always with you and conscious of what is happening," said Professor Thalmann at Nadine's unveiling this week. "These socially intelligent robots could be like C3PO, the golden droid from Star Wars, with knowledge of language and etiquette."

Unlike C3PO – which, for all his eloquence, never progressed from looking like a nutcracker covered in tin foil – Nadine also looks very human. She has soft skin and brown hair styled in a sleek bob and her expression as she shakes your hand and says how nice it is to

Picture: NTU SINGAPORE



FACE OF THE FUTURE:  
Prof Nadia Thalmann  
with Nadine the robot,  
main picture, and  
Edgar 1 and Edgar 2

see you again is a full eye contact, friendly half smile. In reality her manner is a little stiff and her cool, direct gaze a little unnerving but the fact that almost every account of Nadine's introduction to the world referred to the robot as "she" is testament to how human she looks and sounds.

In fact her appearance was modelled on her creator Professor Thalmann. Indeed Nadine could be the professor's younger sister or daughter. They are even the same height – 5ft 7in or 1.68m – although instead of the Swiss-born profes-

sor's pronounced accent Nadine seems to speak with a slight Scottish burr.

Her remarkably human face is evocative of the humanoid robots (played by human actors) in films such as Steven Spielberg's 2001 futuristic thriller A.I. (Artificial Intelligence) in which Haley Joel Osment portrays a robot child that is adopted by human parents and Jude Law is a male prostitute robot.

More recently TV viewers were gripped by the Channel 4 series Humans in which the robots,

known as synths, were so extraordinarily lifelike that humans worked and had relationships with them without realising that they were robots.

Ironically that is the characteristic that is most unsettling about Nadine. Roboticists call it "uncanny valley", the aversion people feel towards mechanical creations that are designed to replicate human actions. The more robots look and behave like humans, the more we find it "creepy". This innate mistrust of humans for human-like gizmos has

been explored in many fantasy works. In Star Wars clinky-clanky C3PO is regarded as cuddly but the humanoid Terminator robot (as played by Arnold Schwarzenegger) is a creature to be wary of.

This repulsion for human-looking machines is so ingrained in us that roboticists are already concerned about how humans and robots will interact in the future and are cautious about developing machines that look too human.

We are, it seems, far more comfortable with something like Edgar, another robot produced by the university's School of Mechanical and Aerospace Engineering.

**E**DGAR is a much more reassuring kind of creature, all spindly metal limbs full of screws and wires that can be operated by remote control and a rear-projection screen for a face.

In fact there are two Edgars. The first version Edgar 1 is a robotic avatar, meaning that he can be controlled from far away. The robot operator stands in front of a special web cam that displays his or her face on to Edgar's screen face. Edgar will also mimic the operator's upper body movements.

Edgar 2 is more sophisticated and can control its own movements without an operator. Both Edgars are categorised as "service" robots and Edgar 2 is destined for public spaces such as shopping centres, airports and tourist attractions where it will dispense directions and other information. Edgar also opens up the possibility of lectures and business meetings taking place simultaneously in different locations using robot stand-ins.

As for Nadine her role for the moment is a stationary one not least because she cannot walk. Introducing mobility is the next step, says Professor Thalmann. A walking as well as talking Nadine brings closer the day when a robot could take the place of a childminder or elderly person's carer.

For all her sophisticated programming Nadine is not a "sentient" robot. But in any discussion about what a robot cannot do one must always add – yet.