**Machine Learning, Love and Social Intelligence**

***Reading***

***Baby Robots Feel the Love***

Researchers have for the first time created robots that can develop and express emotions. If you treat these robots well, they'll form an attachment to you, looking for hugs when they feel sad and responding to reassuring strokes when they are distressed. They are capable of expressing anger, fear, sadness, happiness, excitement and pride and will demonstrate very visible distress if you fail to give them comfort when they need it. And they can even display different personality traits.

"This behaviour is modelled on what a young child does," says Lola Cañamero of the University of Herfordshire, who led the research. "This is also very similar to the way chimpanzees and other non-human primates develop affective bonds with their caregivers." It's the first time that early attachment models of human and other primates have been used to program robots.

The researchers believe that the ability to interact, learn and show emotions is crucial if robots are ever going to become an integral part of human society. Without it, people will find them alien, repetitive and eventually boring. But how do you get emotions, which are far from well-understood in humans, into machines that only understand maths?

First, you need to have a good look at emotional development in humans. Being able to form bonds with people who look after them, usually mothers or fathers, is vital in the emotional and cognitive development of children. Caregivers act as a secure base for infants, giving comfort, soothing distress and providing the courage to explore the environment and learn.

In a 2008 paper Cañamero and her colleague Antoine Hiolle described a basic blueprint for mimicking this aspect of the caregiver-infant relationship. Robots work on a step-by-step basis. At any given time step a robot takes impressions from the outside world as input, for example visual information from cameras and tactile information from sensors on its body. It then uses that information to update variables that mimic emotions and which also give the cues as to what action to take.

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**Source:** [**https://plus.maths.org/content/making-robots-feel**](https://plus.maths.org/content/making-robots-feel)

[**Marianne Freiberger**](https://plus.maths.org/content/list-by-author/Marianne Freiberger)**, 11 August 2011**

1. **Read the text carefully and decide whether the following statements are True or False:**
2. Researchers have discovered emotions in robots. **False** : they have discovered how to create artificial emotions in robots.
3. The research is a breakthrough in the field of autonomous robots. **True**
4. Lola Canamero is a psychologist at the University of Herdforshire. **True** : she led the research over there.
5. Her work takes inspiration from early parent-infant interactions. **False** : It takes inspiration from “the way chimpanzees and other non-human primates develop affective bonds with their caregivers”. But it is also important to have a good look at emotional development in humans.
6. She studies how the behaviour of the robot influences the emotions of the caretaker. **False**
7. **Match the definitions below with words from the text:**
8. a [feeling](https://dictionary.cambridge.org/fr/dictionnaire/anglais/feeling) of [love](https://dictionary.cambridge.org/fr/dictionnaire/anglais/love) or [strong](https://dictionary.cambridge.org/fr/dictionnaire/anglais/strong) [connection](https://dictionary.cambridge.org/fr/dictionnaire/anglais/connection) to someone or something: an attachment
9. that [comfort](https://dictionary.cambridge.org/fr/dictionnaire/anglais/comfort)s someone and [stop](https://dictionary.cambridge.org/fr/dictionnaire/anglais/stop)s them from [worrying](https://dictionary.cambridge.org/fr/dictionnaire/anglais/worrying): to hug
10. an [act](https://dictionary.cambridge.org/fr/dictionnaire/anglais/act) of [moving](https://dictionary.cambridge.org/fr/dictionnaire/anglais/moving) [your](https://dictionary.cambridge.org/fr/dictionnaire/anglais/your) [hand](https://dictionary.cambridge.org/fr/dictionnaire/anglais/hand), [gently](https://dictionary.cambridge.org/fr/dictionnaire/anglais/gently) over something or someone: reassuring strokes
11. upset or worried: distress or distressed
12. a [feeling](https://dictionary.cambridge.org/fr/dictionnaire/anglais/feeling) of [pleasure](https://dictionary.cambridge.org/fr/dictionnaire/anglais/pleasure) and [satisfaction](https://dictionary.cambridge.org/fr/dictionnaire/anglais/satisfaction) that you get because you have done something good: pride
13. a [close](https://dictionary.cambridge.org/fr/dictionnaire/anglais/close) [connection](https://dictionary.cambridge.org/fr/dictionnaire/anglais/connection) [joining](https://dictionary.cambridge.org/fr/dictionnaire/anglais/join) two or more [people](https://dictionary.cambridge.org/fr/dictionnaire/anglais/people): affective bonds
14. someone who [takes](https://dictionary.cambridge.org/fr/dictionnaire/anglais/take) [care](https://dictionary.cambridge.org/fr/dictionnaire/anglais/care) of a [person](https://dictionary.cambridge.org/fr/dictionnaire/anglais/person) who is [young](https://dictionary.cambridge.org/fr/dictionnaire/anglais/young), [old](https://dictionary.cambridge.org/fr/dictionnaire/anglais/old), or [sick](https://dictionary.cambridge.org/fr/dictionnaire/anglais/sick): caregiver
15. extremely important or necessary: vital
16. to make someone [feel](https://dictionary.cambridge.org/fr/dictionnaire/anglais/feel) [calm](https://dictionary.cambridge.org/fr/dictionnaire/anglais/calm) or less [worried](https://dictionary.cambridge.org/fr/dictionnaire/anglais/worried): soothing
17. a [plan](https://dictionary.cambridge.org/fr/dictionnaire/anglais/plan) that describes how to do or [achieve](https://dictionary.cambridge.org/fr/dictionnaire/anglais/achieve) something in the future: a blueprint
18. to [copy](https://dictionary.cambridge.org/fr/dictionnaire/anglais/copy) the way in which a [particular](https://dictionary.cambridge.org/fr/dictionnaire/anglais/particular) [person](https://dictionary.cambridge.org/fr/dictionnaire/anglais/person) usually [speaks](https://dictionary.cambridge.org/fr/dictionnaire/anglais/speak) and [moves](https://dictionary.cambridge.org/fr/dictionnaire/anglais/move): mimicking
19. point out (three words): cues as to

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***Listening and Grammar***

1. **Listen to the first part of the podcast (0’43”- 4’00”). Explain what Shimon does and then write down a detailed description of TERESA.**

Shimon is an associate professor in the computer science department at the university of Oxford. He does reaserch on machine learning and create algorithms to allow computers to learn things like a human does. THERESA is a robot the size of a human with some cameras on the top and a screen which shows the life thread of the person who is controling it.

1. **Listen to the second part of the podcast (4’47” – 5’41”) and fill in the gaps in the following sentences:**
2. This is where Shimon comes in. He’s in he is teaching THERESA to read social cues.
3. So, she learns thought demonstration by showing her how to act over and over and over again he creates a dataset that she can then learn from.
4. The goal of the Teresa project was to add some intelligence to this robot in particular by making it semi autonomist.
5. That person behind the curtain is providing the demonstration data that will enable the robot to learn, to take over that behaviour.

1. **Listen to the third part of the podcast (5’41”- 7’01”) and complete the following sentences using words from the podcast as well as your wn words.**
2. Teresa was tested and taught by residents of a retirement home in France.
3. Telepresence technology could help people breaking with the social network to keep participate.
4. To make the robot navigate where you want her to go you select the person with who you want the robot go to talk**.**

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***Reading and Grammar***

**Read the text and fill in the gaps with words from the box below:**

|  |
| --- |
| **relies** **can be guided is free needs enable** **enables** **having to** **ability enabling are able** |

***The friendly face of robots***

*A computer science project coordinated by an Oxford computer scientist is developing robots that can help to relieve the isolation often faced by elderly or disabled people.*

To many people the word ‘robot’ conjures up an image of a machine undertaking purely mechanical tasks. However, Professor Shimon Whiteson in the Department of Computer Science has a different vision: one of socially intelligent robots which are able to go out into the world and act on our behalf, controlled by us but with the **ability** to react intelligently to the situations they find themselves in.

The TERESA Project, a collaboration between several European universities with scientific coordination provided by Professor Whiteson, has developed a robot that **enabling** elderly people and others with mobility issues to continue to interact socially with others, without ever **having to** leave their room. Loneliness and isolation are major problems faced by many older or disabled people, but the TERESA robot provides an imaginative and revolutionary solution.

‘Telepresence’ robots (in which the robot’s ‘face’ is a video screen) are already commercially available and can perform a range of functions. The robot **can be guided**  by remote control to go out and be the owner’s representative, **enables** someone who is unable to be there in person to communicate remotely with other people, and giving an isolated person a physical presence in the world. However, the robot still 6. **needs** heavily on its owner to make the decisions about how it ‘behaves’.

The TERESA project adds a vital dimension: social intelligence. The researchers have developed methods that **enable** the robots to perform social functions automatically, so that the human controller never **relies** to make decisions about how the robot should move around or what postures it should adopt. TERESA robots **is free** to navigate semi-autonomously among groups, maintaining face-to-face contact during conversations, and displaying appropriate body-pose behaviour – in a similar way to human beings. Algorithms that can interpret social behaviour are able to detect facial emotions such as the intensity of a smile, for example, and respond accordingly. Thanks to the robot’s social intelligence, the human controller **are able** to focus on interactions with other people, instead of worrying about manually navigating the robot or adjusting its position and orientation.

**Gerunds or Infinitives**

1. Lilian said I should **do** yoga to relieve stress.

**Haut du formulaire**

**doing do to do**

Bas du formulaire

2. I learned how to cook by **watching** my mother in the kitchen.

**Haut du formulaire**

**to watch watching watch**

Bas du formulaire

3. Alex dreads **having** to retire.

**Haut du formulaire**

**have to have having**

Bas du formulaire

4. Mr. Davis was accused of **leaking** classified information to the press.

**Haut du formulaire**

**leak to leak leaking**

Bas du formulaire

5. You'll be able **to do** it yourself when you're older.

**Haut du formulaire**

**to do do doing**

Bas du formulaire

6. The children are anxious **to go** to the circus.

**Haut du formulaire**

**to go going go**

Bas du formulaire

7. The manager let Jane **go** early as she had a doctor's appointment.

**Haut du formulaire**

**going to go go**

Bas du formulaire

8. I decided not **to enter** this contest.

**Haut du formulaire**

**enter to enter entering**

Bas du formulaire

9. My parents do not allow me **to go** out late.

**Haut du formulaire**

**go to go going**

Bas du formulaire

10. Vivian can't help **to worry** about her children.

**Haut du formulaire**

**worrying worry to worry**

Bas du formulaire

11. I don't want **to make** such a decision right now.

**Haut du formulaire**

**to make make making**

Bas du formulaire

12. People sitting in front of me in the movie theater kept **talking** loudly.

**Haut du formulaire**

**talk talking to talk**

Bas du formulaire

13. **Mastering** a second language takes time and practice.

**Haut du formulaire**

**Master Mastering To master**

Bas du formulaire

14. The horses struggled **pull** the carriage out of the mud.

**Haut du formulaire**

**pulling pull to pull**

Bas du formulaire

15. Bob and Tina arranged **to meet** outside the movie theater.

**Haut du formulaire**

**meet to meet meeting**

Bas du formulaire

16. If you know how, it is easy **to float** in water for a long time.

**Haut du formulaire**

**floating to float float**

Bas du formulaire

17. I don't blame you for not **wanting** to go to that boring meeting.

**Haut du formulaire**

**to want wanting want**

Bas du formulaire

18. I've given up **trying** to learn how to skate.

**Haut du formulaire**

**trying try to try**

Bas du formulaire

19. I was relieved **to find** out that I had passed the exam.

**Haut du formulaire**

**to find find finding**

Bas du formulaire

20. I appreciate **to be** able to study in peace and quiet.

**Haut du formulaire**

**to be being be**

Bas du formulaire

21. My teacher insisted on **cleaning** up all the trash, even if it wasn't ours.

**Haut du formulaire**

**cleaning to clean clean**

Bas du formulaire

22. Monica's parents forbid her **to play** in the street because there's too much traffic.

**Haut du formulaire**

**playing play to play**

Bas du formulaire

23. Everyone in the neighborhood participated in **searching** for the lost child.

**Haut du formulaire**

**search to search searching**

Bas du formulaire

24. Our teacher encourages us **to check** a dictionary to check the spelling of difficult words.

**Haut du formulaire**

**check to check checking**

Bas du formulaire

25. She learned **to treat** students with respect.

**Haut du formulaire**

**treating treat** **to treat**

***Grammar reminder***

1. ***Common verbs followed by the to-infinitive are:***

**Verbs of thinking and feeling:**

|  |  |
| --- | --- |
| * choose * decide * expect * forget * hate * hope * intend * learn | * like * love * mean * plan * prefer * remember * would like * would love |

|  |  |
| --- | --- |
| **Verbs of saying:**   * agree * promise * refuse | **Other common verbs are:**   * arrange * attempt * fail * help * manage * tend * try * want |

#### Some verbs are followed by a ****noun**** and the ****to-infinitive****:

She **asked him to send** her a text message.  
He **wanted all his friends to come** to his party.

|  |  |
| --- | --- |
| **Verbs of saying:**   * advise * ask * encourage * invite * order * persuade * remind * tell * warn \*   \*Note: The verb warn is normally used with **not** The police ***warned everyone not to drive*** too fast. | **Verbs of wanting or liking:**   * expect * intend * would * prefer * want * would like   **Other verbs with this pattern are:**   * allow * enable * force * get * teach |

**Verbs which change meaning when followed by the gerund or infinitive form**

**Stop**

When 'stop' is followed by the **gerund**, the verb in the gerund stops.

* I've stopped***buying***coffee – it's too expensive.
* I've stopped***smoking -*** it's bad for my health.

When 'stop' is followed by **the** **infinitive**, we stop something else in order to do the verb in the infinitive.

* I stopped***to buy***a coffee on the way into work this morning. (I stopped walking in order to buy a coffee.)
* I stopped***to have***a cigarette (I stopped working in order to have a cigarette.)

**Regret**

When 'regret' is followed by the **gerund**you feel sorry about something you did – or didn't do - in the past.

* I regret***telling***you I was going to enter that singing competition!
* You'll regret not***finishing***university.

When 'regret' is followed by the**infinitive**, you regret something you are about to say. Often used in formal, written English with verbs 'tell', 'say' and 'inform'.

* We regret***to inform***you that your application has not been successful.

**Go on**

When 'go on' is followed by the gerund, the activity in the gerund continues.

* She***went on***talking about verbs for hours - she didn't stop! (She continued talking.)
* I can't go on***living***in this tiny house.

When 'go on' is followed by the**infinitive,**one action finishes and another and another action starts. This is often the next stage in a process.

* After talking about verbs she went on***to tell***a joke. (She changed activity.)
* After finishing his novel, he went on***to direct***a couple of plays.

**Remember/forget**

When 'remember' or 'forget' are followed by the gerund it means you forget or remember something you have done.

* I still remember***being***nervous on my first day of school.
* I'll never forget***seeing***his face

When 'remember' or 'forget' are followed by the infinitive, there is something you need to do and you remember or forget to do it.

* I forgot***to bring***my lunch today.
* Remember***to call***your mother tonight!