



From Anthropomorphic to Zoomorphic Social Robots: Our Experiences

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Seminar @ Universidad Politécnica de Madrid, Spain

January 24, 2024

Salute

- Our Team Members

- Dale Mcinnis, PhD Student
- Samuel Agaga, PhD Student
- Jennifer Cardenas, Master Student
- Marco Cano, Master Student
- Carolina Velasco, Master Student
- Jackson Sears, Master Student
- Devika rani Padam, Master Student
- Anuhya Dasika, Master Student
- Kevin Jhong, Visiting PhD Student
- Sunny Tseng, Visiting Master Student
- Jasper Tsai, Visiting Undergraduate Student
- Kaixuan Koh, Visiting Undergraduate Student



PromoScience



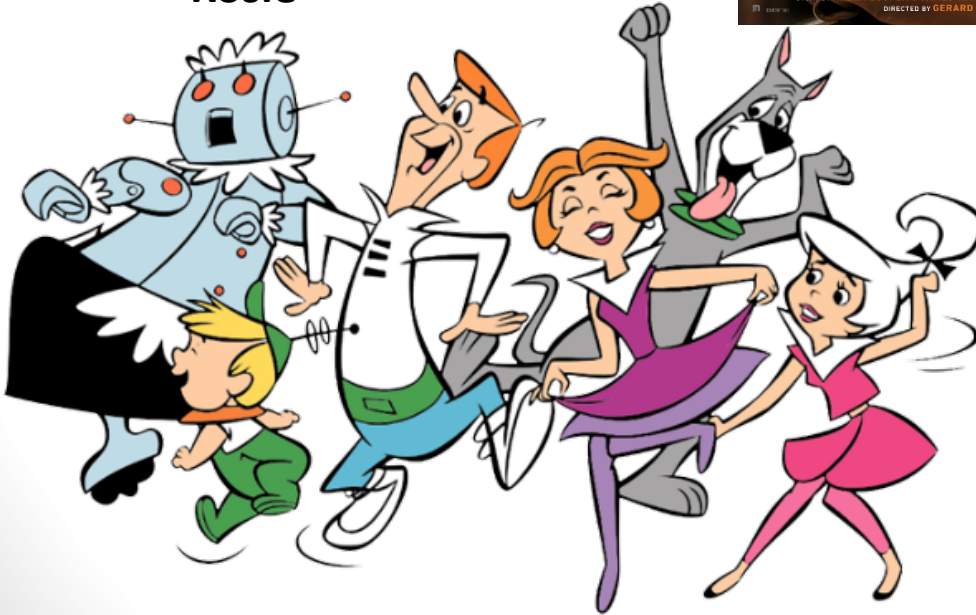
Accessibility Standards
Canada

Normes d'accessibilité
Canada

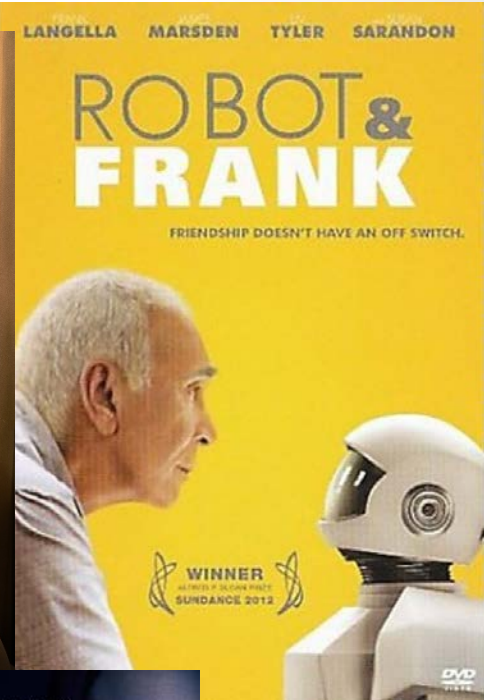
The Jetsons

- *Back in 1962, when the cartoon The Jetsons first aired on TVs across the nation, everything about it seemed like it came from a very far and distant future.*

Rosie



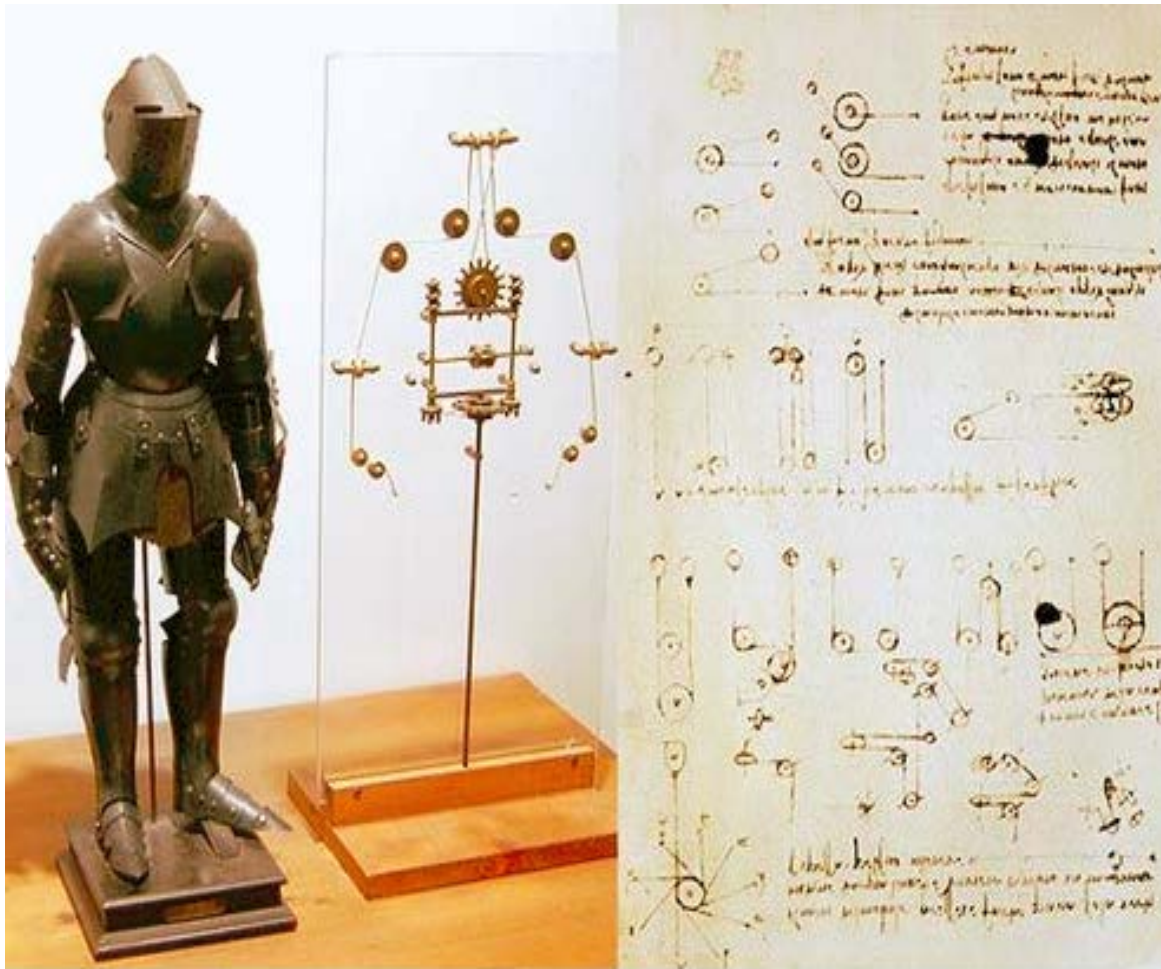
Source: Google Images



Ethics in Robot

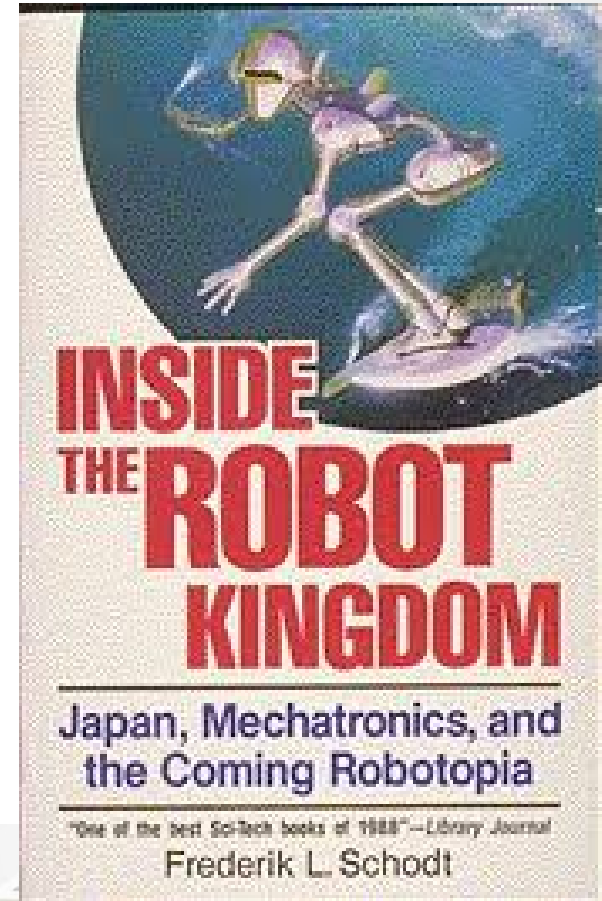
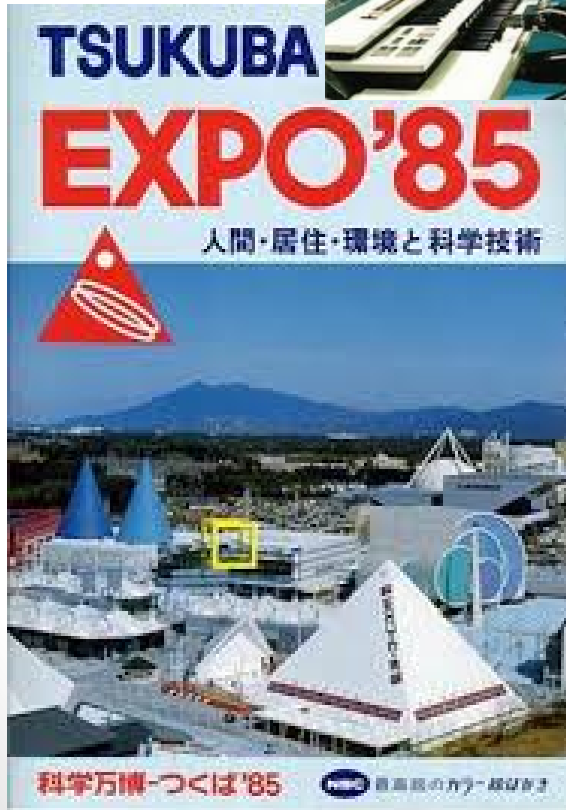
- Isaac Asimov (January 2, 1920 - April 6, 1992) proposed three rules of robotics that would safeguard humanity from malevolent robots:
 1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
 2. A robot must obey the orders given to it by human beings except where such orders would conflict with the First Law.
 3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.
- Although Asimov's work is highly visible in the public media, it has been criticized by philosophers.
- Asimov eventually added a zeroth law:
 0. *A robot may not harm humanity or, by inaction, allow humanity to come to harm.*

First Robot in History by Leonardo da Vinci (1452-1519)



Ref: Gorvett, Zaria. "Future - Leonardo Da Vinci's Lessons in Design Genius."
BBC News, BBC, 28 July 2016: <https://www.bbc.com/future/story/20160727-leon>

Japan is Robot Kingdom!



Source: Google Images

CANADA

May 6, 2018 8:00 am

Meet Pepper – Canada's first emotionally sensitive robot for sick kids



By Aalia Adam

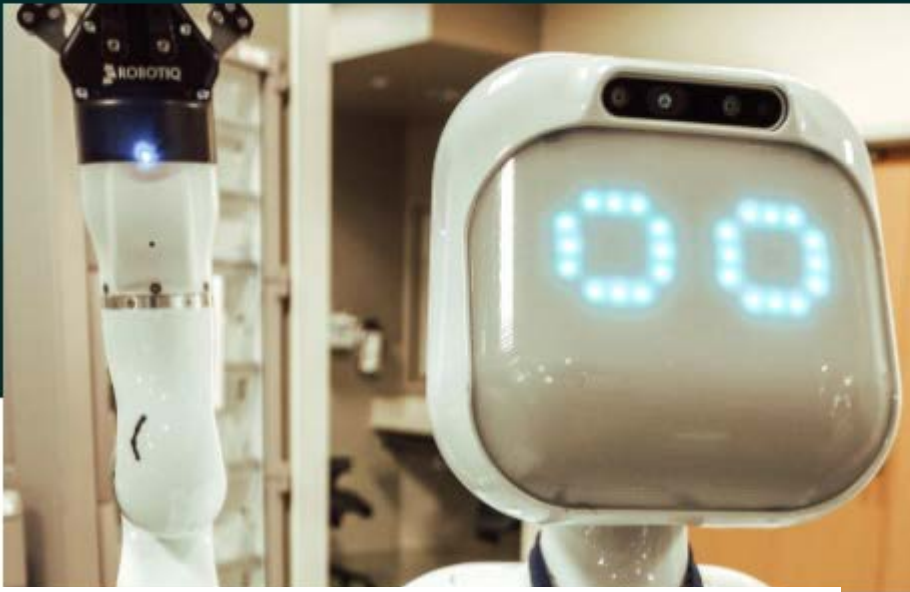
Online Video Journalist Global News



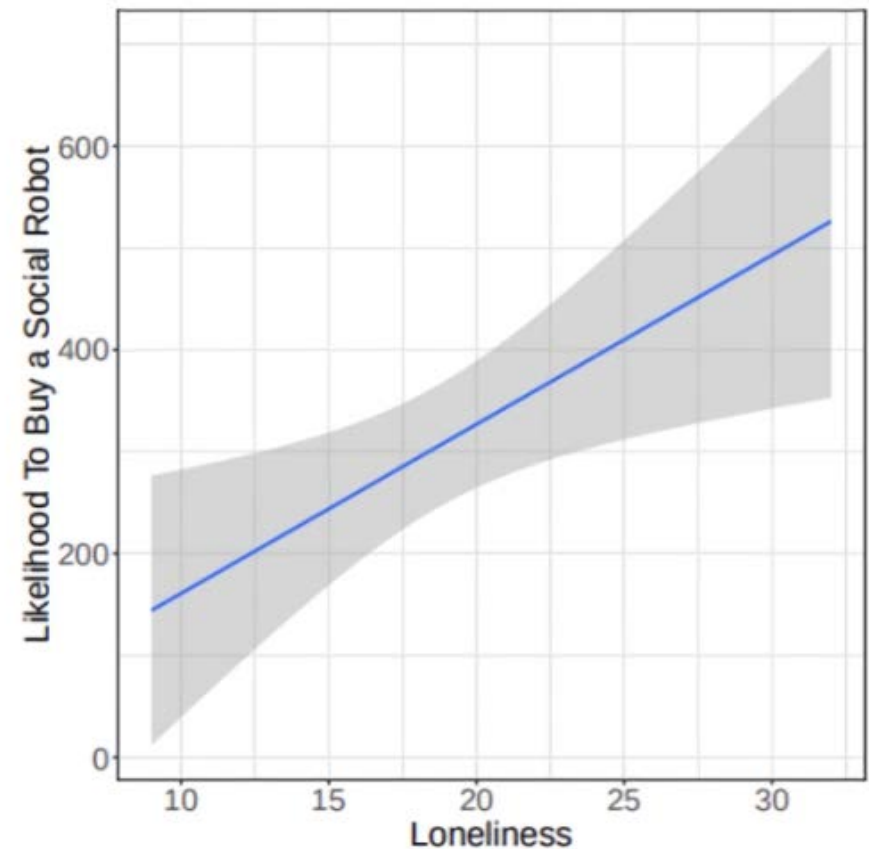
Source: Global News Toronto and Google Images

Researchers find people are more receptive to social robots during the pandemic

Kyle Wiggers @Kyle_I_Wiggers August 13, 2020 8:30 AM AI



In an attempt to gauge the public's perception of social robots during the pandemic, the researchers designed an online questionnaire that asked subjects to report their loneliness, stress levels, adherence to lockdown rules, and the overall effect of the pandemic on their lives, as well as their attitudes toward social robots (specifically whether their perception had changed as a result of the pandemic and the likelihood they would buy a social robot). Drawing on studies that suggest a relationship between loneliness and the “big 5” personality traits — neuroticism, agreeableness, extroversion, conscientiousness, and openness — the researchers also had respondents, who were recruited through Amazon Mechanical Turk, complete a brief personality assessment.



Some Florida seniors isolated with Alzheimer's and dementia due to the pandemic are getting robotic therapy pets



By [Allen Kim](#), CNN

🕒 Updated 4:45 PM ET, Mon April 27, 2020



Singapore deploys robot 'dog' to encourage social distancing

By [Michelle Toh](#), [CNN Business](#)

Updated 7:56 AM ET, Fri May 8, 2020



Technology

Amazon Has a Top-Secret Plan to Build Home Robots

By [Mark Gurman](#) and [Brad Stone](#)

April 23, 2018, 7:00 AM EDT Updated on April 23, 2018, 11:22 AM EDT

- ▶ Prototypes can navigate from room to room like driverless cars
- ▶ Company hopes to start testing bots in homes later this year

Advertisement 0:12



THE CIO'S GUIDE TO
AUTOMATION, AI,
AND ROBOTICS

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Amazon is working on a live-in robot named Vesta, says report

Shelby Fleig

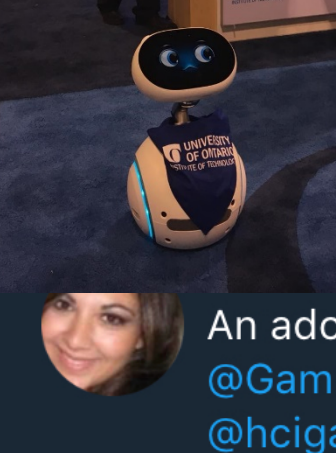
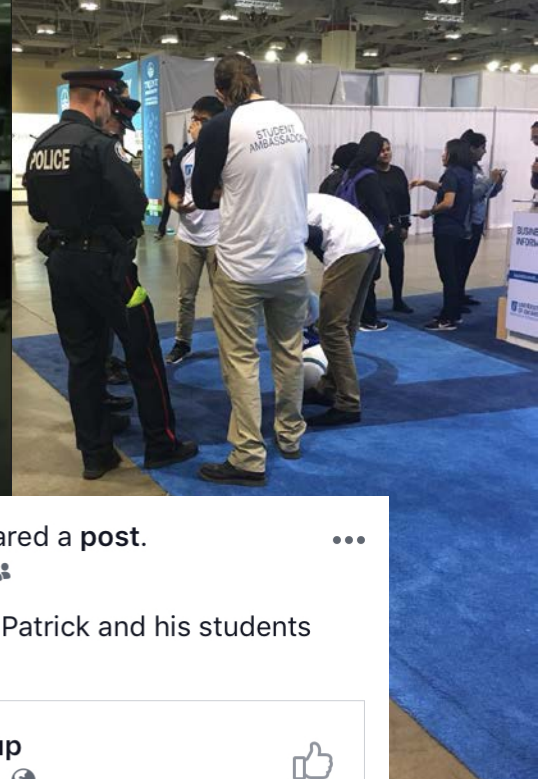
Published 2:19 p.m. ET April 23, 2018 | Updated 3:20 p.m. ET April 23, 2018



Amazon unveils 'Jetsons'-like roaming robot for the home



Senior Vice President, Devices & Services, Dave Limp introduces Astro on Tuesday.
Jamie McCarthy / Getty Images



Lennart Nacke shared a post.

Thursday at 19:52 • 🧑🏿‍🦱

Awesome visit today from Patrick and his students showing their robots.



HCI Games Group

Thursday at 18:49 • 🌐



Patrick Hung and his students from UOIT visits The Games Institute - University of Waterloo.



Toronto News, 2019



"SPEECH RECOGNITION" "REAL TIME INTERACTION" THEME : PROMOTING MALAYSIAN CULTURE USING ZENBO ROBOT

Tarikh/Date : 29 April 2019
Masa/Time : 9:00 am - 4:30 pm
Tempat/Venue : Pusat Sains Negara

**Join us and support 13 teams
from 7 top universities!!**



3 teams



2 teams



2 teams



1 team



3 teams



1 team



1 team



Pill boxes

Sponsored · Shop pill boxes :



7 Day Pill Case Large (3 Times...)
AED 17.00
Amazon.ae



Weekly Pill Organizer 7 Day 2L...
AED 24.32
Amazon.ae



Royal Apex 12 Grids PVC...
AED 15.00
Amazon.ae



Plastic Adjustable Removable Grid Bl...
AED 28.92
Amazon.ae



Weekly Pill Organizer, 1...
AED 51.38
Amazon.ae



Ezy Dose Weekly (7-Day) Pill...
AED 68.73
Amazon.ae



EZY DOSE Weekly (7-Day) AM/PM PI...
AED 14.70
Amazon.ae



LHOOOME Weekly Pill Organizer, 7 D...
AED 16.19
Amazon.ae



MEDca Weekly Pill Organizer with 28...
AED 28.98
Amazon.ae



7 Day AM & PM Pill Box, Tablet Stora...
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Amazon.ae



MEDca Weekly Pill Organizer - (Pack...
AED 39.99
Amazon.ae



New Fashion 1set Medicine Weekly...
AED 20.00
Amazon.ae



MEDca Weekly Pill Organizer, Four...
AED 44.50
Amazon.ae



Month Pill Box Organizer - 32...
AED 98.76
Amazon.ae



Wholesale Pill Box 7 Days Weekly, 20...
AED 308.46
Alibaba.com



Voxxy Multipurpose Small Storage Box
AED 30.00
suh.desertart.com



AUVON Weekly Pill Org...
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Pill Organizer, Pill Box With Removable ...
Amazon.ae



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16 Best Pill Organizers That Ar...
www.eelf.com



Weekly Pill Box 7 Day 28...
etsy · In stock



Elle - Smart Pill Box - ElleGrid
ElleGrid · In stock



Wholesale Pill Boxes | Gem L...
To Green Properties Ltd



Pillbox (military) - Wikipedia
Wikipedia



XL Large Weekly Pill Or...
Amazon.ae



Best Pill Organizers Of 2023 - Forbes ...
Forbes



Pill Box 7 Day | Savers | ...
Savers · In stock



PU 56 Pill Case
MAGCO TRADING LTD · In stock



Weekly Pill Organizer ...
Libby UAE



Pill Box 14 Place - Hom...
Home Store + ... · In stock



Pill Cases and Organize...
New York Magazine



Different Types of Pillbox | Healthy ...
Safe and Sound Health



PM Pill Box ...
Apple · In stock



Blush Pink Pill Box - Po...
Pari and Paraly · In stock



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Pill Boxes - Buy Pill Boxes Online at ...



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Fruugo AE



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Jonathan Arbel



Promotional pill box supp...
Nasreen Gifts



How To Fill A Pill Box - YouTube
YouTube



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Pill Hong



Replacement Standard ...
MedCenter Sy... · In stock



Pills Box Container Cases ...
Libby Apple



Funny Pill Box 7 Day Ho...
Libby · In stock



Danish Design
www.hipart.com

Source: <https://www.google.com/search?q=pill+boxes>

Alarms

Sponsored - Shop Alarms for Medicine



Sponsored - Shop Alarms for Medicine

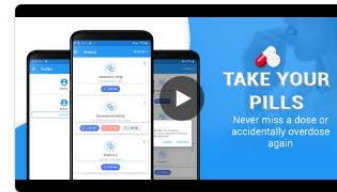


Source: <https://www.google.com/search?q=Alarms+for+Medicine>

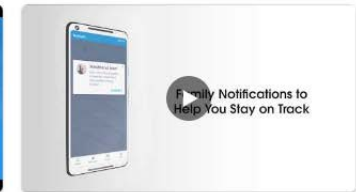
Mobile apps



MyTherapy Pill Reminder
MyTherapy
4.9 ★



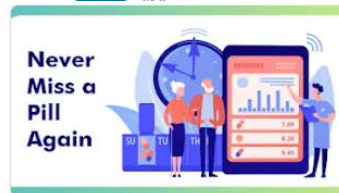
TakeYourPills Pill Reminder
Take Your Pills
4.7 ★



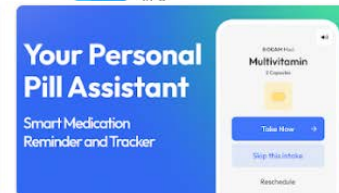
Medisafe Pill & Med Reminder
Medisafe®
4.7 ★



Medication Reminder & Tracker
MedicaApp



Medicine Reminder Pill Tracker
Living Maples



Pillo - Med Reminder & Tracker
Reminder Lab



Pill Reminder Tracker for Meds
CareClinic Tracker & Reminder



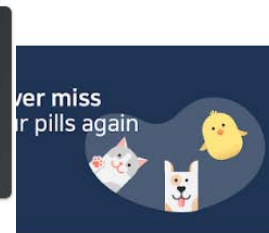
Pill & medication reminder
Whisper Arts



Cute Pill: Medication Reminder
Futasaji LLC



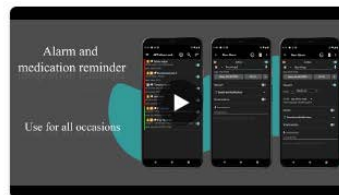
My Pill Reminder - Medication
Water Tracker Reminder



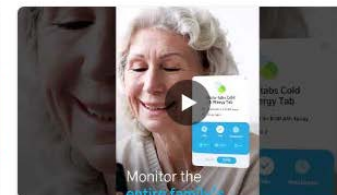
Pill Reminder Max - nutrition
Verify Inc.



MedControl Pill Reminder
Healthy Reminder
4.5 ★



Alarm and pill reminder
calocrol
4.6 ★



Meds & Pill Reminder: CareAide
CaringUp

Source: <https://play.google.com/store/search?q=pill+reminder&c=apps>

Mobile apps (cont.)



UAE WEEKEND GULF MENA WORLD BUSINESS OPINION CLIMATE HEALTH LIFESTYLE ARTS & CULTURE TRAVEL SPORT PODCASTS

Courts | Government | Education | Heritage | Health | Transport | Science | Megaprojects | Expo City Dubai | UAE in Space



Forget to take your medication? UAE students develop reminder app

► Smartphone app helps remind people to take their medication on time and improves communication with pharmacies.



Dubai Police want traders in fake medication to face the death penalty. Philip Cheung / The National

**Nick Webster**
Sep 15, 2017

 Listen in English  Listen in Arabic

Beta V1.0 - Powered by automated translation

Home Robot - Example



CLOSED

Pillo: Your Personal Home Health Robot

The smartest and friendliest way to manage yours and your family's health!



Pillo Health

1 Campaign | New York, United States

434,345 AED by 315 backers

370,883 AED by 273 backers on Aug 6, 2016



See
High-Definition
Camera



Hear
Omni-directional
Microphones



Touch
7" Touch
Screen



Speak
Text to Speech
Software



Sense
Voice + Facial
Recognition



Learn
Artificial
Intelligence




The unit itself is \$499. But even if you can swallow that cost, you also have to pay a \$39.99 monthly subscription which is crazy spendy. Still interested? Head over to pillohealth.com for more info. 2 Jan 2019



The Gadgeteer

<https://the-gadgeteer.com> › News ▾

Current Research





Pill Dispenser Robot

Meet Zenbo

healthcare buddy

Let's Zenbo manage yours
and your family's health

Friendly pill reminder
Voice & Facial recognition
Dispense meds
Prayer activity recognition



Zenbo can remind the patient with useful healthy tips, such as wearing a hygienic face mask and washing hand often.

Zenbo will remind the patient the next medicine time and doctor appointment.

Your next reminder

If the patient is doing Salah, then Zenbo will wait and remain quiet.

ناضرك ميريكم

VYOND

The HIJRI Calendar

Important Dates

Al Isra'a Wal Ashura
Eid Ul Fitr: The End of Ramadan
Eid Al Adha + Days of Tashreeq
Al Hijri: New Islamic Year
Day of Ashura
Wuquf in' Arafat Day
Maulid Nabi Muhammad

The Month of Ramadan Approaches



GET OUR

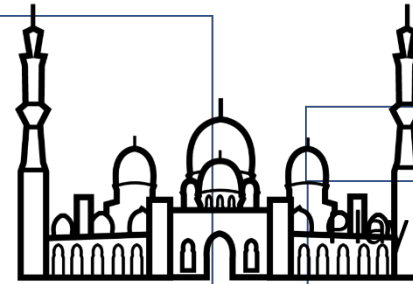
Android App

Humanoid Robot

Time tracking
Alarm trigger

Input:
1. Room value
2. Press START

Quran



The Adhan

Athan for Prayer

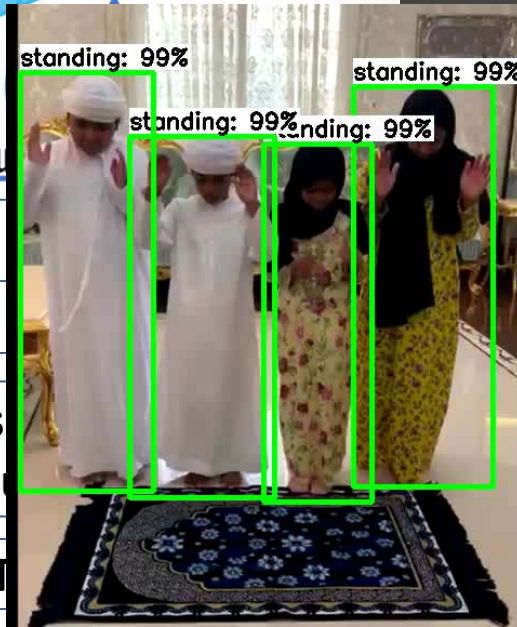
Fajr - 4:56 am
Dhuhr - 12:13 pm
Asr - 3:38 pm
Maghrib - 6:12 pm
Isha - 7:42 pm

standing: 99%

standing: 99%

standing: 99%

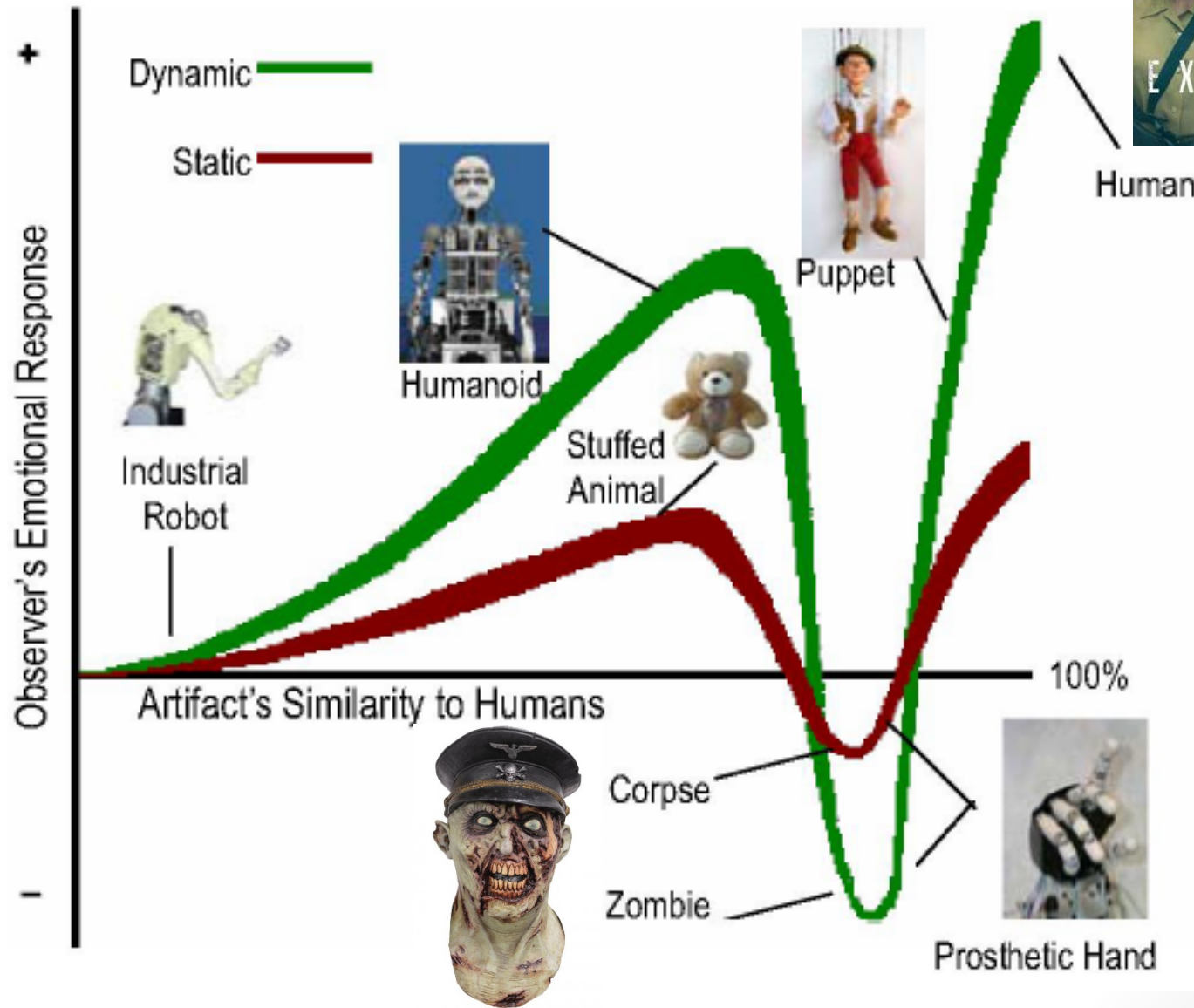
standing: 99%



Robots: Is the uncanny valley real?



The Uncanny Valley



Reference:
M. Mori, K. F. MacDorman, and N. Kageki, "The uncanny valley,"
Robotics & Automation Magazine, IEEE, vol. 19, no. 2, pp. 98–100, 2012

Source: Google Images

AUthentic Robotic Assistant (AURA)

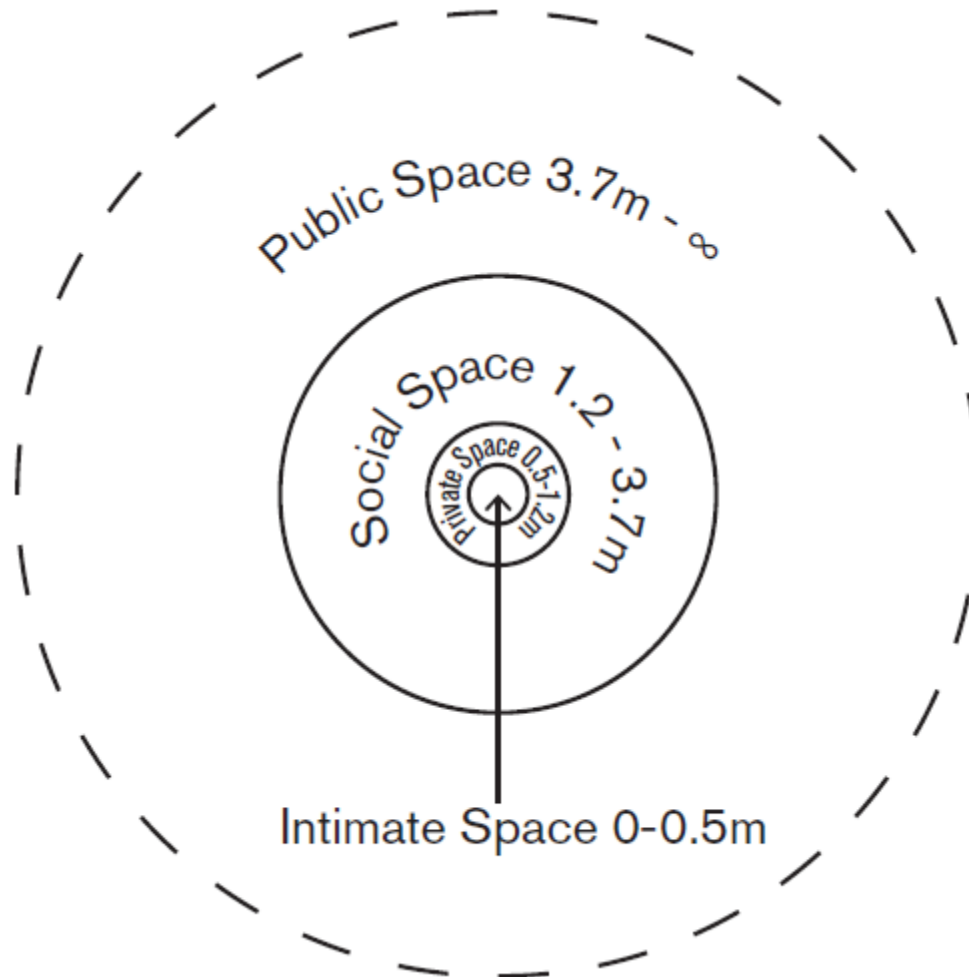
Prof. Ruth Stock-Homburg

Department of Marketing & Personal Management

Technische Universität Darmstadt, Germany



Psychological Closeness between People



Source: Christoph Bartneck, Tony Belpaeme, Friederike Eyssel, Takayuki Kanda, Merel Keijsers, and Selma Šabanović, "Human-Robot Interaction: An Introduction," ISBN:9781108676649, Cambridge University Press, February 2020.
DOI:<https://doi.org/10.1017/9781108676649>

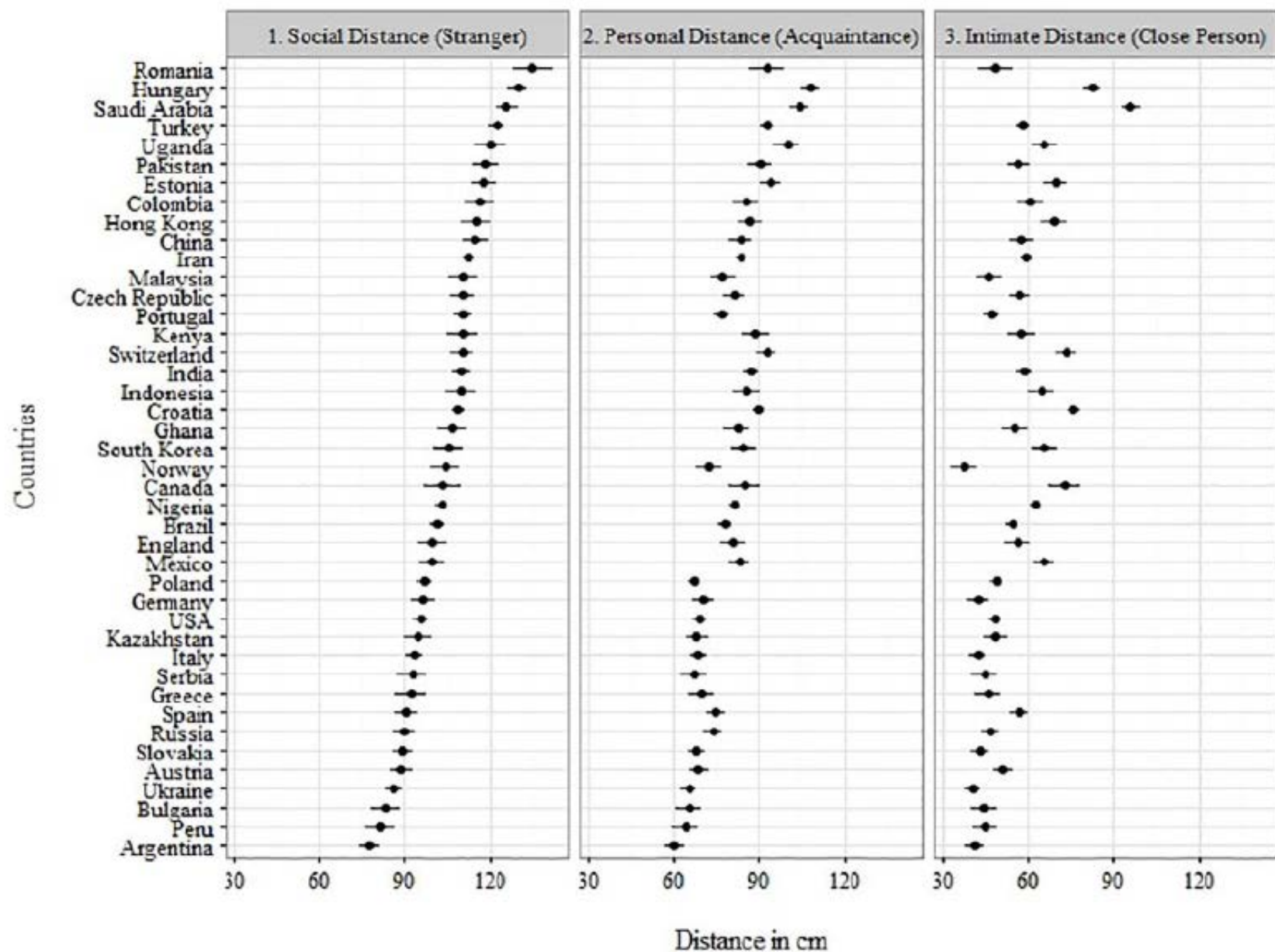


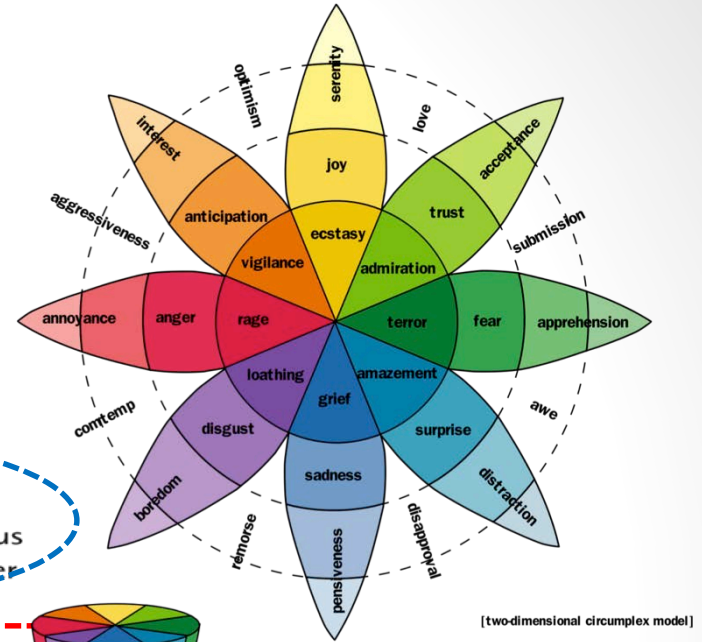
Figure 2. Mean values (cm) of social, personal, and intimate distance across all nations.
 (Adapted from: Sorokowska et al., "Preferred Interpersonal Distances: A Global Comparison,"
 Journal of Cross-Cultural Psychology, Volume 48, Issue 4, 2017, pp. 577–592)

Mastercard's Pepper at Prague Airport

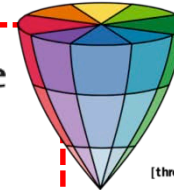
www.prg.aero

8 Basic Emotions

And the purpose of each one



[two-dimensional circumplex model]



[three-dimensional circumplex model]



Anger

To fight against problems



Fear

To protect us from danger



Anticipation

To look forward and plan



Surprise

To focus us on new situations



Joy

To remind us what's important



Sadness

To connect us with those we love



Trust

To connect with people who help



Disgust

To reject what is unhealthy

Pessimistic/Negative

Optimistic/Positive

Colours in Different Cultures

Colour Culture	Red	Blue	Green	Yellow	White
Anglo	Danger	Strong; reliable	Success Green	Coward	Purity
French	Aristocrat	Freedom; peace	Crime	Lucky; temporary	Neutral
Chinese	Happy; Success	Heaven	Cuckoldry	Wealthy; powerful	Death; purity
Japanese	Anger; danger	Villain	Young; energetic	Grace; nobility	Happy; Success
Arab	Death	Virtue	Fertile	Wealthy	Joy
Indian	Life	---	Islam	Success	Death

The Wizard of Oz “AI”

- Researchers commonly rely on the Wizard-of-Oz (WoZ) technique.
- WoZ involves deceiving study participants into thinking the robot is behaving autonomously, when it is actually being operated by a member of the research team.
- Research participants should then be informed about this deception in a post-experimental debriefing.
- Using WoZ, researchers can "pretend" that their robot has interactional skills that it does not have, either because they require further technical development or because additional time or skill must be expended on programming the robot.
- The WoZ approach is particularly suitable in situations in which technology has developed to a degree at which it is almost usable for HRI, such as speech recognition.



Source: Google Images



Office of the
Privacy Commissioner
of Canada

Commissariat
à la protection de
la vie privée du Canada

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Involving seniors in developing privacy best practices: Towards the development of social support technologies for seniors

Organization

Ontario Tech University (University of Ontario Institute of Technology)

Published

2020

Project Leader(s)

Andrea Slane, Isabel Pedersen and Patrick C. K. Hung

Project deliverables are available in the following language(s):

English

The following project deliverables are available at [Decimal Lab](#):

- Andrea Slane, Isabel Pedersen, and Patrick C. K. Hung. [Good Privacy Practices for Developing and Marketing Social Support Technologies for Seniors](#), July 2020.
- Andrea Slane, Isabel Pedersen, and Patrick C. K. Hung. Involving Seniors in Developing Privacy Best Practices: Toward Responsible Development of Social Technologies for Seniors, [Report of the Findings](#), 25 March 2020.
- Andrea Slane, Isabel Pedersen, and Patrick C. K. Hung. Involving Seniors in Developing Privacy Best Practices: Toward Responsible Development of Social Technologies for Seniors, [Privacy Best Practices](#), 25 March 2020.
- Andrea Slane, Isabel Pedersen, and Patrick C. K. Hung. Involving Seniors in Developing Privacy Best Practices: Toward Responsible Development of Social Technologies for Seniors, [Scan of Social Support Technologies](#), 25 March 2020.

Ontario, Canada

- Cooperating with Dr. Andrea Slane and Dr. Isabel Pederson, Faculty of Social Science and Humanities, Ontario Tech University, Canada
- Involving Seniors and Caregivers in Developing Privacy Best Practices: Toward Responsible Development of Social Support Technologies for Seniors
- The first experiment was conducted in Ontario in July 2019.
- Method: Focus Groups
- Oshawa (N=11; 2m, 9f)

Partial Insights: Attitudes towards Social Robots

- Worried about privacy and unwanted advertising
- Don't see themselves as the target customers
- Worried about setting the robots up
- Worried about losing their abilities
- Can't imagine having a conversation with the robot
- Can see useful functions

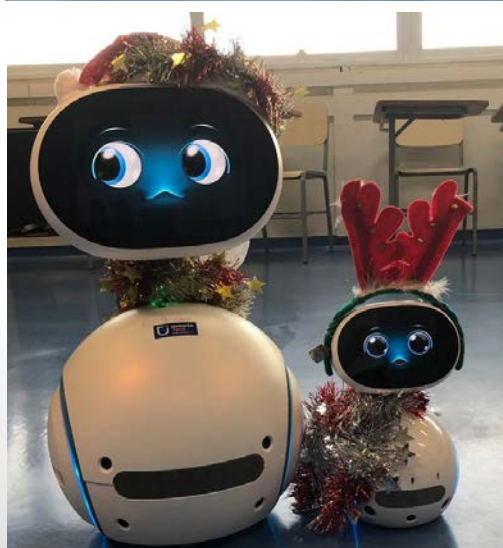
➤ Source:

- Involving seniors in developing privacy best practices: Towards the development of social support technologies for seniors
 - https://www.priv.gc.ca/en/opc-actions-and-decisions/research/funding-for-privacy-research-and-knowledge-translation/completed-contributions-program-projects/2019-2020/p_2019-20_03/
- Ezer N., Fisk A.D., Rogers W.A. (2009) Attitudinal and Intentional Acceptance of Domestic Robots by Younger and Older Adults
- Smarr, CA., Mitzner, T.L., Beer, J.M. et al. Int J of Soc Robotics (2014) 6: 229.

Sao Paulo, Brazil



1. Quiz
2. Aerobics
3. Christmas dance



Participants

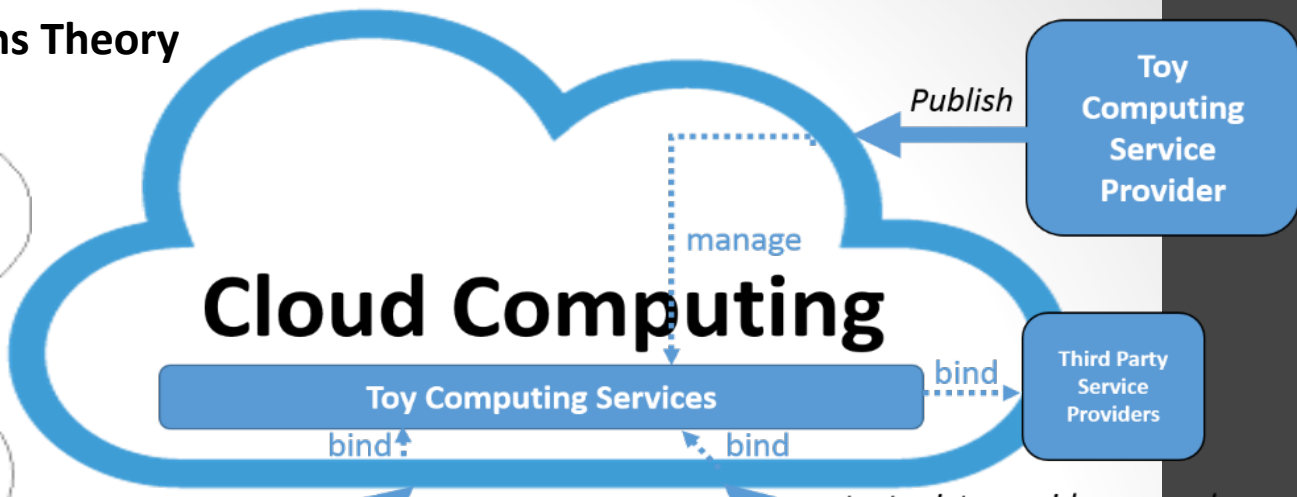
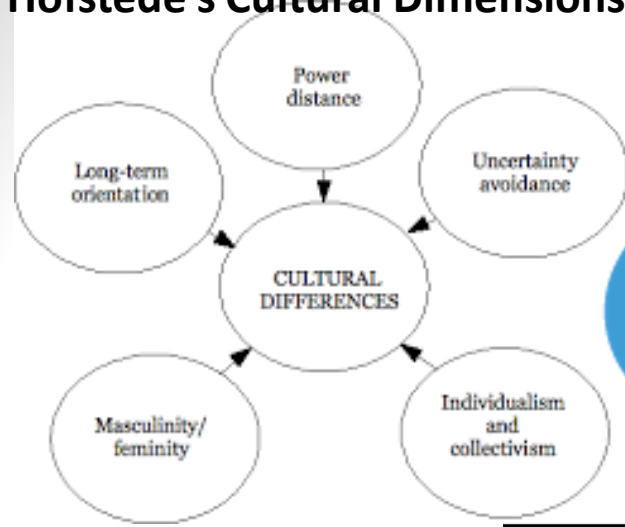
- Cooperating with Prof. Marcelo Fantinato and Prof. Sarajane Marques Peres from the School of Arts, Sciences and Humanities, University of São Paulo, Brazil
- Two focus groups (9 + 11)
- Seniors' open university: students and colleagues
- Collaboration of three gerontologists



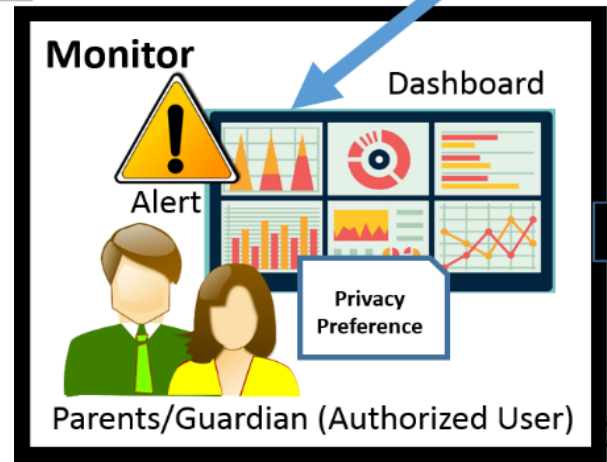
Partial results

- Most participants showed to enjoy interaction with the robots.
- Many of the participants wanted to interact with the robot, even more than our activities allowed.
- Some just watched from afar, but apparently because of their shy personality and not for aversion to the robot (mostly men).
- Most participants agreed that company robots could help them with everyday activities.
- Some participants highlighted some points of concern:
 - Companion robots cannot replace a companion human.
 - Companion robots can make elderly people even more dependent.

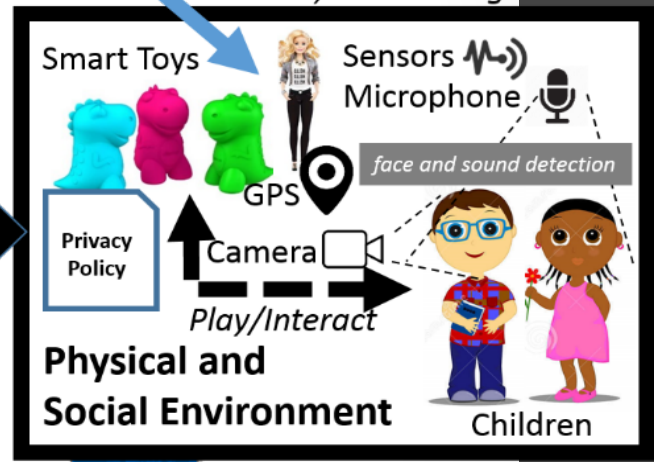
Hofstede's Cultural Dimensions Theory



Source: Google Images



Volume 40, July 2018, Pages 83-90



A preliminary study of Hello Barbie in Brazil and Argentina

Marcelo Fantinato ^a, Patrick C.K. Hung ^b, Ying Jiang ^b, Jorge Roa ^c, Pablo Villarreal ^c, Mohammed Melaisi ^b, Fernanda Amancio ^a

Doctor Who - Companion K9



News > Scottish News

DOG-TER WHO Doctor Who superfan gives faithful robot dog K9 21st century upgrade for Abertay University project

The iconic robot, which featured in the hit sci-fi series with multiple Doctors including Scottish star David Tennant, has been given a new lease of life from Gary Taylor

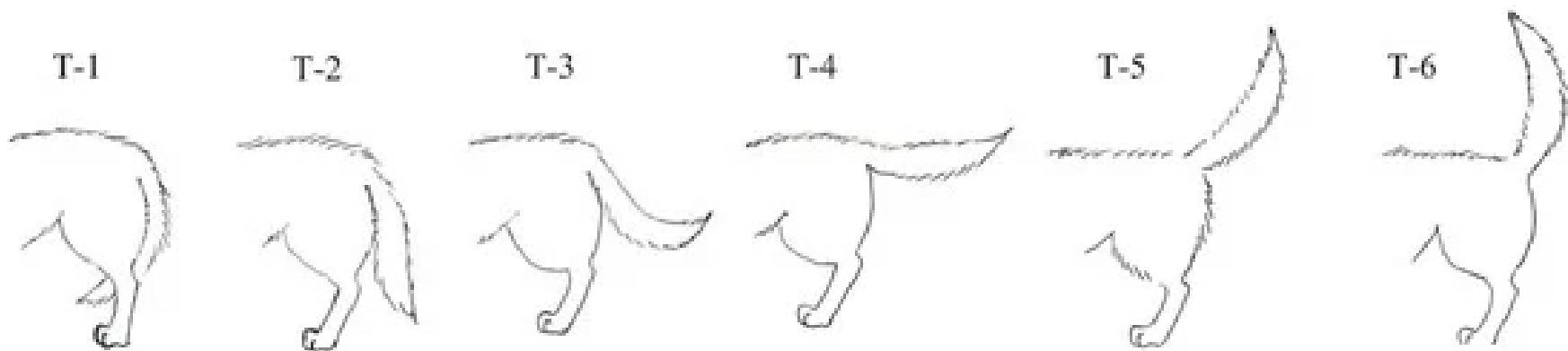
By David Fowler

13:34, 9 May 2018 | Updated: 13:45, 9 May 2018



Source: The Scottish Sun & Google Images

Tail:	T-1	Tail is between the legs
	T-2	Tail is hanging down
	T-3	Tip of the tail is lower than the height of the back
	T-4	Tail is parallel to the back
	T-5	Tail is higher than the height of the back
	T-6	Tail is up almost vertically



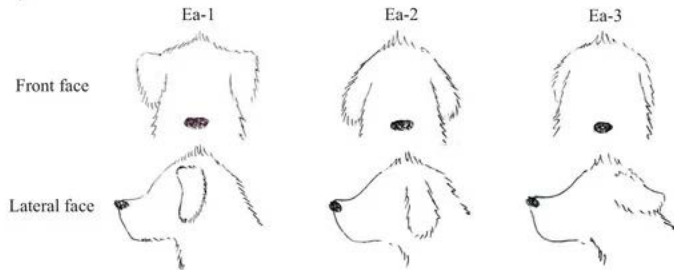
Source: Hasegawa, M., Ohtani, N., and Ohta, M. (2014).
Dogs' Body Language Relevant to Learning Achievement,
Animals 2014, 4(1), 45-58; <https://doi.org/10.3390/ani4010045>.

Future Works: Four-Legged Animals



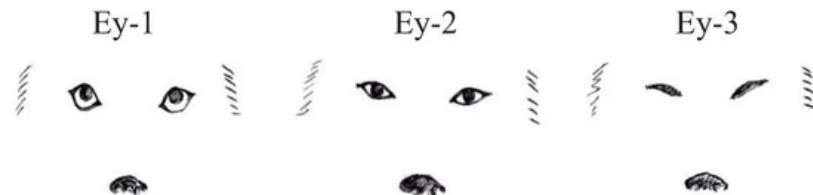
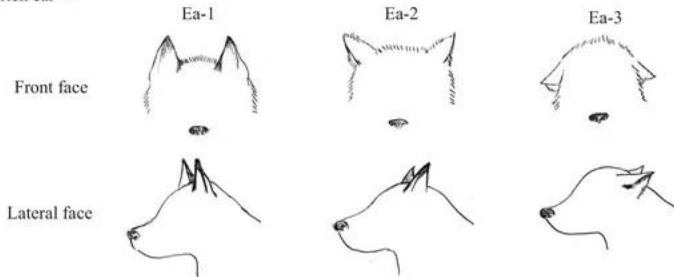
Ears:	Ea-1	Ears are turned forward
	Ea-2	Ears are slightly turned back
	Ea-3	Ears are turned back

< Drop ear >

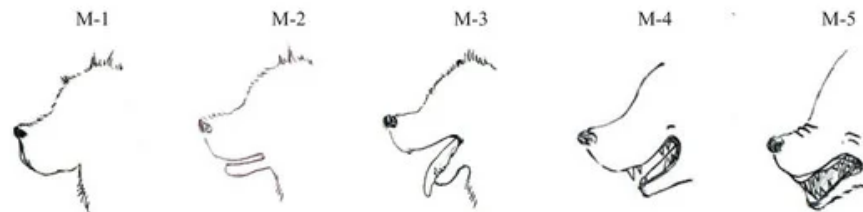


Eyes:	Ey-1	Eyes open wide
	Ey-2	Eyes open normally
	Ey-3	Eyes narrow

< Prick ear >



Mouth:	M-1	Mouth shut
	M-2	Mouth slightly open
	M-3	Mouth opens wide and the tongue is visible
	M-4	Mouth opens, the teeth are visible, and the cheek muscles look firm
	M-5	The front and back teeth are visible, and the look is obviously aggressive

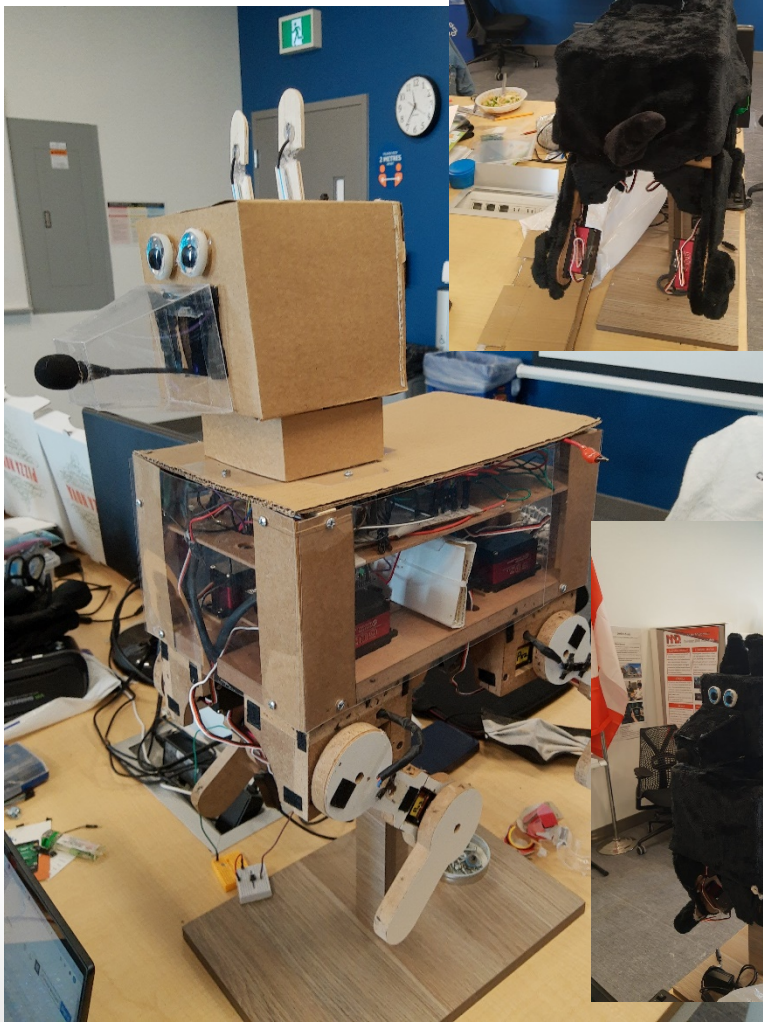


Source: Hasegawa, M., Ohtani, N., and Ohta, M. (2014).
Dogs' Body Language Relevant to Learning Achievement,
Animals 2014, 4(1), 45-58; <https://doi.org/10.3390/ani4010045>.

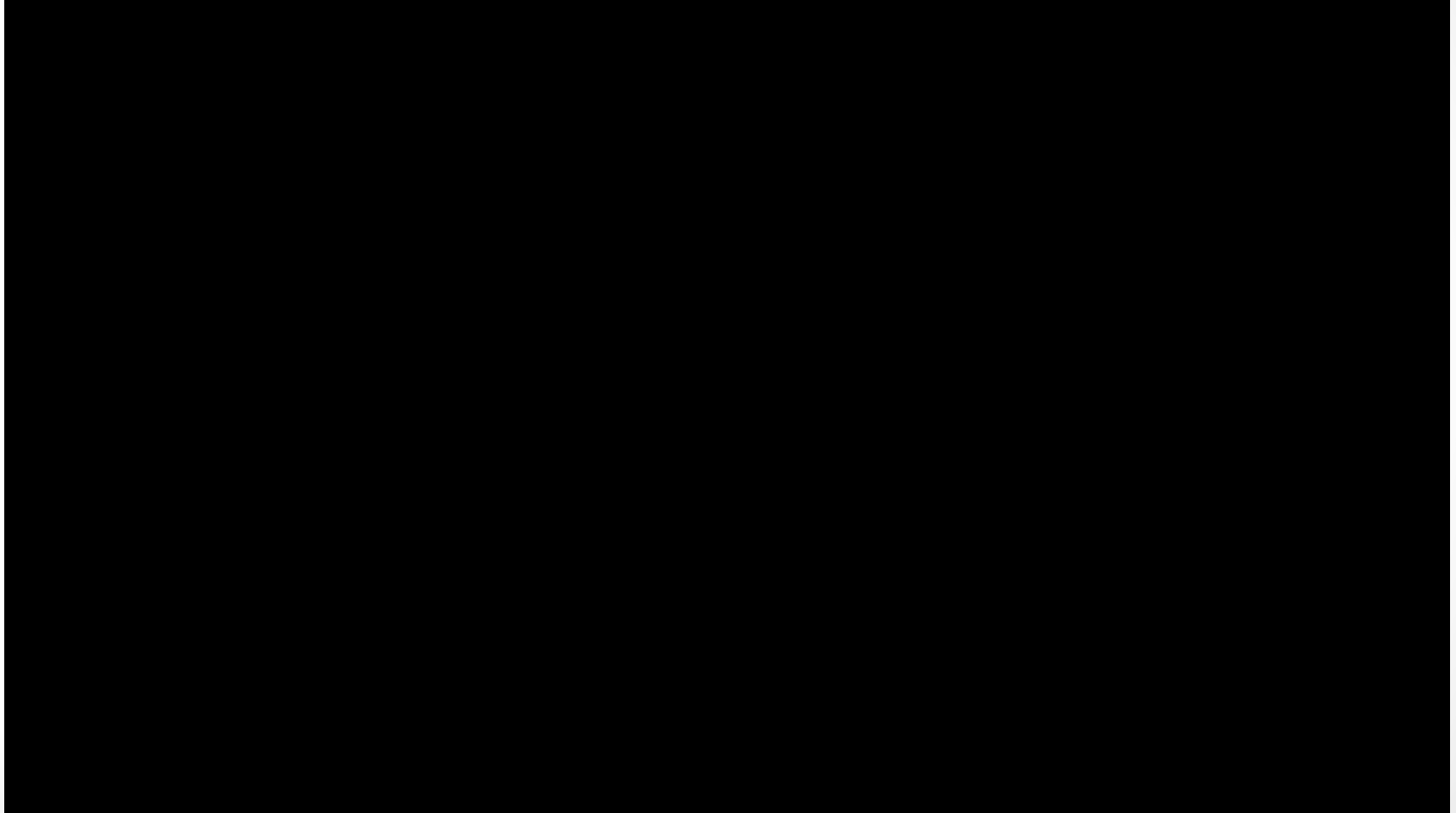


Turn it into a Scottish Terrier

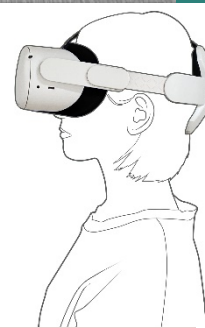
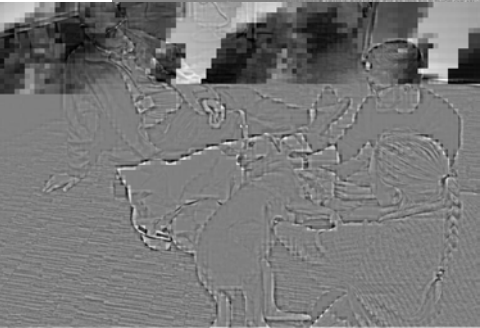
Source: Google Images



Robot-To-Robot Interaction (RRI)



Doting dogs give Abertay students a calming canine cuddle



Cynophobia is an intense & persistent fear response related to dogs. The fear is overwhelming, impairing, & gets worse over time.

Signs of Cynophobia

- Racing heart
- Choking feeling
- Trembling out of fear
- Thinking about worst-case situations
- Hiding and avoiding



Impact of Cynophobia

- Social withdrawal
- Avoidance response
- Extreme anxiety
- Gloom and sadness





指の動きを可視化するグローブシステム

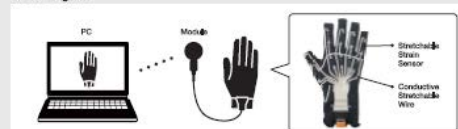
Glove System



指の動きを可視化するグローブシステム



Block Diagram



Applications



お問い合わせ先：YVJ株式会社 研究開発部
Contact: Yamaha Corporation R&D Division
Y2 PROJECT web: <http://www.y2lab.com/>





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World Economic Forum
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MIT News
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Disability Insider
Robot guide dog created to help peo...

Science Times
Robotic Guide Dog Helps Visually ...

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A robot guide dog f...

YouTube
Are ROBOTS Replacing GUIDE DOGS ...

Car and Driver
Robotic Dogs to 3D-Map Fact...

This robot acts like a guide dog
Reddit
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Daily Mail
Student's handheld 'robotic guide dog ...

Semantic Scholar
Robotic Guide Dogs and Humans ...

Evening Standard
guide dogs react to robots ...

Leicestershire Live
creates 'robotic guide dog gadget ...

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Replace Guide Dogs For Blind ...

OpenGrowth
Do You Know About Robotic Guide Dogs ...

New Atlas
NSK develops four-l...

ResearchGate
Development of a guide d...

YouTube
Guide Dogs - What About Guide R...

Tech Xplora
A laser equipped robotic gui...

Design Principles

There are six design principles.

1. A robot dog is **NOT to replace a real guide dog** as a companion to the visually impaired persons.
2. A robot guide dog **should behave like a real dog**. For example, a robot dog should not speak human language.
3. Besides the functional requirements such as navigations, we should also focus **on the non-functional requirements** such as the Uncanny Valley, Human-robot Interaction (HRI), emotion engagement and attachment.
4. The robot guide dog should **provide haptic feedback** to the visually impaired persons such as body gestures and movement.
5. We only apply the concept of robot guide dog as **an assistive technology** (e.g., a tool) for training the guide dog owners.
6. We should also provide **an open programming platform** for the visually impaired persons to do coding on the robot dog to customize their special needs.

Climb stairs and avoid obstacles

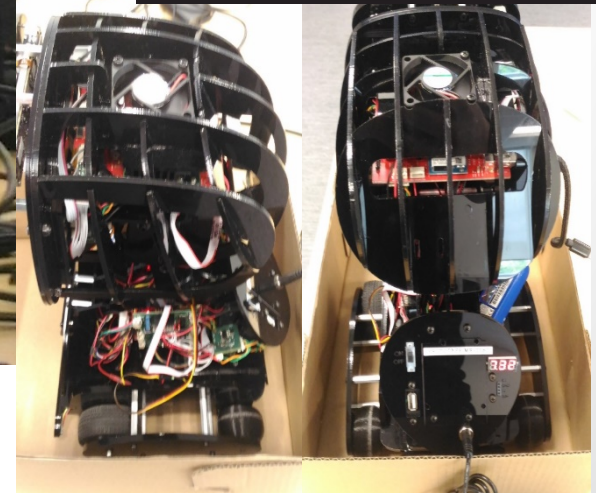
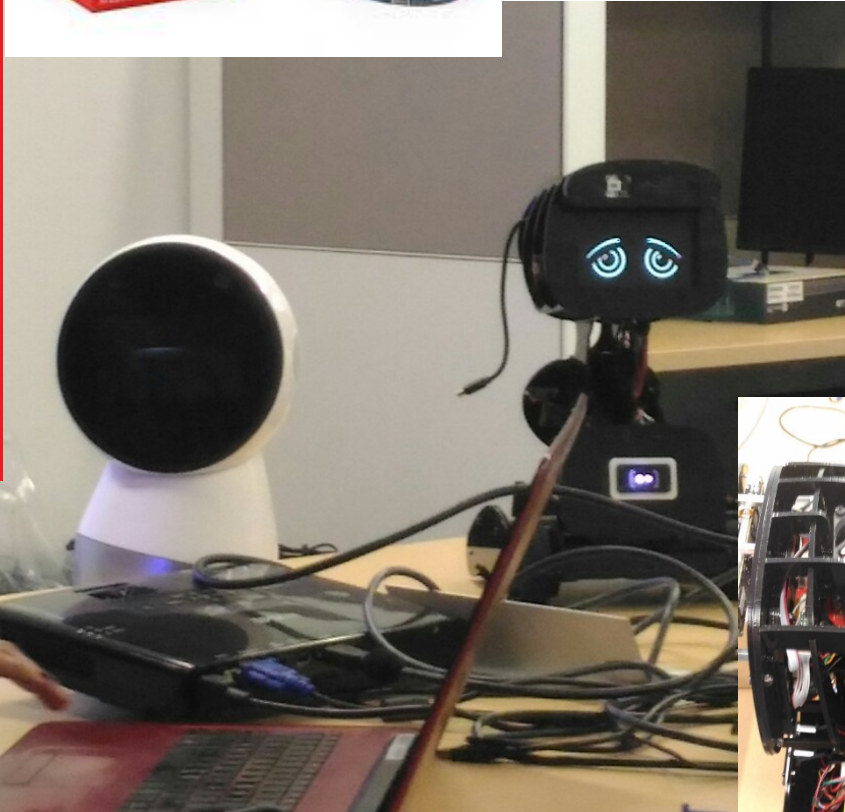


Study in Taiwan



Study in Canada

Thank you for your listening!



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