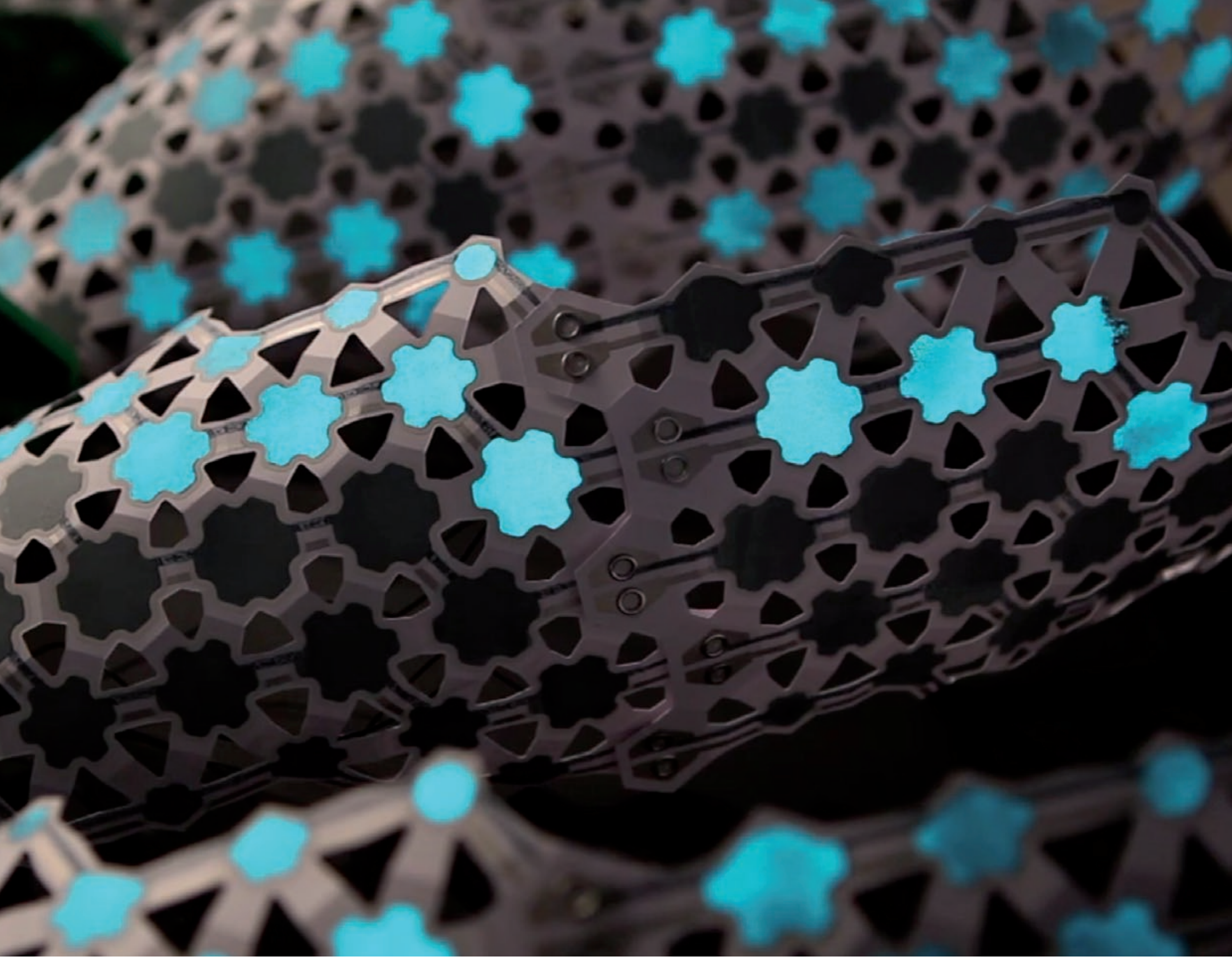
Ethics of Robotic Aesthetics



Lin-Lin Chen, Tom Djajadiningrat, Loe Feijs, Jun Hu, Steven Kyffin, Lucia Rampino, Edgar Rodriguez, Dagmar Steffen

Design and semantics of form and movement

DeSForM 2015

Aesthetics of interaction: Dynamic, Multisensory, Wise

Cover image: Electroluminescent surface printed on folded paper (Karmen Franinovic and Luke Franzke, "Luminous Matter. Electroluminescent Paper as an Active Material", page 37-47)

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Aesthetics of interaction:
Dynamic, Multisensory, Wise

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13 October 2015

15.00 Seminar “Capturing value in design-intensive start-ups”
Venue: Sala Arena, PoliHub - Startup District & Incubator, Fondazione Politecnico di Milano, via Durando 39, Milan

14 October 2015

Topic 1 | Tangible, smart and dynamic objects: how the new aesthetics affects meaning and experience
Venue: Sala Rossa, Politeca, Bovisa Campus, Politecnico di Milano, Via Durando 10, Milan

8.30 Conference Registration

9.00 Opening Ceremony and Topic introduction

9.30 Keynote speech by Johan Redström “Project, Program, Practice”

10.15 Paper session
- Janne van Kollenburg, Eva Deckers, Paul Gardien, Caroline Hummels, “People Research for Eco-system Propositions: a Theoretical Framework towards the Future of Interaction Design”
- Mads Nygaard Folkmann, “The Aesthetics of Digital Objects”

11.15 Coffee break

11.30 Paper session
- Nazli Cila, Marco Rozendaal, Michaël Berghman, Paul Hekkert “Searching for balance in aesthetic pleasure in interaction”
- Patrizia Marti, “Poetry in design”
- Jelle Stienstra, Sander Bogers, Joep Frens, “Designerly Handles: Dynamic and Contextualized Enablers for Interaction Designers”

13.00 Lunch + Interactive Demo session

14.00 Paper session
- Karin Niemantsverdriet, Joep Frens, “Design for Attachment: an explorative search for product qualities that enhance our emotional bond with digital products”
- Hendrik N.J. Schifferstein, Elif Özcan, Marco C. Rozendaal, “Towards the maturation of design: From smart to wise products”
- Fang-Wu Tung and Hui-Yu Tseng, “Enriching the Expressiveness of Products with Life Experiences”

15.30 Coffee break

16.00 Paper session
- Karmen Franinović, Luke Franzke “Luminous Matter. Electroluminescent Paper as an Active Material”
- Valentina Rognoli, “Dynamic and imperfect as emerging material experiences. A case study”

17.00 Interactive Demo session

18.00 Sound design performance by Lorenzo Palmeri + Happy hour

15 October 2015
Topic 2 | Designing and virtualizing the multisensory product experience
Venue: POLIfactory, Bovisa Campus, Politecnico di Milano, Via Durando 10, Milan

9.15 Topic introduction

9.30 Keynote speech by Giorgio Metta "The iCub Project: an Open Robotic Platform for Research in Embodied AI"

10.15 Paper session
- Shuichi Fukuda "Design for flow in an age of material digitalization"
- Theo Mahut, Carole Bouchard, Jean-François Omhover, Carole Favart, Daniel Esquivel, "Interaction, the core of User Experience"

11.15 Coffee break

11.30 Paper session
- Claudio Germak, Maria Luce Lupetti, Luca Giuliano "Ethics of Robotic Aesthetics"
- Serena Camere, Hendrik N.J Schifferstein, Monica Bordegoni "The Experience Map. A Tool to Support Experience-driven Multisensory Design"
- Attalan Mailvaganam and Miguel Bruns Alonso, "Haptic Beats: Designing for Rich Haptic Interaction in a Music Controller"

13.00 Lunch + Interactive Demo session

14.00 Paper session
- Murat Bengisu and Marinella Ferrara "Kinetic Materials Experience"
- Saskia Bakker, Simone de Waart and Elise van den Hoven "Tactility Trialing: Exploring Materials to Inform Tactile Experience Design"
- Bahareh Barati, Elvin Karana, Paul Hekkert "From Way Finding in the Dark to Interactive CPR Trainer: Designing with Computational Composites"

15.30 Coffee break

16.00 Paper session
- Edgar R. Rodriguez Ramirez, Kah Chan, Simon Fraser, Keith Thurlow, Sebastien Voerman, Dana Fridman, Scott Brebner, "3D Printing Sensor-enabled Splints and Exergaming"

16.30 Speech by Francesco Trabucco "The beauty of things"

17.00 Interactive Demo session

20.00 Social dinner

16 October 2015
Topic 3 | From smart to wise: toward a new conception of digital products and services
Venue: Saletta Lab, Triennale di Milano, Viale Alemagna 6, Milan

9.15 Topic introduction

9.30 Keynote speech by Jodi Forlizzi "Designing Today's Product-Service Ecologies"

10.15 Paper session
- Elif Özcan "Towards wise experiences: The role of wisdom in design for well-being"
- Xinchu Zhang, Lois Frankel, Audrey Girouard, "Examining Sensorial Interfaces as the Stimuli for Remote Affective Communication"

11.15 Coffee break

11.30 Paper session
- Marc Hassenzahl, Eva Lenz, Sarah Diefenbach, Nigel Geh Keong Teck, "The delicacy of handshakes: Reflections on the aesthetics of interaction"
- Jacklynn Pham "Expanding the Palette of Digital Interaction"
- Bin (Tina) Zhu, Yanqing Zhang, Xiaojuan Ma, Haibo Li, "Bringing Chinese Aesthetics into Designing the Experience of Personal Informatics for Wellbeing"

13.00 Lunch + Interactive Demo session

14.00 Paper session
- Shushu He "The Social Shopping in Smart Space"
- Marco Spadafora, "Object's Personality, a Tool to Chase an Aesthetic Approach in the Design of Smart Objects"
- Ilaria Mariani, Ida Telalbasic, "The Reverse Engineering of Emotions"

15.30 Coffee break

16.00 Paper session
- Mizuki Sakamoto and Tatsuo Nakajima, "In Search of the Right Design Abstraction for Designing Persuasive Affordance towards a Flourished Society"
- Annamaria Andrea Vitali, "Play design and sense-making: players and games as digital interactive contexts for effects of sense"

17.00 Conference Closing Ceremony

17.30 Possibility to visit the Triennale Design Museum

17 October 2015 (morning)
Guided Visit to Expo 2015

Keynotes

Topic 3: Wise

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Papers

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Ethics of Robotic Aesthetics

Abstract
This article explores the relationship between expressivity morphology and acceptance, defining the conditions that make service robots desirable by man. In the attempt to define "an ethic for robotic aesthetics", it is discussed the evolution happened in robot design and how they where perceived by people, both in scientific community and in pop culture. The conception of robots begin with an approach strongly oriented to a biological imitation, especially anthropomorphic, conversely, nowadays, the scenario is various and robots assume a multitude of synthetic aesthetic languages and, moreover, are characterized on the base of the context. In the final part of this article, it is described, through a series of examples, the contemporary scenario in which to the multitude of languages is added also the contamination of the digital world, outlining new morphological types. One of the examples is Virgil, a service robot for Cultutal Heritage enhancement, designed by the research team JOLCRAB Telecom Italia/Politecnico di Torino.

Keywords
Robotic Design, Expression, Aesthetics, Acceptance, Human-Centered Design

1 Introduction
Over recent years, Service Robotics has spread widely and its rising trend shows no signs of deceleration thanks, mostly, to the lowering of the costs and the improved performances of the components, both hardware and software [1]. In the perspective of a society in which humans and robots will have to coexist, it is necessary to investigate all the aspects that regulate their relationship, in order to ensure an ethical dimension and an effective benefit for people. It is necessary to shift from a technology based approach, that drove the development of most robotic project until today, to a human centred one, in which the focus of the design activity is the man, the contest with which he relates, his activities and needs.
In Robotics, as well as in any other project discipline, it is important to be aware that human existence is characterised by three fundamental dimensions: biological, social and ethic. To the primary needs for conservations, indeed, is added the need of interaction with other humans, which takes place in modality defined by the individual system of values. These three dimensions generate the cultural life [2]. For this reason, the research activities that investigate the conditions at the base of acceptance in HRI become crucial. The acceptance depends on many factors, first of all the perceived utility and usability [1], but, even before the user interacts with the robot for the purpose it is designed for, other influent factors are involved, especially expressive aspects of the machine.

1.1 Towards a new conception of robot

The conception of robot over time evolved as well as its capabilities and morphologies. If at the beginning a robot was conceived as a mechanical surrogate of humans [3] already in 1979 the Robot Institute of America raised a reflection on the modern evolution of Robotics and agrees in defining robot *"a reprogrammable multifunctional manipulator designed to move material, parts, tools or special devices through variable programmed motions for the performance of various tasks"* [3]. In 2007, the Italian agency for New Technologies, Energy and Sustainable Economical Development (ENEA) published a report curated by Attilio Sacripanti that is a sort of summary of the state of Robotics worldwide, in which describes the main aspects of this discipline: operating principles, application fields, geo-political aspects, human-robot interaction principles and ethics of relationships. In this document the robot is defined as *"any artificial agent, either mechanical or virtual, that is able to perform one or more (intelligent) operations autonomously"* [4].

Compared to the previous definition it is noticeable the concept of robot is, increasingly, moving away from the mechanical aspects on behalf of greater consideration for cognitive aspects. This evolution reflects what is happening in robotic world: from a preliminary diffusion limited mostly in industrial area, service robotics is now spreading in everyday life. In this regard, the Interaction Design team of Polytechnic of Turin extended the Sacripanti's vision, defining robot *"any artificial agent, either mechanical or virtual, that is able to perform one or more (intelligent) operations perceiving, analysing and acting in the space-context"* [5]. The purpose of this extension is to include the relationship with the context that influence and define, more and more, nowadays robots.

A last definition useful to interpret the contemporary world of Robotics is the one suggested by Nourbakhsh, in 2014, according to which *"robot represent a new form of glue between our physical world and the digital world that we have created"* [6], thanks to the fact that robots are connected to the environment they are placed in and provided of decision-making skills, that interpret circumstances and determine the appropriate actions. A robot, then, can be defined as an intelligent agent provided of perceptive system that receives input from the environment, an executive system that produces output, namely the actions and, finally, a cognitive system that processes the sensations to deliberate the actions that have to be carried out [6].

2 Perception and Acceptance

In the last decades, robotic solutions for industrial, military and medical fields have been, increasingly, consolidated. At the same time, as already mentioned, the Service Robotics diffusion becomes one of the hot topics in contemporary robotics research. In the future, most probably, service and personal robots will move and act in dynamic and unpredictable environments, and will be employed and driven by untrained users [7]. This diffusion of increasingly autonomous robots will drive to a shift from a condition of man possess and control of robots to a **coexistence** condition [7]. So, it is necessary, as already mentioned, to define the conditions that make robots acceptable for society, in order to avoid unsuccessful or competitive situations. The acceptance is defined as *"the willingness, demonstrable within a sample of users, to use information technologies for the task to which these were designed"* [8]. It depends on various factors of human-robot interaction such as the main five identified by Rogers: relative **advantage** in compared to other tools; **compatibility** with the existing social practises; the level of **complexity** in terms of usability; **trialability**, namely the possibility to try the tool before its "enforcement" and **observability**, i.e. the expressive clarity that makes the technology easily recognizable [9]. In addition to usability, functionality, safety and costs, the **physical appearance** assumes a central role [10] because it relates with the user both at the cognitive and emotional level [11]. The effects that it generates are strongly connected to the socio-cultural context, in which are crucial factors like the level of explosion to consumer products and rhythms of consumption [11]. In Robotics it is possible to identify two main morphological orientations: mechanical and anthropomorphic aesthetic. The first one concerns, mainly, industrial robots, in which the design in based on functionality and performances, whereas the anthropomorphism concerns, particularly, personal robots [10] in which all the human-robot interaction assume a key role. People, in fact, tend to act in a more natural and emphatic way when interact with humanized robots [12].

2.1 Morphology and acceptance in pop culture

The idea of robot, diffused in pop culture through comics, books, series and movies, matches, at least partially, to the scientific conceptions. In particular, from the morphological point of view, there is a sort of parallelism between real robots and those ones described by science fiction, indeed, an initial anthropomorphic trend is gradually abandoned on behalf of a more abstract aesthetic and a language diffused by digital products. Besides to the aesthetic appearance, the parallelisms concern conceptual themes, such as the already diffused and consolidated idea that robots could overtake human abilities, physically and cognitively, with the consequent risk that this widespread could drive to their taking of power at the expenses of human beings freedom. This scenario, although extreme, is widely investigated in scientific debate about ethical and legislative issues that should drive the contingent diffusion of robots in our society. The good-evil dualism assumes a key role, therefore, in the perception and acceptance of robots from people and, in pop culture, it is represented through different acting roles assigned to robots. In a first period, as shown in movies such as *Metropolis*, the robot is represented almost always as **evil helper**, anthropomorphic and extremely strong, that, in some cases, free itself from the human control and becomes a real **enemy** who threatens humanity. Afterwards, both in Asimov's novels and in many movies, robots acquire the ability to have feelings. Consequently the robot assumes, sometimes, the role of **antihero**, such as in Blade Runner and *RoboCop*, while in others become a good helper who collaborate with men for the salvation of humanity, as in *Io, Robot*. The figure of the robot as a good helper acquires greater strength, especially in *Star Wars,* in which it is introduced an additional shift: robots are not necessarily anthropomorphic anymore, but rather introduce a mechanical aesthetics, as in the case of R2-D2. However, the anthropomorphic aesthetics is completely abandoned in the movie Wall-E. In this movie, moreover, the robot is not longer conceived as a perfect and indestructible machine. In fact, in this case the spectator feels strong empathy towards this small robot, ordinary as much as heroic, thanks to the fact that it shows its limitations and brittleness instead of explosive power. The robot is represented as unquestioned **hero** of the story and it's completely accepted.

2.2 The limits of anthropomorphism

In scientific research, as well as in pop culture, the purely imitative approach has been abandoned and emerged the limits of anthropomorphism. In particular, the famous study by Masahiro Mori, highlights the fact that although people are more likely to interact with humanized robots, there is a limit within which these are preferable to an mechanized aesthetic [12]. Beyond that limit, there is the so-called *uncanny valley* by which a robot is perceived as disturbing and repulsive. Mori compares this type of effect to the feeling you get in shaking hand with a person and realize, just by touch, that the one that you are clutching is a prosthesis. Similarly, a person that interacts with a highly anthropomorphic service robots will have at first a sense of familiarity and will tend to interact naturally, but after the first impression, the limits in the fluidity of movement, speech, and other characteristics will show the mechanical nature of the artefact, arousing in the user a strong sense of repulsion. This mainly occurs because the appearance does not manifest the true nature of the robot, tricking the user who is not able to evaluate the proper type of interaction to be adopted. At the same time, he points out how a puppet (*bunraku*) when is observed at a proper distance during a show, despite its size and its synthetic form, can achieve a high level of affinity with the observer [12]. This shows that it is not necessary to perfectly replicate the biological beings to gain acceptance by the users. In recent years, these reflections about acceptance related to the aesthetic aspects, have led to a definition of three main categories: the androids, appearing, as technically possible, similar to humans; humanoids, which are not realistically anthropomorphic but rather manifest their nature of robots despite having human characteristics and finally the mechanoids, in which is clear the mechanical nature [13].

2.3 From anthropomorphic to humanized

Robotics is now far away from the romantic idea of biological reproduction and in the future that lies ahead, robots will be highly diversified and increasingly less anthropomorphic. These new robotic artefacts will be, for many aspects, inferior to humans but high-skilled and most sophisticated in specific abilities [6]. In addition to physical appearance, both movement and behaviour can be humanized in order to reach the sense of affinity useful to establish an effective human-robot interaction [14]. This affinity can be obtained, for example, through **facial expressions** and the related ability to communicate emotions, extremely useful because allows the user to understand both personality and the intentions of the robot, which results much more engaging [1]. In this sense it is an exemplary case study the robot developed by Cynthia Breazeal: *Kismet*. This can be defined as a social robotic creature, able to interact physically and emotionally with the people, in order to learn from their behavior [15]. Expressive and learning skills allow the robot to deal with a complex social environment and, above all, allow people to adjust their expectations and modes of interaction to be implemented with Kismet.

Another aspect that significantly increases the degree of familiarity between the robot and the user is **movement**. As pointed out by Masahiro Mori, when an industrial robot is off, is perceived simply as a machine, but in the moment it is turned on and moves the user establishes a substantial degree of affinity [12]. The fluid and articulated movements, visible especially in industrial robotic arms, evoke movements of typical in biological world and generate a sense of empathy, thanks to the phenomenon of motion interference, namely the tendency of individuals to imitate the movement of another encountered in their trajectory [16]. At the same time, however, it is necessary to bear in mind that a reduced variety of movements and high repetitiveness generate the opposite effect, emphasizing the mechanical aspect of the robot. Therefore, it is preferable to design the robot with the ability to move fluid and variable both in positions and speed.

Last but not the least important factor that influences the perception of a robot by the user, is the **formal synthesis**. Especially with regard to service robotics, products relate to humans in contexts highly characterized by the activities that take place there, from the objects that populate them to the social relationships that take place there. Then, in order to be accepted and become part of the everyday life, the robot needs a recognizable function [1] and has to refer to the environment in which is located. In the home environment, for example, robotics has become part of everyday life with great success through cleaning robots. In particular, the robotic vacuum cleaners have an aesthetic similar to electrical appliances, in which the function is declared and this generates an immediate sense of familiarity in people. Moreover, the fact that they are perceived more as appliances than robot creates lower expectations in the user [21]. The wide acceptance that this type of robot gets is witnessed by a number of common practices among the owners of robot vacuum cleaner, many, in fact, tend to give it a name and a personality, interact with the robot, spend time to observe it or do a demonstration of its capabilities to other people [22].

The aesthetic and discreet familiarity introduced by cleaning robots in the home environment is, increasingly, also adopted in robot companions, who gradually lose anthropomorphic and zoomorphic aspects on behalf of synthetic lines and more abstract aesthetics.

In the relationship between morphology and expressiveness it is possible to identify three main characters, namely: the expressiveness, the fluidity of the movements and the formal synthesis familiar to the context of reference.

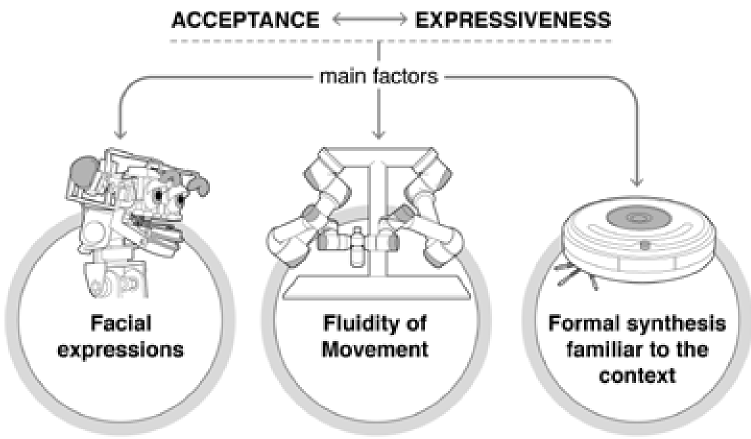

Fig. 1. Expressiveness and acceptance: main factors.

3 Digital world in robotic aesthetics

Nowadays, robotic aesthetics is experiencing a further evolution, as contaminated by the relationship with the digital world. The world of digital devices is becoming, in fact, more and more extensive and pervasive, besides smartphones and tablets, that almost all now have, begin to spread wearable devices and diffuse sensors, such as beacons. Each of these artefacts introduces new possibilities of interaction with humans and between humans and robots. A smartphone can then act in a case as a joystick while in another as face and distributed sensors can help robots to move into environments.

From these relationships emerge some main areas that characterize the contamination between the digital world and service robotics.

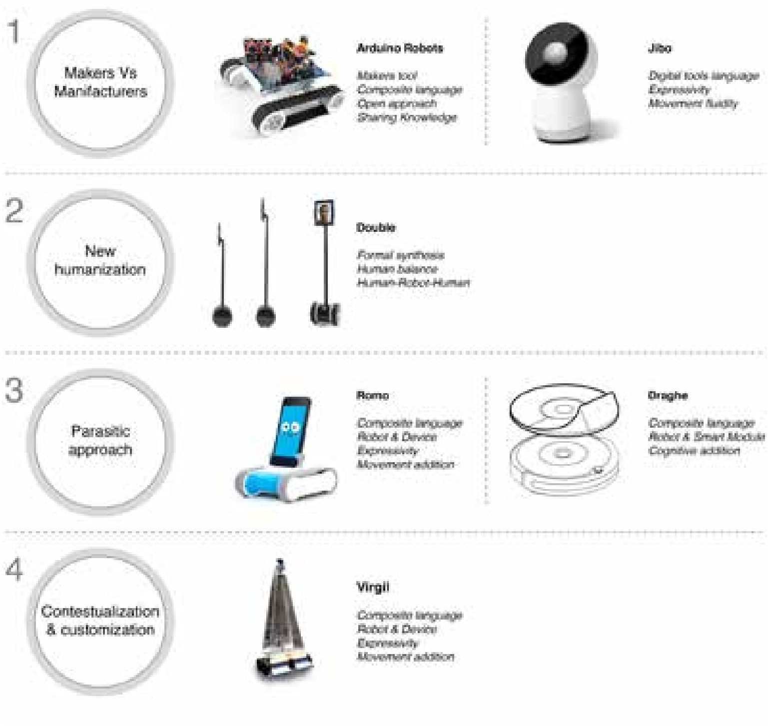

Fig. 2. Emerging trends and related factors, in contamination between Robotics and Digital world.

3.1 Makers e Manufacturers: from the Arduino robots to Jibo

The animation movie Wall-E shows two opposite versions of robots, on the one hand Wall-E, male figure of robot that can be ascribed to the category of cleaning robots, characterized by a mechanical and composite aspect, in fact to its original components were added or replaced components found in time. It does not have a particular strength, but is smart, clever and versatile. The other figure, Eva, is a female robot, of military matrix, that appears compact, streamlined lines and glossy surfaces. It speaks the language of digital devices and, not surprisingly, is reminiscent of products like iPod and MacBook. In fact, its design was developed in collaboration with Jonathan Ive, head of design at Apple [1]. Eva can be read, then, as an allegory of the deceptive allure of digital technologies [1]. These two figures, Wall-E and Eve, represent the dichotomy that characterizes today's world of service robotics: the maker and the manufacturer approach [6]. The world of makers includes all those composite robots, generated by the associations of printed circuit board, 3D printed components and other available materials, such as **Arduino robots**, characterized by a total open approach, both hardware and software [19]. This approach promotes the free dissemination of the design concept, each application, indeed, is shared on web platforms in a perspective of *sharing knowledge* [19].
An example of the manufacturer approach is, instead, **Jibo**, a robot companion designed by Cynthia Breazeal. Jibo is a small family robot, able to observe, recognize faces, take photos, interact via speech, learn from user behavior and communicate emotions. Its functions are not very different from those of a smartphone, in fact to it are entrusted mainly communication activities, but to these it adds the execution autonomy and the ability to orient itself according to user. This object is, therefore, inseparable from the digital world. Familiarity and engagement, even in this case, are obtained through the expressiveness, taking advantage of the results matured in the project Kismet. While this robot does not imitate in detail the face expressions, it is extremely effective in communication because it uses synthetic, and already familiar, expressive language [20]. Jibo is not able to move around the environment but is able to orientate itself due to the three axes of rotation placed in his body, appears in fact as a head with a neck able to move towards its interlocutor. Also from the aesthetic point of view it is extremely familiar. Jibo, in fact, seems perfectly in line with the objects of everyday life, it is reminiscent of the modern aesthetic typical in cult objects of design history, as the lamp Eclisse by Vico Magistretti, and it is, avowedly, inspired by robots of pop culture like R2-D2 and Wall-e. In particular it reminds the figure of Eve, also from the Wall-E movie, in its streamlined shapes and glossy surfaces.

3.2 Towards a new humanization: Double

In some cases a robot reaches a high level of acceptance in the moment in which manifests its function and is in line with the context in which it is located, but there are cases in which the high level of engagement can be reached through charm. This is the case of the telepresence robot **Double**, that consists of a base similar to a Segway on which is inserted a pole with support for iPad. Its function, in fact, is to allow a person to participate in an event of various kinds (business meetings, medical, school lessons) via streaming video and differs from a traditional video conferencing for the ability to move in the environment. The Double arises from the digital world, integrating the ability to move into an existing service. However, the charm of this robot is achieved through the expressivity. Its morphology reminds the human one, but dematerialized [21]: the slender structure supports a sort of head (tablet) and the wheels represent the feet, which give it an apparent fragility and generate a gentle oscillatory motion. It is precisely the sense of precarious balance, combined with the archetypal morphology of human skeleton, which makes this robot fascinating and highly accepted. In addition, this robot, thanks to its function, represents also the overcome of the human-robot interaction on behalf of the human-robot-human interaction. The head, represented by the tablet, allows a physical dematerialization on behalf of the virtual, in which the empathy is entrusted to the multimedia communication.

3.3 The parasitic approach: the Romo robot and the Draghe project

The ability to connect a digital device to a robotic artefact is a phenomenon in large rise and can be ascribed within the concept of parasite robot [22]. The phenomenon of parasitism, in fact, concerns solutions, robotic or not, that works by exploiting the capabilities of others, called guest. In this parasitic relationship, the two identities are distinguished primarily on the basis of cognitive and motor abilities. It is possible to identify, in fact, two main types of robot parasite: robotic devices with movement ability whose cognitive part is assigned to a device, such as the smartphone, and smart devices that are attached to mobile robots, to expand their cognitive abilities. The robot **Romo**, for example, consists of small crawler that only works if hooked to an iPhone, on which it is installed an app that manages the movement, allows to make video calls and acts as the face of the robot, which acquires, thus, expressive skills. In the project **Draghe** [22], instead, is proposed the idea of creating a robot companion by adding an intelligent module to a robotic vacuum cleaner, taking advantage of both the increasing spread of the robot vacuum cleaner and from their high level of acceptance. This second case generates, also, an unpredictable aesthetic, since the composite and open nature of the robot.

3.4 Virgil: between contextualization and customization

The concept of formal synthesis familiar to the reference context is at the basis of **Virgil** [23]: tele-presence robot designed as part of a project that aims to promote cultural heritage, in particular the network of Savoy's royal residences. Royal Residences are rich and, at the same time, delicate contexts, where take place two main activities: the preservation and fruition [24], which in some cases are incompatible. There are, in fact, areas excluded from the tour, mainly, because of the state of conservation. The service proposal consists of an extension of the tour through a real-time virtual tour, made possible by the robot placed in inaccessible areas. The remote control of the robot is entrusted, mainly, to the museum guide but also to the visitors to experience a cultural game. For this purpose, the team has designed a mobile robotic platform, equipped with a camera that sends a streaming video displayed to users on a special screen or on personal devices.
Similarly to Jibo, designed with the aim to be accepted into home environment, the robot Virgil has been designed taking into account the **artistic and cultural context** in which have to be inserted. The cover is made of PMMA (poly-methyl-methacrylate) and is composed in a shape of truncated pyramid, reminding to the similar shape largely diffused in Savoy tradition, used in obelisks, bollards and other architectural elements or furniture. The choice of a transparent material is determined by two requirements: from the technical side, it was necessary to ensure maximum lightness and from the acceptance point of view was essential that the robot does not catalyse the attention of visitors distracting them from the cultural goods. Therefore, this project tries to go beyond the formal synthesis by introducing the concept of **customization based on the context**, consisting in a decorative pattern applied on the robot coverage, that varies on the base of the location. In this case the decoration represent the Palagiana palm, an already existing decoration that can be found in the castle. In particular, when the service will be extended to other residences it will assume in every location a slightly different image.
In addition, the robot Virgil appears as an open platform, whose functions and components (such as camera, speaker, LED, photovoltaic panels ...) can be replaced or simply added, outlining a new world of multitasking robots.

Fig. 3. Robot Virgil with a particolar of Palagian palm, 2014.

4 Conclusions

In the near future there will be a strong spread of service robotics, which will affect, almost, every aspect of daily life and generate growing concerns [25]. For this reason it is necessary to put the community, its needs and social habits at the centre of the design process. Putting people at the centre of the project means, therefore, analyse and improve as much as possible the degree of acceptance of the robot, dealing with the three main requirements: **empathy**, through the expressiveness and similarity; **engagement**, through the use of simplified language and imitation of movements similar to those of the biological world and, finally, **collaboration**, based on the task performed by the robot and the consequent perceived usefulness.

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