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Feliform

Cats are the world’s most popular pet.¹ The high popularity of the cat is helped by the fact that cats are self-reliant, meaning they need basically no training; they groom themselves and they can be left alone without yearning for their caretakers. In other words, they are convenient. Still though, cats tend to remain aloof and enigmatic to us humans. Humans usually have no issues in understanding dogs because the latter are evolutionarily in tune with humans, making dogs’ faces and emotions easily readable to people, because dogs tend to be open, honest and compliant. Cats on the other hand demand that we accept them on their terms but never really reveal what those terms might be. This easily leads to cats being overlooked, underappreciated and misunderstood. In fact, cats are one of the most neglected, vilified and abused domestic non-humans throughout time and are so in modern times as well.² With Feliform, the aim is to combat this phenomenon, by encouraging more intimate and more frequent interactions between the human and the cat by means of bringing both species physically closer to one another, and the hope is that the cat will therefore be more understood and come to be seen in a new light. This is done through a catalyst, in this case, a piece of furniture. In the human home, that which completes it, and what defines the space within, and is the backdrop of our lives, is furniture. Furniture plays a paramount role in our lives, and that is why I have chosen a piece of furniture to serve as the catalyst to combat the above-mentioned phenomenon. In order to inform my investigation in this query I have been observing my own two cats and been including them in my studies. My two cats are domestic house cats and this species averages approximately 45 cm in body length, and roughly 25 cm in height, and typically weighs 4-5 kg. The outcome of this project is tailored according to the domestic house cat.

¹ Bradshaw, John. Dogs we understand; cats are mysterious, even though they are the most popular pet. The Washington Post. 2013-10-14. https://www.washingtonpost.com/national/health-science/dogs-we-understand-cats-are-mysterious-even-though-they-are-the-most-popular-pet/2013/10/14/2c59c6b0-26ca-11e3-ad0d-b7c8d2a594b9_story.html
Ideation process

In order to inform my work, I have been working with my two cats (see Figure 1), Panter (the black one) and Tiger (the tabby one). Both are neutered female rescue cats that were adopted in 2006 from a cat shelter in Stockholm, and both were approximately one year of age at the time of adoption. Panter is the more outgoing of the two, while Tiger is the more reserved and cautious one. Tiger, on the other hand, shows signs of higher analytic behavior because you can see how she observes for longer period of times and analyses your behavior, and makes strategic decisions on how and when to interact with you based on your own mood. Tiger is more sensitive to human behavior than Panter is.

Figure 1

The ideation process of this project started out first by analyzing my current living situation with Panter and Tiger. I spend most of my time in my living room because that is where the sofa is, the big and comfortable armchairs, and the home entertainment system. My cats interact with me a lot whenever I am in the armchairs or the sofa. Hence, I thought to myself that some sort of a seating for a human
coupled with a cat gym would enable both species to utilize the same piece of furniture all the while being close to one another and interact.

**Mock-up**

With this idea in mind, I did a mock-up (see Figure 2) by placing banana boxes in an arrangement around a chair. In this instance, the chair is for the human, and the boxes mimic a cat gym. A cat gym should be variable and labyrinthine which is why I placed the boxes a little randomly and cut out sides from some of them in order to create pathways. This mock-up stood there for three days and during that time both Panter and Tiger played and slept in the boxes. Observing my cats interact with this mock-up it was safe to assume that my idea was pursuable. For more insight into my interaction with my cats in this mock-up see Figure 3.
The next step of the ideation process was to refine the idea based on the mock-up. I wanted to retain modularity as a key aspect in this project, in the sense that the cat gym was supposed to be made of modular boxes that can be attached, detached, rearranged and configured according to however the user wants it. Having this in mind I started sketching on the idea of having a metal frame that is the seating itself, and onto this metal frame the modular cat gym would be attached (see Figure 4 and Figure 5).
The metal frame has a base onto which you place a cushion and a backrest in order to create a seating for a human, and onto this metal frame one can attach the modular boxes in order to create the cat gym.
However, upon further analysis of this iteration I realized that having a dedicated seating place for a human somehow still combated my idea of trying to design a piece of furniture that is both for the human and the cat interchangeably. In the ideation above, albeit it being one piece of furniture, it is still divided into two different areas for different users: the seating for the human, and the cat gym for the cats.

**Second iteration**

In order to create one interactive piece of furniture for both humans and cats I decided to discard the metal frame and the seating for the human and only retain the modular boxes to work with. Previously, the modular boxes measured roughly 300 mm by 300 mm by 300 mm. However, having excluded the dedicated human seating and now only having the modular boxes to work with, I had to resize the boxes so that, say, one box could function as a seating for a human. I decided to do quick physical mock-ups (see *Figure 6*) of two different sizes of modular cat gym boxes. Standard seating for a human is approximately 450 mm. Having this guide in mind I resized the modular boxes to measure one set of 450 mm by 450 mm by 450 mm and another set of 400 mm by 400 mm by 400 mm. Furthermore, now being left with only the modular cat boxes to work with in this iteration, I decided I had to add some more variability to the project, and I did this by dividing the square box diagonally, and in doing so I was now left with a second triangular module, leaving me with two modules to work with. The whole idea about these two modules is that they can be combined and configured in order to create all forms of configurations (see *Figure 7*). This allows the user to combine the modules however the user wishes and create their own configuration of seating and that of a cat gym.
Marius Afram

Figure 6
Modularity is a paramount aspect in this project in order to allow for user-friendliness and flexibility. With modularity, though, comes technical aspects that one must solve, and earlier I mentioned that the “modular boxes … can be attached, detached, rearranged”. I started thinking about the how the modules can be attached and detached, preferably with ease and straightforwardness. Firstly, let’s identify the nature of the stakeholders for which this project is dedicated. The resulting piece of furniture from this project will be used by cats, and cats are very much playful and curious beings and have very sharp claws with which they climb and scratch. They are also furry and shed hair, and furthermore they tend to regurgitate hairballs, and occasionally food. Accidents might happen where cats might unintentionally urinate and/or defecate outside of their designated toilet area. As for humans, Feliform serves to function as seating for us where our interaction with this piece of furniture will include sitting on it, lying on it and/or leaning on it. Concludingly, Feliform ought
to incorporate aspects of being sturdy and shear-resistant (because cats will run and jump on and in it, and humans will sit, lie and lean on it), and scratch-resistant (because cats scratch), and any component and/or appurtenance that of Feliform ought to be removable (for cleaning and washing since cats will inevitably eliminate bodily matter, be it hairballs, food, urine and/or feces). Having these parameters in mind, I started thinking about different ways of how the modules and their appurtenances can be attached and detached. An initial idea was to use industrial grade hook-and-loop fasteners. However, the average human male in Sweden measures approximately 181 cm in height and may weigh somewhere between 70 and 80 kilograms. Such a human specimen will undoubtedly subject Feliform to heavy loads and shearing forces, not to mention wear and tear. Hence, I concluded that hook-and-loop fasteners are not reliable and binding enough in the long run to withstand the compressive and tensive forces that will be exerted by human users. That took me to the next possible solution of an attachment solution, namely magnets. There are very strong permanent magnets on the market today called neodymium magnets which offer the strongest magnetism of all available magnets. At first impression, magnetic attachment seemed like a very practical and straightforward means of attaching the modules to one another but when reading further about neodymium magnets it became apparent that perhaps this type of attachment would not be suitable for this project after all. It so turns out that these magnets rust very easily, are very brittle and will crack under stress. Considering the structural stress Feliform would be subjected to, there is too much of a risk to opt for neodymium magnets because of their fragility, and when the integrity of neodymium magnets is weakened or damaged, they lose their magnetism. The upside with the above-mentioned attachment solutions is that they are user-friendly, straightforward and it is only a matter of putting two modules together and the two will join. The downside, aside from the above-mentioned reasons, is that the modules are not

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really secured to one another, because they can simply be pulled apart (with a little force). This is what lead me to the third alternative that I opted for, namely *hinged metal fasteners* that one screws onto two adjoining modules. This method of attachment is straight-forward but involves more tinkering compared to the previous two alternatives. Having said that, this alternative is far more superior in terms of durability and in securing the modules, which feels *safer*. The way this works is that the metal fasteners (see *Figure 8*) are hinged in the middle and slot into recess where the edges of two modules meet (see *Figure 9*). When a fastener has been slotted into its recess one secures the fastener in place by screwing two screws into the countersunk screw holes in order to give the screws a “flush” finish. Each screw hole is fitted with a so called *rampa muff* (see red markings in *Figure 9*) which allows one to use the same hole repeatedly without damaging the integrity of the screw hole.
Figure 9

Opting for the metal fasteners had, naturally, an aesthetical implication on the expression of the modules. The recesses, which are there to begin with so that the fasteners remain flush with the surface of the modules, are situated by four along every edge of the modules (see blue markings in Figure 10). Being recesses in the surface, this has changed the silhouette of the modules. The modules are no longer smooth-edged with a crisp profile, instead there are now regular breaks in the edges that give the modules a more rustic expression.
The fasteners are necessary accessories that are part of Feliform, but they are not the only accessories that come with this project. Other (important) accessories are the so-called caps and pads that are an integral part of Feliform, and they too are attachable and detachable. Note that the modules (see Figure 10) are hollow and their walls have openings - this is an adaptation to allow cats move through all the connected modules and to reside inside them. The caps are appurtenances that serve to close up any opening in a module if one so wishes. This allows the human user to close up certain openings, and leave others open, and hence create certain pathways inside the connected modules for their cats. A labyrinthine layout if you will. As per Figure 11, the way the accessories attach to the modules is by means of magnetism. In the surface of the modules, there are recesses where magnets have been fitted, and these recesses correspond to their counterpart magnets that are attached to the pads and the caps. The pads, which serve as seating for the humans and are also scratchable for the cats, are fitted with washable magnets which are sown into the fabric. The caps are also fitted with magnets.
**PAD MAGNETS**
Washable magnets attached to the pads that slot into the corresponding magnetic recesses in the module.

**MODULE MAGNETS**
Neodymium magnets fitted into recesses.
Thanks to the flexible nature of the modules and their accessories one can create all sizes and configurations of Feliform. See Figure 12 for an example of one such configuration. The caps and pads have been highlighted to give a better understanding of how these accessories can be attached to the modules. See Figure 13 for some renders to give an idea of what a finished Feliform might take the expression of where, in this case, the modules are made of solid wood.
Figure 12
Marius Afram

**Third iteration**

In the third iteration of Feliform, practical aspects had to be addressed such as:

- How it is purchased by consumers.
- How the modules are delivered and whether they are delivered intact or delivered in pieces to be assembled by the consumer (very much like an IKEA furniture).
- What materials it should be made of.
- How it is produced and manufactured.

**How is it purchased?**

As to how to order Feliform as a whole product with its appurtenances is done the easiest through the means of a website dedicated to the product. In this website, there is an easy-to-use interactive planning tool that allows you to virtually combine modules, attach caps and pads, and play with colors and materials, until you find a configuration that fulfills your needs. Once you are happy, you order the whole configuration which is then delivered to your address.

**How is it delivered?**

The modules are available in three standard sizes, which are 400 mm by 400 mm by 400, this size is called Small; and 450 mm by 450 mm by 450 mm, this size is called Medium; and lastly 500 mm by 500 mm by 500 mm, this size is called Large. If one were to configure a Feliform of, say, 11 Small intact modules, they would measure 800 mm by 800 mm by 1 200 mm when stacked together (see Figure 14).
Such a package to be delivered to your doorstep is undoubtedly impractical and takes a lot of unnecessary space. Therefore, the modules are instead delivered in pieces that are to be assembled on site by the consumer. The triangular module consists of five (5) pieces and is delivered in a flat package which comes by default with its own appurtenances – a set of caps, hinges, and screws (see Figure 15). Each piece is like a puzzle and slots into its corresponding piece. Once all the pieces have been joined, it is only a matter of securing all pieces together by means of screws (see Figure 16 and Figure 17).
Figure 16

Figure 17 (note that the magnetic recesses have been replaced with magnets that are set flush with the material surface so as to give the modules an aesthetically “cleaner” expression)
The square module consists of six (6) pieces and is also delivered in a flat package which comes by default with its own appurtenances – a set of caps, hinges, and screws (see Figure 18). See Figure 19 for the square module in an exploded view, and Figure 20 for an assembled view.
Materiality and production

Textile materials for the pads (taken from the home environment of Panter and Tiger)

Based on my observation of Panter and Tiger I have come to identify a set of textile materials that cats seem to respond well to when it comes to their scratching behavior. The textiles featured here are directly taken from my household.

**Velvet**

The velvet that you see above is the seating pad that belongs to my big IKEA armchair that I have in my living room. This textile material is surprisingly resistant to cat scratches. When choosing cat-friendly furniture textile, velvet is a gorgeous and luscious fabric that is, sadly, often overlooked because it seems more delicate than it is. A timeless and classic material, it is a woven fabric where the threads are cut to give the fabric a short pile, kind of like a rug, if you will. This is why the fabric will not scratch too easily, and this is also why velvet releases pet hair so easily, rather than trapping the hair in, like traditional woven fabrics.
This is my IKEA carpet (100% cotton) that is situated in my living room. The fabric that it is made of is surprisingly thin and yet hardy, resistant and flush. My cats dig their claws into and scratch this carpet all the time and it has stood against these stresses surprisingly well. There are no damages and no loose threads - it is still very much intact. Furthermore, the material comes in an array of colors, such as beige, brown, black, blue and grey.
This is the sofa that is situated in my living room. The upholstery is of a grey thin, soft fabric that my cats love to scratch. I would deem this material not as suitable as the previous two examples, because this fabric attracts stain, pills easily and it is weaved in the traditional *basketweave* pattern where the threads in the fabric are interlaced so that they form a simple criss-cross pattern. This weave seems to grant cats satisfactory traction, because my cats love to dig their claws into my sofa upholstery and scratch it, which you can tell by the image above. This fabric is perfect if you want to attach a pad solely for the purpose of scratching, but then you will have to expect that this particular pad will have a shorter lifespan compared to a pad that is made of velvet or the carpet fabric that is featured above.
Wood materials for the modules

*Laminated particleboard*

Particleboard is nowadays the most used wood product in furniture. It is much easier and cheaper to make than, say, solid wood. Laminated particleboard is an *engineered* material where one prints a layer of wood-colored plastic which is then adhered to a composite wood substrate. The substrate is made of wood fibers that are bound together with an adhesive (formaldehyde) resin – used for its high tensile strength – into panels at high temperature and pressure. Laminated particleboard usually has a shiny finish which is durable and is hard to scratch and is known for being used in low-end furniture that need durable surfaces. However, this product is known for problematic off-gassing of formaldehyde gas.4

**Pros:**

- *Low footprint*
  
  Particleboard is made of sawmill waste from the production of cut wood.

- *Low cost*
  
  It is popular because it is the cheapest wood board material.

**Cons:**

- *Large carbon footprint*

  Manufacturing of the adhesive resins and the panels themselves require a lot of energy. Furthermore, the plastic laminate is more often than not produced in China before it is shipped to its destination.

- *Toxicity*

  Dust from the working with particleboard can be carcinogenic or create respiratory issues, because of the adhesives contained in the material.

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Furthermore, particleboard off-gasses hazardous formaldehyde emissions for the first 1-3 years after production.

- **Short lifespan**
  It lasts shorter than massive wood or plywood. It damages quickly with moisture, and it is less resistant to weight, wear and tear.

- **Difficult recycling and reuse**
  The only treatment possible for waste particleboard is incineration. Furthermore, it is very difficult to reuse because it damages easily, and it cannot be planed nor cut without exposing the chips in the composite wood substrate.

### Plywood

Plywood is an engineered wood product made of thin layers of wood (veneer) that are glued together having their wood grain rotated up to 90 degrees (cross-graining) to one another. Cross-graining not only gives plywood good consistent strength across all directions, but it also reduces the tendency of the wood to split when nailed at the edges, and it reduces expansion and shrinkage in the material itself. Plywood can do that solid wood cannot - it can be bent, shaped, curved and formed. The environmental profile of this product depends on that of its ingredients - the wood itself, and the adhesive resin that is used to bind the layers of wood. It is always preferred to choose FSC-certified (Forest Stewardship Council) and local wood types. As for the adhesive, the major dilemma with the use of the formaldehyde resin is the slow release of formaldehyde as the bonds between the wood layers microscopically break apart over time due to heat, moisture, wear and tear. Having said that, there is an alternative adhesive for the formaldehyde weary, and that is of soy-based, non-toxic adhesive that is completely formaldehyde free.\(^5\) However, this type of “eco”

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plywood is unfortunately not nearly as readily available as the much more established regular plywood. Eco plywood has simply not made a break-through yet.

**Pros:**

- **Quick**
  Plywood is easy to work with because it is uniform and strong.
- **Long lifespan**
  It is durable and resistant that can make long lasting products.
- **Easy reuse**
  Because of its durability, plywood can be easily reused and have several life cycles.

**Cons:**

- **Energy intensive**
  The manufacturing of plywood uses much more energy than solid wood.
- **Toxicity**
  The adhesive resin used in plywood contains formaldehyde which off-gasses from the product and can cause multiple health issues.

**Solid wood**

Solid wood is a term most commonly used to distinguish between ordinary lumber and engineered wood, and as described previously, engineered wood products are manufactured by binding together wood fibers (in the case of particleboard) or veneers (in the case of plywood) with adhesive resins to form composite material. Solid wood is the same all the way through, making repairs relatively easy, whereas repairs to engineered wood are much more difficult and sometimes impossible to make. The sustainability profile of solid wood is good durability and low material footprint when the wood is sourced from sustainably managed FSC-certified forests, and especially so if the wood is sourced locally, ensuring that the lumber has undergone minimal transportation, thus minimizing its carbon footprint. The
production process of solid wood from lumber creates less waste compared with the afore-mentioned wood products. Furniture that is made of solid wood is very resistant and will last for centuries if maintained well. A regular wipe-down with some wood cleaner is really all it takes to keep your solid wood products looking nice and last long (moisture and dust are the biggest threats to your solid wood). Solid wood products age gracefully - even when they do develop wear and bumps, it often just adds to the character of the piece. These imperfections do not become an eyesore and they do not end up something you want to conceal. By comparison, lighter, laminated particleboard can chip, dent, crack and peel back with time, and this does indeed become an eyesore. All of the benefits of solid wood lead to a higher initial price point. You pay for a superior material compared to its other wood competitors on the market, and you pay for durability. However, it is those same things that make solid wood a much better value. The solid wood will last, the veneer piece will not. You can pay for a single, high-quality piece, or you can pay several times over for something less.

Pros:

- **Local**  
  If you are in the Northern Hemisphere, you can find solid hardwood not far from where you are, especially most commonly used species such as birch, spruce and oak, just to name a few.

- **Non-toxic**  
  Although all wood products emit some formaldehyde in the first months of use, solid wood has considerably lower emissions than engineered wood.

- **Long lifespan**  
  Solid wood from hardwood species are the most durable types of wood, resisting to tension, load, scratches and rotting.

- **Easy reuse**
Good durability and the possibility to easily refashion and/or repair the material by sanding makes solid wood a material that can go through several life cycles.

- Easy recycling
  If it is not too much treated with adhesives, finishes and paints, solid wood can be recycled into other wood products or fuel.

Cons:

- Costly
  Solid wood is more expensive than its other wood competitors, although it lasts longer.

- Time consuming
  Sawing, sanding and milling can be a time-consuming process.

Conclusion

- Laminated particleboard
  This wood type features too large of a carbon footprint; it is toxic; it does not last very long; and it is near to impossible to reuse or recycle. Because of these reasons, this is not a suitable choice of material for this project. The only good qualities particleboard has is that it is light-weight and boasts a sturdy and scratch-proof resistance. But so do its competitors. Furthermore, the laminate that is glued onto particleboard tends to chip, crack and peel back as it ages.

- Plywood
  This wood type has many great qualities such as that of being structurally sound and sturdy and can make for long-lasting products. The downside is that this product is also toxic and energy intensive in its manufacturing process. Moreover, because plywood is made from a series of laminated veneers with the wood grain on subsequent layers oriented in a perpendicular manner to each previous layer, this gives the plywood boards exposed striped edges.
These conspicuously striped edges can, aesthetically, detract from the overall look of a project.

- **Solid wood**
  Solid wood seems to be the superior choice of all three types. It is not nearly as lightweight as particleboard, but more importantly it is non-toxic, has a long lifespan and is very durable. Solid wood has a good deal many pros that make it a valuable choice of material for this project – far too important to be overlooked. Furthermore, being of durable nature makes it suitable for cat use because it will stand well against claw scratches (especially solid wood made of hardwood). Even more so if the surface of the wood is treated to make it more resistant. This material will also stand well against the trials of human use over time, and especially so seeing that Feliform is not only envisioned for the private home, but also for cat cafes.

**Production**

Solid hardwood would most likely be the suitable choice of material for Feliform, because it is denser and sturdier than softwood. Hardwood can be locally sourced in Sweden, and common hardwood tree species that grow here are birch, oak, beech, ash, and maple, just to name a few. The raw wood material for Feliform is processed in a production unit in Sweden where all the modular components are milled. Being of solid wood, the Feliform components need no gluing and no other manufacturing of any sort that are otherwise necessary in the manufacturing of particleboard and plywood. When the components have been cut to size and then milled, the final step of the manufacturing process is the *surface finishing* where the surface of the pieces is sanded down and treated to enhance the appearance of the wood and increase its resistance to moisture and other environmental factors.
Concept images

This is one of many possible configurations that Feliform can be assembled into. Here, the modules are made of birch matte solid wood, and the pads are made of a yellow fabric that is hardy and stainresistant.
Design references

LURVIG by IKEA

This product is a cat den that can be attached to four legs or be attached to the wall. When attached to its four legs, it can function as a practical bedside table which your cat can sleep in (close to you) whilst you can keep your belongings on it. It is easy to maintain and keep clean because the fabric is removable. On the front side there is a scratch panel where your cat can sharpen their claws.

NEKO Cat Tree by Yah Komiyama

The people behind NEKO asked themselves if it is possible to design recreational cat furniture that can fit harmoniously in “architectural modernism or art museum.” The product is made of high-quality, natural materials and has been approached practically and yet artistically. The vertically oriented NEKO offers a private space for cats while still serving as a decorative interior artefact that fits seamlessly with its surrounding. Not only does the marble used for the base function as a low center of gravity to stabilize the tree, but it also serves to regulate the cat’s body temperature when the cat lies on it. The wood that is used for this product is sourced from Japanese species of broad-leaved trees, which are also known as hardwoods. This wood is often used for furniture due to its attractive texture and high scratch-resistance (thanks to its higher density and hardness).
This is a project that resonates very much with me because the people behind it have the same reasons that I do as to why they decided to undertake this project. Read about this project in their own words (corrections and modifications have been made to the quote where necessary):

“In our lives many kinds of pet[s] are already recognized as … family member[s] and are loved by many people. As time passes, [the] number … of households raising pets are increasing and now [a] new industry related to pets [has become a big market]. After all, pets coexisting with people are establishing themselves as … companion[s]. Companion animals are no longer [mere] pets but [are] positioned as companions of people. … in Korea, more than 10 million people are living with pets. For this reason, the living space of humans is shared with … companion animal[s]. Between humans’ and pets’ living space, ‘the furniture’ [has taken] the largest and most important position. We would like to
use ‘the furniture’ as a tool to share emotions and feelings with pets. This Cat Tunnel Sofa is to communicate and share feelings with … cat[s]. The [Cat Tunnel Sofa] is at [this] level [still a] concept [for] now and it was a collaborative project with Korean designer[s] Yongjeh Park and Kangkyoung Lee. Cat Tunnel Sofa is designed for a cat and the owner of the cat. After analyzing and observing cats’ habits and behavior [from] experts’ opinion and [from] sufficient research, we designed the structure and shape of the sofa to be fully in harmony with [?].”

**CATable by LYCS Architecture**

This is another project which I regard as very much related to mine. Please read about it in the designers’ own words (corrections and modifications have been made to the quote where necessary):

[People] who live[ ] with cat[s] always [have these] kind of experiences:

1. Putting away the cat from your lap … [is] like a sentimental ritual of temporary farewell.
A [properly] sized hole [is] … so irresistible to cats. Their curiosity would be greatly satisfied through … exploring the unknown … [beyond] the hole. The Design of CATable [is] a fusion of [these] experiences, as well [as] a locus [a center of activity, attention, or concentration] where the interaction occurs. It is a table for us, and a paradise for cats.”
The cat

The domestic cat (*Felis catus*) has more or less conquered the world within a few thousand years - partly with the help of humans, but mostly thanks to its amazing plasticity, which is as remarkable as its robustness. With so many people keeping cats, understanding cat behavior in the human setting is important. It is today the most commonly kept non-human in the developed world, where cats form the largest pet population in the USA, numbering up to 86.4 million in 2011 (of a total of 374 million pets), and in Austria, for example, a human population of 8 million keeps more than 2 million cats, in contrast to just about 700 000 dogs. From the earliest stages of their domestication, cats have certainly, more than any other domestic animal, been as much terribly persecuted as they have been treated with great affection, bordering on reverence - either loved or hated for their enigmatic self-reliance. However, the success story of the cat is not without its ecological consequences which continue to fuel the debate between cat lovers and conservationists.

Cat biology

The domestic cat is the product of two different phases of evolution, the first as a wild obligate predatorial carnivore, and the second as a commensal and then semi-domesticated facultative social species, living in an increasingly dependent relationship with humans. When otherwise solitary animals such as the cat live close together with their conspecifics (and other species) and seemingly benefit by cooperation, they need the ability to resolve conflict without resorting to physical violence when one is as well-armed as a cat. This has necessitated the need for the development of new signaling and communicative strategies among cats both intraspecifically and extras specifically - domestication favors those individuals capable

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8 Turner & Bateson 2014, p. 38.
of communicating effectively with their human caretakers. As with any species, communication and perception intraspecifically and extraspecifically can only take place within the constraints of their sensory repertoire.

Ocular perception

With almost three times the number of rods, which are the most sensitive visual receptors, the cat eye is much better adapted to see in low light conditions compared to the human eye (this is an adaptation to crepuscular hunting in the cat). This adaptation, however, has its costs in allowing less space on the retina for the color-detecting cones. Knowing this, scientists are now fairly certain that cats only see blue and green colors and their combinations, lacking the cones required to see the color red. Presumably, color seems to play of little importance in cats’ visual perception of their environment and/or in their signaling repertoire. The cats’ reduced ability to see various colors means that in communicative and perceptive terms visual displays based on color contrast are likely to be ineffective for cats. Despite their reduced color perception, research has shown that cats are adept at distinguishing differences in size, shape and texture of objects and are also able to visualize partially hidden outlines.

Auditory communication

The range of sounds that cats can hear is one of the largest recorded in the mammalian kingdom and they are very adept at hearing sounds at both the high- and the low-frequency ends. Humans, however, are better than cats at distinguishing sounds of the same frequency but of different intensities and sounds of the same intensity but of different frequency.

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Miaowing

Apart from purring sounds, the vocalization that is most common in cat-human communication is the very familiar ‘miaow’, which comes in a large array of subtle variations. However, the amount of vocalization occurring, compared to cat-human communication, between cats is surprisingly low, and miaow sounds do not seem to play any obvious role in this auditory spectrum. Considering humans’ advanced ability in distinguishing sounds of subtle variations coupled with the fact that cats do not use ‘miaow’ intraspecifically, this has lead specialists to conclude that ‘miaow’ is a vocalization that cats have learned to use as an effective means of gaining the attention of their human caretakers and therefore this particular vocalization is considered to be a product of domestication.\(^\text{10}\)

Scratching behavior

Scratching, which is an essential biological behavior performed by cats and other felines, is done for various reasons. Cats have so called interdigital glands in their paws, and when cats scratch a site (most commonly a tree) they deposit their own personal scent on the scratch site. The resulting scratch marks serve as a clear territorial marker which presumably draws the attention of other cats to the scratch site, and the scent from the scratcher bears information to other cats. Once a scratch site is chosen, cats tend to stay with it – territorial markers need to be renewed on a regular basis. The texture of scratch sites is also of a crucial factor to cats because they must be able to sink their claws into the material and drag their claws downwards. The resulting traction not only serves to remove an old outer claw when the replacement new claw underneath is ready (claw conditioning),\(^\text{11}\) but it also has a bearing on how effective of a territorial mark a cat can produce when scratching. Therefore, soft-barked trees are scratched more often than hard-barked trees. Softer bark presumably produces a more effective visual mark, but also allows for better

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\(^\text{10}\) Turner & Bateson 2014, p. 50.
\(^\text{11}\) Turner & Bateson 2014, p. 43.
traction and therefore more effective claw conditioning. Because territorial marking is such a powerful predisposition in cats, they often choose a tree-like site to scratch in the setting of a home, such as the corner of a couch.

**The human and non-humans**

The urge to engage in relationships with other species seems to be part of typical human ‘biophilia’.¹² Humans are 1) mammals and 2) social, and the mammalian brain seems to be fundamentally ‘social’, and humans share a need to properly socialize during early development in order to develop empathic understanding.¹³ This urge does not only manifest intraspecifically but tends to manifest extraspecifically as well. This is evident in the number of different animals that we keep as pets in human households. Among Nordic ethnologists and folklorists there is an increased interest in questions that explore in a more elaborate way the human’s complex relationship to and the dependence on non-humans.¹⁴ Humans have, throughout time, always found themselves to be dependent on and emotionally attached to other species.¹⁵ The exploration and the analysis of our relationship with other species is anthropocentric and, ultimately, serves to increase our understanding of what it actually means to be human.¹⁶ Cats are today among the most common companion animals. How is it possible that a species such as a cat, which is fundamentally not very social, can become human’s most common and popular companion animal? Cats are mammals too, and even if cats are relatively solitary evolutionarily when compared to wolves and dogs, they are anything but asocial.

**How the cat came to be domesticated**

Recent genetic studies have shown that all domestic cats are descended from the African wildcat (*Felis silvestris lybica*) and that domestication probably occurred

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¹² Turner & Bateson 2014, p. 117.
¹³ Turner & Bateson 2014, p. 117.
¹⁶ Ekström & Kaijser 2018, p. 12.
somewhere in the Fertile Crescent\textsuperscript{17} some 12 000 years ago.\textsuperscript{18} The most widely accepted notion of cat domestication and why they were domesticated to begin with posits that cats essentially domesticated themselves. According to archeological findings, the onset of agriculture in what is today’s Middle East around 11 000 – 12 000 years ago (the advent of the Neolithic period), and the subsequent cultivation and storage of grains, attracted the unwelcome attention of small rodents (which are the natural prey of wildcats). Drawn by this abundance of food, wildcats then invaded and colonized these agricultural towns and villages. The human inhabitants quickly saw the benefit of allowing these felines to remain there in their rodent-infested homes and granaries. On the other hand, this is not to say that humans never played an active part in the domestication process of the cat. Wildcats undoubtedly had initially only a utilitarian value to humans of the then farming communities, but based on observations of modern-day small communities of hunter-gatherers in the Amazon forest, it could be argued that the then Neolithic agriculturists also developed social bonds with these cats and their value was now based on emotional considerations more so than on utilitarian considerations. These cats no longer needed to serve any functional or commensal purpose in order to be valued by their caretakers. Rather, they were now an integral part of village life and people actively adopted, hand-reared and socialized young wildcats to keep as family members. The wildcats’ rodent-hunting expertise did without a doubt enhance their instrumental value as feline pets, as well as providing them with a more permanent ecological niche in which to flourish. Nevertheless, it is highly unlikely that domestication of the cat would have proceeded at all in the absence of social bonds between humans and cats.\textsuperscript{19}

\textsuperscript{17} Turner & Bateson 2014, p. 85.
\textsuperscript{19} Turner & Bateson 2014, p. 88.
The reverence of the cat (along with other non-humans)

On the basis of an old pictorial representation dating back 1950 BCE found in the tomb of Baket III at Beni Hasan, it is likely that the cat we know today attained fully domesticated status in ancient Egypt. This pictorial representation depicts a cat in a domestic or household context confronting a rat. From about 1450 BCE onwards, images of cats in domestic settings become more common, which suggest that the domestication of the cat proceeded in ancient Egypt much further than anywhere else in the ancient world, despite the fact that the ecological opportunities for cats in ancient Egypt were similar to those found in other large agricultural civilizations of the same era and region.\textsuperscript{20} One plausible explanation for the advanced domestication of cats in ancient Egypt might lie in the Egyptians’ unusual affinity for animals in general – from the earliest Egyptian dynasties onwards, animals appear to have played a particularly prominent role in Egyptian social and religious life. These various (wild) animals came to be viewed as the earthly representatives of gods and goddesses, and many of these animals were subsequently the objects of organized religious cults. The Egyptians used various non-humans as powerful tools to name, organize and demystify the world around them. This usage of animals appears abundantly during the course of the human history and is much prevalent up until today. Our modern language teems with references to an “animalistic existence”. We find ourselves constantly referring to the animal kingdom when we want to describe other humans’ qualities and characteristics. We say for example that someone is strong as an ox, or busy as a bee, or wise as an owl.\textsuperscript{21} In this process, and because the animals played such a central role in the Egyptian anthropocentrism, The Egyptians often kept and cared for large captive populations of these animals in and around temples dedicated to the worship of the appropriate deities.\textsuperscript{22} Cats were presumably bred in captivity and so gave rise, over many generations of captive breeding, to a domestic

\textsuperscript{20} Turner & Bateson 2014, p. 89.
\textsuperscript{21} Ekström & Kaijser 2018, p. 16.
\textsuperscript{22} Turner & Bateson 2014, p. 89.
strain more docile, sociable, and tolerant than its African wildcat ancestor. The subsequent domestic cat was commonly kept in Egyptian households as cult objects and status symbols. From approximately 2,000 to 1,500 BCE, the male cat began to be represented as one of the forms of the sun god Ra, and it was in this manifestation that Ra was believed to battle each night with the powerful serpent of darkness, Apophis.  

The status of cats during this period of Egyptian history seems to have been comparable to that of cows in present-day India. Many Egyptians of the time kept cats as pets, and the death of one sent the entire family into mourning. Those who could afford it had their deceased cats embalmed and buried in special cat cemeteries. Cats were a protected species in Egypt, and causing the death of one, even by accident, was a capital offence.  

The vilification of the cat

With the gradual extinction of the old ancient deities and consequently with the rise and spread of Christianity came a dramatic change of attitude toward cats throughout Europe. From being essentially venerated and admired, they came to be associated with malevolent demons, agents of Satan (and later depicted as having a strong preference for appearing to his disciples in the form of a monstrous cat), and the traitorous companions of witches and diabolists. Between the 12th and 14th centuries, Christianity was responsible for accusing nearly all major heretical sects of worshipping Satan in the form of a large black cat, and how their rituals involved sacrificing innocent children, cannibalism, grotesque sexual orgies, and obscene acts of ceremonial allegiance towards huge cats which were supposedly kissed on the anus. By associating cats with Satan and misfortune, the medieval Church seems to have provided the superstitious people of the time with a sort of universal scapegoat; something to blame and punish for all of life’s many perils and hardships. With such a

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23 Turner & Bateson 2014, p. 89.
25 Turner & Bateson 2014, p. 94.
wealth of negative associations tied to the cat, it is not surprising that cats became the objects of widespread persecution throughout Europe during the Middle Ages and early modern period. As a symbolic means of driving out Satan, cats, especially black ones, were captured and tortured, tossed onto bonfires, set alight and chased through the streets, impaled on spits and roasted alive, burned at the stake, plunged into boiling water, whipped to death, and hurled from the rooftops of tall buildings. According to 19th century zoological literature, cats were the most frequently and vehemently vilified of all domestic animals. Whilst the dog was admired for its loyalty and obedience, the cat was hated and distrusted for its lack of submission and for its failure to acknowledge human dominion.

Misogyny

Before the vilification of cats, they were essentially benevolent symbols of female fertility, sexuality and motherhood. But with the advent of Christianity in Europe, a powerful element of misogyny was ascribed to cats. Medieval and early modern Christianity was dominated by a male priesthood with a notoriously ambivalent attitude toward women. Deriving their prerogative from Aristotle, clerical scholars of the period not only declared that women were the weaker and more imperfect sex, but also portrayed them as vulgar temptresses with insatiable carnal appetites who used their sexuality to seduce, bewitch and corrupt men. These clerics also accepted Aristotle’s evaluation of the female cat as a carnal creature that seeks out sexual attention indiscriminately from any available male. No doubt has the natural behavior of cats reinforced this evaluation. Sexually, the female cat is highly promiscuous, willingly inviting the attention of several males. She is also a back-biter, however, often turning and attacking her partner immediately after copulation. For the sexually repressed clerics of the time, female cats seem to have inspired a mixture of horror and disgust.26 Ergo, a strong metaphorical connection was established between cats and the more threatening aspects of female sexuality. The cat’s long-term association

with human females and their sexuality is still implied by the use of slang terms such as ‘cat house’ and ‘pussy’. Just as I described earlier how the ancient Egyptians and modern humans use animals to gain an understanding and to demystify the world around them, we tend to use cats and other animals directly derogatively at each other as well when we are riled up, where we find ourselves calling each other ‘rat’, or ‘snake’, or ‘cow’ (misogynistic), ‘bitch’ (misogynistic) and so on. Just like how the female cat is derogatively associated with human females, many other non-humans are also closely tied to our notions of gender and sexuality. Our way of describing the world through animals can also be used reinforce or question different gender related positions.²⁷

**Concluding remarks**

The opposite of aloofness is sociable (having a presence), and so I would like to explore this notion by imparting sociability in cats through Feliform by encouraging more interaction between the cat and the human. My question is how the relationship between the cat and the human can be investigated and uplifted through design. I want to create a product that allows cats and humans to interact more closely daily, which will in turn, I hope, let humans see their cats in a new light.

The human, most often than not, tends to put itself at the center of everything that it does, and therefore the human needs are almost always the dominant driving force in this constellation. For once, the non-human's needs must be the dominant driving force. The investigation of the relationship between the cat and the human should be informed from both the human’s and the cat’s perspectives. My own cats are the methodology by which I will be utilizing in informing my design choices.

Humans believe themselves superior (*human exceptionalism*) to other non-humans and therefore many of us deem it ethically acceptable that humans treat animals however we like, where we use them for food, where we use them for labor, and

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²⁷ Ekström & Kaijser 2018, p. 16.
where we use them for medical experiments. I want to challenge this notion and make the needs of the non-human more prevalent to that of the human. I find this field of design, that being of non-human-centrism, is very much relevant in the context of the shared home that constitutes the habitat of the inter-species relationship to that of the human and the cat (and other non-humans). It allows us designers to challenge ourselves and cater others than just humans, and in the process teach us how to think more highly and more intimately about non-humans.

We are surrounded by animals in all the aspects of the human (Homo sapiens) life. Many of us have non-humans as friends, as family members, and for companionship. Non-humans are an indispensable part of many human societies and other forms of life. They are, in fact, an inevitable part of humanity’s historical journey from the very beginning up to this very day. We have always been dependent and emotionally attached to other species for as long as we can remember.

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28 Ekström & Kaijser 2018, p. 18.
Appendix

Below follows a reproduction of my dialogue with my appointed critic Bettina Schwalm about Feliform at my final presentation.

MA denotes Marius Afram.
BS denotes Bettina Schwalm.

BS: It is an interesting project. Following the mock-up with the banana boxes, your project ended up being sort of a single chair. How was your thinking around that and why did you choose to have a single seat for a human? I am asking because that iteration felt like a cage, almost as if the human was to be safeguarded from the cat.

MA: That iteration was a direct take based on the way I interact with my cats on a daily basis in my home environment. I have a big armchair which I use a lot and my cats always come to me when I use it, and that is where my interpretation comes from. Following the 50% presentation and subsequent feedback that I got from my audience, I decided to get rid of the metal frame with the chair and just stick to the modules and work with those.

BS: When I read your thesis report it was not really clear at the time what your intention was. You mention that cats are heavily misunderstood, neglected and have been abused throughout history. Do you have an aspect of education where you want people to engage with cats and learn from them and learn about their behaviour and have these people open up to cats?

MA: Cats are wonderful beings, but they are just really misunderstood because of their cryptic and subtle behaviour which we humans have a hard time interpreting and understand. With Feliform I want to open up people’s eyes for cat behaviour and try to bring both species closer to one another. The hope is that by bringing them closer together new interactions will emerge automatically and new understandings of the cat’s behaviour. The typical cat products for the typical private household are
usually singular in their function and are solely for the cat. I want to develop a product that both the cat and the human can use together.

**BS:** I think that makes a lot of sense. I have thoughts about curating these interactions between the human and the cat through Feliform. Is the main intention to keep both species close to each other sufficiently enough for interactions to emerge or do you also intend to create certain behaviour in the cat?

**MA:** The main idea, at least as to how Feliform started in the first place, is to bring both species closer so that they can spend more time together. For instance, I can only speak for myself in this case because I have mainly worked with my own two cats, but a lot of the extraspecific interaction needs to happen on the cats’ terms. When a cat comes to you for affection and has had their dose of that for the moment they will usually leave and go off somewhere to lie in a dark and secluded place to sleep. I would like to bring this behaviour closer to cat caretakers. With Feliform, you can cap up a module and convert it into a sleeping chamber. Having said that, I do not have all the answers, but I do know that by interacting more with a certain species, new understandings will emerge.

**BS:** Absolutely. For me it is very interesting because the first thing that came to my mind about this project is the fact that there are ‘cat people’ and ‘dog people’. This is how I relate to this project as I myself do not have a cat nor a dog. I believe it is difficult to be a ‘cat person’ in the company of ‘dog people’. It is easier to put yourself out there as a ‘dog person’ somehow, even so in the company of ‘cat people’ – the other way around seems harder. I did some research about this because I think from a behavioural analytical perspective I would like to know more from you how much you went into this area because it is proven that your preference in either a cat or a dog makes you a certain type of person behaviourally. Are you interested in this aspect of human behaviour?

**MA:** Yes. Cats and dogs, although they are wildly popular, are still very different. Dogs are very much social animals and have evolved along with humans throughout
history, and this has allowed humans to be able to read dogs very easily. Dogs are expressive in their body language and in their behaviour, and it does not take too much effort from us to read this dog language in order to communicate successfully extraspecifically. With cats, however, it is indeed harder to read their intentions because they are very much subtle and cryptic in their body language. This necessitates the need of more patience and more effort from our side as humans. You have to make an effort to really learn how to read the subtle signs of cat language. You simply have to have patience.

**BS:** You make a physical product that is well thought-through and has all of these elements that you talk about as to how they came to be and how they work technically. What I am wondering about is if you have had thoughts about a certain type of community or service that have informed, and shaped, your product?

**MA:** The way I envision this project, and where I envision it, is in the private household, in cat shelters, and in cat cafes. Cat cafes are becoming more popular in Europe, and usually these cafes are home to homeless cats. At these cafes, you get to interact with the resident cats, and these cats are also usually available for adoption. I have not delved into the target human group as such, because insofar it has been more about the cat and spreading knowledge about the cat and open up more humans to this feline species.

**BS:** The question is then if Feliform can on its own sufficiently do as per your intention. Do you need to instruct people what to look for when interacting with your product? There are aspects to behaviour overall, to that of cat behaviour as well as human behaviour - the human’s needs to do certain things as much as the cat’s needs to do certain things. This is an interesting topic that can be explored further with your project.

**MA:** At this stage of the project I am not very much interested in dictating human behaviour. My main interest has been insofar to provide a catalyst, or a tool if you will, through which these two species can interact more closely, more frequently, and
more playfully, which in turn will yield more understanding and more affection between the human and the cat. You can use Feliform however you want, and it is interesting to see what can come from this. I have not really thought about how I want to steer human behaviour when interacting with cats through Feliform.

**BS:** I am more interested in the human side of things and in the cat side of things, and what takes place on your product - as to how the human positions themselves on your product. What happens in you sit upright, does that trigger a certain behaviour in the cat? Or if I lean back, does that trigger something else? What happens if I lie down, will the cat jump on my belly? In your project, have you used certain *behavioural* aspects that have shaped your product?

**MA:** Much of what has informed Feliform has come from my own interaction with my cats. Cats are very much individualistic, just like humans - they can be extremely different from one another. It is hard to predict what a certain human sitting position would trigger what behaviour in different cats. With Feliform, you can configure the modules per your own preference, whether you want to combine the modules to form a place for you to lie down on, or a place where you can lean back, like in a lounge chair, or simply if you just want to sit upright. This allows for flexibility in how you can use and position yourself and therefore how you interact with cats through this product.

**BS:** There are so many different ways to go from here because the product itself is one thing and I think how you talk about this product and what people understand from it is the next step. If you look at the research about ‘cat people’ and ‘dog people’ and as to who prefers cats over dogs, and vice versa, can tell you what brings ‘cat people’ together. This community might be interesting for you to look into. Look at the connections and interactions between these humans. Have you talked to someone about the design and the structure of your product, and have you got feedback from people in your target groups?
MA: I have had a dialogue with the manager and some staff members at my local cat shelter. These people interact with many different cats on a daily basis. They have been positive and happy about this project, and the manager would like to see more products that are more interactive between the human and the cat.
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