Platforms for Architecture:

Imperatives and Opportunities of Designing Online Networks for Design

ABSTRACT
The rise of platforms such as Facebook, YouTube, and Uber, initially celebrated as part of a disruptive new era of the internet, has slowly been reassessed as a problematic and unregulated form of twenty-first-century info-capitalism that contributes to inequality, mistrust, and user polarization. The internet has become a place for content creation, not only consumption, and the content freely created by the network of users has defined a self-organizing system of ad-hoc audiences following echo chambers organized through artificial intelligence, which amplifies previously identified trends. While a large portion of the content created by users seems to be aimed at personal forms of entertainment, a few remarkable projects, such as Wikipedia, have allowed hundreds of users to contribute to a collective goal. While we can observe that the platform model has appeared in diverse disciplines, allowing the creation of content from news articles to music, we have not seen the emergence of a robust design platform intended to proliferate and advance the discipline of architecture.

This paper makes the case that video game technology and its audiences have reached a state of technical capability that could allow for architectural platforms to emerge, one in which players could learn, create, and share architectural designs. Such a platform comes with a series of ethical imperatives, questions of value proposition, and liabilities, as well as a high potential to communicate and proliferate architectural knowledge and know-how. Common'hood, currently under development, will be used as a case study to engage the development of an ethical architectural platform that develops a proposition towards authorship, ownership, and collective engagement.
INTRODUCTION
Platform Capitalism: Surveillance, Data Collection and Crowdsourced Labor

Author Nick Srnicek has described the current condition of information collection and monetization through the internet as “platform capitalism.” For Srnicek, data has become a new raw material that the recent form of twenty-first-century capitalism has been exploiting for years. To harvest this data new infrastructural models needed to emerge. An actor that would facilitate interactions in a network and would position itself in a privileged position between users can be called a platform. As Srnicek explains, a platform is a ground upon which users’ activities occur, giving the platform a unique position to record and collect data on any interaction (2016).

Organizations such as a Facebook or Google are examples of contemporary platforms, operating at a higher level of network provider and possessing an asymmetric relation to all other users. In the case of YouTube, its users are encouraged to promote and grow the network, receiving payment for their services. This establishes a crowdsourced competition for the production of content, where everyone operates as an entrepreneur, building his or her channel and brand identity.

For theorists such as Srnicek and Tiziana Terranova (Terranova 2004), this constitutes a business model based on the exploitation of free labor; “laborers who produce goods (data and content) that are then taken and sold by the companies to advertisers and other interested parties” (Srnicek 2016).

While operating within a private network, users lose all personal rights and tacitly sign an agreement with the network provider to handle their data for the commercial use of the company. Nevertheless, the April 2018 hearing of Mark Zuckerberg in front of the U.S. Congress, following the whistleblower Christopher Wylie’s denouncement of the data collection performed by Cambridge Analytica, demonstrates a lack of understanding on the part of the general public regarding issues of privacy and data ownership. As presented by Senator Richard Durbin:

I think that may be what this is all about. Your right to privacy. The limits of your right to privacy. And how much you give away in modern America in the name of, quote, connecting people around the world. (quoted in Wichter 2018)

The right to privacy is a battle that has long been fought by technology insiders, in particular by the group broadly

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known as cypherpunks, whose members include internet activist Julian Assange. For Assange, the current form of platform capitalism is far bleaker than what we have been led to believe:

The internet, our greatest tool of emancipation, has been transformed into the most dangerous facilitator of totalitarianism we have ever seen. The internet is a threat to human civilization. These transformations have come about silently because those who know what is going on work in the global surveillance industry and have no incentives to speak out. Left to its own trajectory, within a few years, global civilization will be a postmodern surveillance dystopia, from which escape for all but the most skilled individuals will be impossible. In fact, we may already be there. (Assange et al. 2016)

His message is a call to arms for utilizing the power of encryption to protect the right of privacy. For Assange, the technology of encryption presents a unique possibility for limiting the capacity of platforms and states to breach the privacy of individuals. This assessment operates under the simple principle that it is easier to encrypt information than it is to decrypt it. As Assange presents it:

the universe, our physical universe, has that property that makes it possible for an individual or a group of individuals to reliably, automatically, even without knowing, encipher something, so that all the resources and all the political will of the strongest superpower on earth may not decipher it. And the paths of encipherment between people can mesh together to create regions free from the coercive force of the outer state. Free from mass interception. Free from state control. Cryptography is the ultimate form of non-violent direct action. Strong cryptography can resist an unlimited application of violence. No amount of coercive force will ever solve a math problem. (Assange et al. 2016)

Assange calls for collective resistance that begins from the acknowledgment that the right to privacy is fundamental to protecting democracy. His methods have been an attempt to increase the literacy of data privacy issues through the public exposure of corrupt practices. His organization Wikileaks has been at the forefront of transparency advocacy, attempting to bring some light to the unseen power exerted by obfuscated networks.

From this perspective, the internet, ostensibly connecting people and giving voice to new members in democratized platforms, has created one of the most powerful infrastructures for mass surveillance, one that is today attempting to be weaponized for political agendas. Nevertheless, alternative approaches have looked at this very problem as an opportunity and have attempted to redefine the ethos of a network as a fundamentally collaborative enterprise.

Platform Cooperativism
Not all platforms seek to impose a hierarchical structure over its users. Author Trevor Scholz has long theorized the impact of digital labor (2012) and the possibility of using
platforms as collaborative enterprises. Scholz calls this approach "platform cooperativism." Platform cooperativism places special interest in the ownership of the network and the content being produced, ensuring that the value produced by users to grow a network remains in the hands of such users, generating a virtuous cycle. Platform cooperativism attempts to revert practices of extractivism and exploitation commonplace in contemporary hierarchical networks by redefining the operating system of platforms aligned with a long tradition of cooperative labor practices. Scholz explains:

In opposition to the black-box systems of the Snowden-era Internet, these platforms need to distinguish themselves by making their data flows transparent. Platform co-ops should consider the following principles. The first one, which I explained already, is communal ownership of platforms and protocols. Second, platform co-ops have to be able to offer income security and good pay for all people working for the co-op. (Scholz and Schneider 2017)

For Scholz, it is not enough to engage in a cooperative business model; he is attempting to reenergize this historic tradition with the power of digital networks. Platforms, explains Scholz, are the place where we hang out, work, and create value. In his studies of platform cooperatives that are already in operation, such as Fairmondo, Stocksy, or Coopify, he places particular interest in the ownership model for both the network and the value produced by it (Scholz and Schneider 2017).

Under the contemporary big data paradigm, data authorship and ownership can be traced with high granularity, but it is up to the user agreements to establish protocols that are productive and beneficial for both users and platform providers without inheriting asymmetries.

Granular Ownership and Provenance
The importance of tracing data’s origin or provenance is an argument raised by Jaron Lanier in his studies of the work of internet pioneer Ted Nelson. Lanier attempts to conceptualize a humanistic computing network, one that would care about the prosperity of its members and would not exercise an asymmetric cohesive power over its members. In such a network, every action of every user would be tracked, allowing for a highly granular account of the role of multiple players in any given process. As he explains:

The foundational idea of humanistic computing is that provenance is valuable. Information is people in disguise, and people ought to be paid for value they contribute that can be sent or stored on a digital network. In humanistic information economics, provenance is treated as a basic right, similar to the way civil rights and property rights were given a universal stature in order to make democracy and market capitalism viable. (Lanier 2013)

Lanier envisions a network that would utilize the two-way links proposed by Ted Nelson in the early days of the internet. For Lanier, a two-way link is fundamental to trace back data provenance. Having this new two-way cartography, data and value could trace the members of a
network that contributed, in any form, to its creation. This could allow a kind of micropayment system to distribute capital to the users that contributed to its creation.

Projecting Lanier’s conceptualization into architectural design, architect and software designer Panagiotis Michalatos anticipates a transition from file-based sharing to a model where databases granularly store user actions, allowing models to be reconstructed from such information. (Michalatos 2016)

Still, the ethical imperative of storing value contributions and data provenance does not guaranty that a network will succeed. The relations established between users need to be meaningful and frictionless, allowing for the accumulation of interactions to become knowledge and to evolve as such.

**Design as a Form of Knowledge Encapsulation**

The information that flows through a network can reach specifically useful information states; organizations that are unusual if explored through randomness, but relevant to specific cultural interpreters. For this to happen, a network should be able to facilitate means for order to be accumulated and propagated by users, setting in motion a large crowd machine that can explore the possibility space with purpose.

MIT professor Cesar Hidalgo presents a compelling case for the rare configuration of atoms, described as information-rich states, defining physical order: “In a physical system, information is the opposite of entropy, as it involves uncommon and highly correlated configurations that are difficult to arrive at” (Hidalgo 2015).

Configurations that “are difficult to arrive at” could be understood in the context of design combinatorics (Sanchez 2016) and the nature of building blocks: discrete units that compose the system also play a role in allowing for meaningful patterns to be discovered by crowds (Sanchez 2014).

Hidalgo explains how information grows through social structures such as firms. In his studies of the work of economist Ronal Coase, he explains that the friction generated by the cost of interactions, analogous to links in a network, can define the system’s boundary. Coase uses these properties of links to explain the rise of firms and commercial enterprises. In the words of Hidalgo:

Coase’s intuition tells us that the ability of networks of firms to hold knowledge and know-how will depend on the cost of links. That is, when making and sustaining links is inexpensive, creating large networks of firms will be easier, and accumulating vast volumes of knowledge and know-how will be easier, too. When links are expensive, on the other hand, it will be harder to connect firms, and so it will be harder to create the networks of firms and people needed to accumulate vast volumes of knowledge and know-how. In short, when links are costly, our world becomes fragmented. (Hidalgo 2015)
The cost of links, from this perspective, is crucial for the frictionless flow of information in a network. When conceiving a platform that aims to aid the production of architecture through a distributed network, links—represented as the channel of communication of design from one user to another—are one of the key features that can allow virality as a positive attribute regarding knowledge propagation.

A platform will only evolve its content and its users by creating clear frictionless channels of communication, where thousands of users can iterate over designs with the incentive to be adequately credited and compensated for their work and effort.

**Platform Design**

For architecture, the conceptualization of a platform presents several design challenges. Should a platform be conceptualized as a 3D-modeling software—as a network to store geometrical models, as is the case with repositories like 3DWarehouse (Trimble n.d.)—or as a private dashboard for team coordination, as is the case with Modelo.io (Su and Deng 2017).

This raises the question of what is the medium by which architecture is communicated between members of a network? Is it a file sharing protocol or a hybrid form that could include geometry, user data, rankings, and prices?

The kind of licensing agreements that could be established between users are copyrights and Creative Commons. Moreover, should the network allow monetization and compensation for the creation of content? Should the network charge a fee or percentage for every transaction?

Finally, what about the role of education in such a network? Should the network provide any guidelines, instructions, or constraints for achieving specific architectural standards? Alternatively, should it be agnostic to conventional forms of value, incentivizing more radical innovation?

To answer these questions, platform design should have a clear objective. The platform described in the following paragraphs attempts to engage the questions above with a design proposition. The proposal is not a solution to the current state of platforms but rather a creative exercise to envision a design platform that can challenge the unethical practices of current networks. It attempts to communicate architecture to increase the literacy of architecture in a general audience, allowing for ideas to be easily propagated and understood by others, promoting the crediting of creative content and compensation for authorship. The proposal seeks to facilitate the communication of design ideas, not only as a result, but also through process and ideation.

A field that has grown to become a leader in the production of digital content through social means is the field of video games. Games such as Minecraft, with a network of nearly 75 million players, are the closest resemblance to what we could consider a social platform for spatial content. Games have been able to establish a two-way dialogue between...
users and developers actively participating in the production of a network via forums, polls, and streams, among other forms of digital content. Games have also adopted a healthy practice of modding, allowing for the main software to remain open-ended for user modifications. All these attributes position game environments as strong candidates for the development of architectural platforms. The medium of games has matured over time, allowing for close approximations of reality, as is the case with games like “Farm Simulator” or “Kerbal Space Program,” which has been embraced by NASA for expanding the literacy of the challenges of the agency (White 2014). The project that will be described below continues research that started with the video game title Block’hood (Sanchez 2015), released in 2016, which has a community of over ninety thousand players. By placing special emphasis in social network features, the research aims to address the problems and potentials of platforms presented above.

Design Proposal
Common’hood is a video game designed and directed by Jose Sanchez at the University of Southern California. The game proposes the creation of an online design tool that situates a player in a simulated environment populated with resources in the form of materials and technology and real-world constraints such as gravity, scarcity, and (lack of) access to labor and knowledge.

The project has been conceptualized as a modeling platform where the ability of a player to create an object is constrained by their access to knowledge, labor power, technology, and access to tools. Instead of offering access to all the possible modeling tools from the beginning of the experience, as is the case with modeling packages like Rhino or Maya, in Common’hood a player needs to build a fabrication facility to host the machines that will afford access to fabrication. In this way, the act of designing is delayed, establishing a critical assessment of the infrastructure necessary to develop a particular design. As an example, dimensioned lumber needs to be acquired by processing larger pieces of wood through a table saw or any other machine that is capable of performing such an output. Each machine in the simulation allows the manipulation of a source material, generating a particular output. As the player progresses and acquires more machines, the modeling tools available will increase, expanding the design possibilities.

Machines are not free in the game, so the player must acquire resources to purchase or build machines that will, in turn, allow for more complex building structures. Again, the emphasis of the simulation is not to take for granted the knowledge and technology that is required for conceptualizing a building. This process might be understood as a highly constrained modeling package, but it is one that starts to bring to the foreground narratives of resource scarcity, the costs of complexity, and the challenges of designing with limited means.

Labor
Common’hood also simulates the social interactions that are required to manage labor in a construction site. By simulating workers, the game allows the player to place instructions that autonomous agents can perform. Following real-world principles, workers will only work for specific periods of time, taking breaks and completing normal hours of work. Their efficiency and speed of construction depend on attributes like skill and proficiency. Construction in the hands of an unskilled worker can incur errors or injuries, forcing the player to engage with labor practices that would allow construction to be executed.

Managing workers is a first tactic towards understanding how the construction process is a choreography of multiple agencies that need to be coordinated, in this case by the architect. Once the player has access to multiple workers and understands the tasks that agents can perform, the player will be able to multitask and perform many actions simultaneously, relying on a set of initial instructions to perform different tasks.

For this system to perform well, the project has identified that there is a strong necessity for a communication protocol that is robust and non-ambiguous, one that is capable of transmitting construction information between players and between players and autonomous agents. For this issue, the project has utilized a graph data structure internally referred to as blueprints.

Blueprints
The blueprint system of Common’hood is defined as the data structure that enables assembling multiple construction units into one larger group. Similar to BIM models, each unit within a blueprint is a representation of a material and has unique properties. Blueprints use a graph data structure that defines a topological connection between every part, adding a new layer of information to the group. Some of the additional information fields include authorship, time of construction, and order of construction, allowing anyone to trace a design back to a particular player. Any modification to a blueprint in the form of a player alteration is also tracked and linked to the previous author, generating an authorship tree that cascades with different forks. The timestamp and sequence of construction allow for blueprints to be self-contained units of education, as each
blueprint can initiate a tutorial sequence guiding a new player through a step-by-step process to rebuild the item effectively. This mode introduces several modeling aids for the player, like a strong snapping function and a guideline of materials needed, facilitating the acquisition of knowledge in the process of rebuilding a design. This is achieved by timestamping player actions at a granular level, allowing a complete reconstruction of an object in an animation.

New players will start by using other players’ blueprints, learning how architectural parts come together through the sequential order of fabrication. Once the player understands the properties of an assembly, the player will be able to expand or alter the design, repackaging it and sharing it with the community. In this way, the act of creation creates not only a design but also an instructional tool that will educate other players.

Blueprints in Common’hood offer nesting capabilities that allow for blueprints to be used within blueprints, thus generating dependencies. Maintaining the theme of a “self-contained unit of information,” blueprints also include references to all sub-dependencies. Often the building modules utilized for a large assembly might be useful for the design and construction of other structures, increasing the power of exaptation that the engine offers to players.

Automation
The blueprint is the communication protocol in Common’hood, and as described above, it allows for the player to layer the communication of construction content.

It is also the protocol used to engage with simulated entities in the game. The project identifies two types of simulated agents: workers and machines. Both of these units can perform autonomous tasks for the player with different requirements. Workers make constructions once they receive a blueprint. The success and time required to perform such tasks depend on the worker’s skill and physical capacity attributes. It is possible to assign multiple workers to the same construction, reducing the amount of time needed for completion.

Alternatively, a player can engage with forms of robotic automation, providing blueprints as a protocol for construction. Each machine is built with a series of constraints and capabilities, challenging the player to conceptualize designs that can be effectively automated with the technology the game provides.

The objective here is to lead players to think of automation by acquiring and orchestrating the technology that will allow them to do so. Automation is also simulated through the constraints of energy requirements, maintenance, and operation costs. It is in this way that the game makes evident all the externalities that might make a particular design unfeasible.

Social Platform
The simulated environment developed for Common’hood is constantly linked to an online marketplace. Here players are offered two alternatives: share a blueprint in an open source manner under a Creative Commons license or place
the blueprint in the marketplace, allowing for the item to be purchased for in-game currency. The research team is also evaluating the possibility of allowing a real-world marketplace using cryptocurrency with particular coins like Enjin, which have been developed for the transaction of game items. These alternatives allow players to share creations and be remunerated for their efforts. The network seeks to incentivize knowledge propagation with a reputation system that would reward players whose creations are heavily forked.

Each uploaded blueprint can receive comments and ratings, allowing other players to review the quality of the design, and using a ranking system similar to Reddit, upvote or downvote a creation, leading the most useful creations to be more visible in the network.

Every design decision in this area of the software has a tremendous impact on how players create and share content, and it is only through continuous tinkering and feedback that this marketplace will be able to proliferate content and reward players for doing so. The content and value of design production should remain in the hands of its creators, as the tracing of provenance will effectively allow for granular authorship to be credited as such. In this network, every creation is a form of derivative work that only slightly alters the solutions created by other players, believing that authorship is indeed cooperative and collective.

CONCLUSION
An engine like Common’hood does not intend to create additional friction between the imagination of a designer and its capacity to represent his/her vision. On the contrary, by making evident all the network relations and dependencies that surround the process of fabrication and manufacturing, the game hopes to render the role of the architect as an entangled and interconnected professional. Design activity is understood as a synthesis of knowledge, know-how, resources, and intentions, with the objective to create a value proposition. In this sense Common’hood is a visual testament to the intermediary forces that often influence design and a celebration of the architect as a creative professional that can opportunistically navigate this often-obfuscated cartography.

Leading the field of real-time simulations, games have become a powerful and social medium for the proliferation of content, and are slowly blurring the line between entertainment and work. The profound ethical implications of this have to be considered critically. By engaging in the design of social platforms that establish ethical protocols of communication and educate users about their rights, architects and engineers can participate in a global conversation about the role of digital platforms today.

Having the propagation of knowledge and an ethical compensation model as an ethos, Common’hood seeks to participate in the conceptualization of contemporary platforms that operate as infrastructure for users, actively engaging in the issues of the right to privacy and offering non-exploitative models for value production through design.

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Jose Sanchez is an Architect / Programmer / Game Designer based in Los Angeles, California. He is the director of the Plethora Project, a research and learning project investing in the future of on-line open-source knowledge. He is also the creator of Block’hood, an award-winning city building video game exploring notions of crowdsourced urbanism.

He has taught and guest lectured in several renowned institutions across the world, including the Architectural Association in London, The Bartlett School of Architecture, University College, London. Today, he is an Assistant Professor at USC School of Architecture in Los Angeles. His research project “Gamescapes” explores generative interfaces in the form of video games, speculating in modes of intelligence augmentation, combinatorics, and open systems as a design medium.