The winter of parking dangerously

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1 Objective and position

I came to Irvine in the fall of 2007 after four years in Manhattan. I had become naturalized to a high-density urban fabric which afforded walking, face-to-face interaction and an expected freedom of use on sidewalks and other functionally 'public' spaces (although many of them were in fact privately-owned, consumption-oriented spaces), reliance on public transportation infrastructure, and even the possibility of cycling everywhere. In Irvine, many of the technocultural practices I had developed and come to rely on instinctively in Manhattan were worthless. Cycling everywhere was completely nonviable because of the comparatively low density, as was relying exclusively (or indeed at all) on public transportation. At UC Irvine, cycling on the main road that circumscribes the campus is forbidden (despite the bicycle racks that litter the campus), a proscription that was enforced with some vigor—by UCI police officers on bicycles—for the first month or so of the 2007-08 school year. Additionally, parking at UCI is strictly regulated: drivers who wish to park on campus must purchase a permit from "Parking and Transportation Services" (PTS), which has the legal authority (via the UCI Police Department) to tow cars not displaying evidence of the proper authorization to park wherever they happen to be parked. The only non-PTS parking lot within reasonable walking distance, at a nearby shopping center, retains a private security force to ensure that drivers who park there do not walk across the street separating the campus from the shopping center. Vehicles whose owners leave the shopping center are towed.

Here I wish to offer an account of my experiences driving and parking at UCI, and to position it with respect to the theoretical frameworks used in transportation modelling as a gesture toward understanding how it might have got to be how it is. I will then offer a few comments toward a humanistically-informed critique of this modelling approach, and begin a sketch of the space of design interventions.

My background prior to coming to Irvine was in applied mathematics, and so while this paper might be said to aspire to participant observation, I have no formal training in anthropological methods, and I apologize in advance to

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any anthropologists who feel that their methodology is being given a bad name here. This work is offered as a gesture in the direction of Barthes' notion of interdisciplinarity, in which "it is not enough to to choose a 'subject' (a theme) and gather around it two or three sciences. Interdisciplinarity consists in creating a new object that belongs to no one."[1] It is my hope that by highlighting the user-experience ramifications of traditional institutional approaches to modelling complex systems—and offering a few suggestions about how user-subject-participants might model such systems from a first-person perspective—this paper might contribute to the destabilization of institutional ownership of analytic authority over them. It is inspired in part by Bogost and Montfort's "platform studies,"[2] and although I personally find appealing the notion of a transdisciplinary approach to "infrastructure studies" I have no desire, by presenting this term, to point toward the creation of yet another new "inter-" or "trans-disciplinary discipline." Finally, I wish to affirm and broaden Galloway's call for a "political critique of algorithms"[3] into a call for a political and humanistic critique of formal models generally, and to attempt a small step toward the development of alternative models and modelling approaches.

2 The winter of parking dangerously: driving and parking at UC Irvine

After a few exhausting days cycling the 14 miles between the house where I'm living to the UCI campus with a laptop and a hefty course reader on my back, one morning I abandoned my Manhattanite transportation impulse for good and decided to make use of my aging white sports car. Not being particularly inclined (or in a particularly good position) to pay the substantial quarterly fee for a campus parking permit, I dismembered my bicycle and stuffed it, with some difficulty, into my trunk and began a search for free parking near the UCI campus. The closest lot is associated with "University Center," a shopping mall adjacent to the campus and connected directly to it by a footbridge that runs over a four-lane road named, inventively, Campus Drive. Decorating the University Center lot is a veritable menagerie of menacing signage whose main objective appears to be to deter members of the UCI community from using it when they are not engaged in activities that move capital into the accounts of its proprietors, and they proclaim things like "No UCI Parking," "Violators Cited and Towed," and so forth. Not yet inclined to empirical experimentation as to the veracity of these threats, I parked along a street in a residential area on the other side of the shopping center from campus and made the ten-minute bicycle

[1] Roland Barthes, THE RUSTLE OF LANGUAGE, p. 72.

[2] Ian Bogost and Nick Montfort, NEW MEDIA AS MATERIAL CONSTRAINT: AN INTRODUCTION TO PLATFORM STUDIES, *HASTAC Proceedings*, Duke University, 2006 (`http://proxy.arts.uci.edu/classes/gct_w08/week_08_platforms/Bogost_MontfortHASTAC.pdf`, last accessed 20 March 2008).

[3] Alexander Galloway, PROTOCOL, pp. 317-320 in *Theory, Culture, and Society* **23**, pp. 319-320.

ride to the other side of campus, where the trailers and radioactive waste storage bunker that comprise the Arts Computation Engineering (ACE) complex are sited.

I tired of this arrangement quickly. The twice-daily logistical annoyance of disassembling my bicycle to store it in my small trunk and reassembling it for use, combined with the fact that the dual-mode (automobile-bicycle) 14-mile trip took around half an hour, eventually caused me to seek alternative arrangements. The obvious and naïve approach was to attempt to park in one of the various time-limited loading zones immediately next to the ACE complex. This was highly convenient logistically: I didn't need to carry my bicycle in my trunk, and my trip time was reduced by half to about fifteen minutes. After a week or so of this, however, I received a ticket for sixty dollars, payable to UC Irvine Parking and Transportation Services. It said: "VIOLATION: LOADING ZONE."

I decided to interpret this citation literally, and for a while after this, I parked successfully on various unmarked patches of asphalt around the ACE complex. One day I decided to begin taking the additional precaution of removing my license plates and covering my Vehicle Identification Number by placing a piece of paper on my dashboard.

This seemed to work for a little while, but ultimately turned out to demonstrate a rather singular lack of insight on my part. Within the first week of deploying this strategy, I came out of a seminar to observe that there was a large metal object attached to the front wheel of my car, and a UCIPD officer was leaning over my windshield, writing down my VIN after having (apparently legally) opened my (locked) doors and moved the piece of paper out of the way. A tow truck was on the way, he said, and I would have to pay the sixty dollar citation fee, a $145 fee for removing the 'boot' (the oversized bike lock attached to my wheel which prevented me from driving the car away prior to its being towed—why exactly there was such a substantial fee involved in attaching and removing this device remains unclear to me to this day), and whatever the towing company wanted to charge me for the critical service of moving my car to their lot and holding onto it for the afternoon (this turned out to be another $150). (How exactly I was expected to get myself to said lot—located five miles from campus—without my car was not entirely clear.)

"But I'm here," I objected. "I can move the car."

"No you can't," the officer pointed out sagely. "That's what the boot is for."

At this point I realized that the institutional rationale for towing my car had very little to do with moving it from somewhere it was not supposed to be and much more to do with punishing whoever it was that had been foolish enough to think that they could park their car in any manner other than the officially sanctioned one.

After reclaiming my car, the work of finding a stable parking arrangement continued, and eventually I found an off-campus lot between en route to the ACE complex which sported a bicycle rack. This newfound infrastructure allowed me to avoid carrying my bike in my car and allowed me to switch modes rapidly, but nevertheless my trip time rose to around twenty-five minutes, and I persisted in my search for a *closer* off-campus parking lot.

As my dissatisfaction with the lengthy trip time associated with this arrangement grew, I began to consider a mode shift. An offer to park outside the nearby home of a sympathetic faculty member allowed to make the decision, and I purchased and began to learn to ride a skateboard. The convenience of carrying a skateboard over a bicycle led to a small reduction in trip time, and although this was offset somewhat by my initial ineptitude with the device, the novelty of learning made the proposition interesting enough to pursue. After a few weeks of this, however, a somewhat less sympathetic neighbor pointed out to me that only residents were allowed to park in the neighborhood (the usual ”Violators Towed” signs decorated the street), and although explaining that I was a guest seemed to satisfy him, I knew that it was only a matter of time before I began an involuntary test of the neighborhood's parking enforcement policies, and I decided to return to the off-campus lot I had used previously.

As of this writing, the situation remains approximately stable in this configuration, although one additional experience is worth recounting. One morning, I had a meeting on the side of campus closest to University Center (the shopping center with the menacing signage), and decided to park my car there and walk across the bridge over Campus Drive to my meeting. When I returned several hours later, there was a printed form on my dashboard with “WARNING” written in large red letters across the top and a handwritten message that said simply: “Observed crossing bridge to UCI; will get towed next time.”

Thus far there has been no 'next time.'

3 Transportation modelling approach

I will not speculate as to the specific constraints operating in the case of UCI Parking and Transportation Services, but rather will explore the planning processes, perspectives, and assumptions that may have led to an institutional climate that could produce such a 'user-hostile' infrastructural arrangement. Ortúzar and Willumsen offer an eight-point portrayal of the planning processes within which mathematical models of transportation systems are constructed and used for 'decision support':

1. Formulation of the problem.
2. Collection of data.
3. Construction of an analytical model.
4. Generation of [possible] solutions.
5. Forecast[ing] the future values of the planning variables.
6. Testing the model and solution.
7. Evaluation of [possible] solutions.

8. Implementation of [selected] solutions.[4]

I am particularly interested here in part (3), the construction of analytical models. Following Ortúzar and Willumsen, we can represent a model as a mapping

$$\boldsymbol{Y} = f(\boldsymbol{X}, \boldsymbol{\theta})$$

where the $\boldsymbol{X}$ are referred to as "variables" and the $\boldsymbol{\theta}$ as "parameters."[5] In this case by "variables" ($\boldsymbol{X}$) what is meant is in fact *explanatory* or independent variables: these may include demographic data like income, age, and gender; data that describe the state of the transportation system (width and quality of roads, traffic signals, bus routes and frequencies, etc.); data describing the "activity system" or network of destinations that users access by means of the transportation system; and so on. The $\boldsymbol{Y}$ are the dependent variables whose values are predicted by the model and constitute its 'output.' Note that very often there will be some variables which appear in both $\boldsymbol{X}$ ('input') and $\boldsymbol{Y}$ ('output'); these variables are said to be determined 'endogenously'—that is, within the model (as opposed to being determined 'exogenously,' or 'given'). Obtaining the values of these variables generally involves solving a set of simultaneous equations.

To develop a very elementary familiarity of the techniques employed in this way, I will describe a toy problem and solution.[6] Researchers familiar with approaches from neoclassical economics will find this approach unsurprising, if somewhat naïve.

Suppose we have an origin "O" and a destination "D" joined by a single road, along which travel time t in minutes varies linearly with the number of vehicles v on the road at any particular time according to

$$t = 10 + \frac{1}{60}v$$

That is, if there are no cars on the road, it takes 10 minutes to travel from O to D; for the first car, it takes 10 minutes and 1 second; and for every additional car on the road it takes another $\frac{1}{60}$ of a minute, or one additional second (see Fig. 1). This is referred to as the "performance function" of the road under study. Additionally, we can define a "demand function," which predicts the number of vehicles on the road v (i.e., the number of drivers who wish to travel from O to D, in vehicles per hour or 'vph') as a linearly declining function of travel time t:

$$v = 5000 - 100t$$

That is, if travel between O and D were instantaneous (i.e, if $t = 0$), 5000 drivers would make the trip; for each additional minute, 100 would-be drivers decide

[4] Juan de Dios Ortúzar and Luis G. Willumsen, Modelling Transport (Wiley & Sons, 3rd. ed., 2004, pp. 26-27).

[5] Id., p. 18.

[6] I thank Michael McNally of the Institute for Transportation Studies at UC Irvine for this example, although I have altered the numbers slightly.

it's not worth the time and abstain. At the so-called "base travel time" of 10 minutes, 4000 drivers *would like* to make the trip. But of course, things are not so easy; if 4000 drivers take to the road, the travel time increases far in excess of 10 minutes, and more drivers abstain. This process is called "equilibration," and to obtain the model "equilibrium"—that is, the system state predicted by the model—we solve the demand and performance functions simultaneously, for example by substitution:

$$\begin{aligned} t &= 10 + \frac{1}{60}v \\ t &= 10 + \frac{1}{60}(5000 - 100t) \\ t &= \frac{280}{3} - \frac{100}{60}t \\ \frac{8}{3}t &= \frac{280}{3} \\ t &= 35 \\ v &= 5000 - 100(35) = 1500 \end{aligned}$$

and we see that the model predicts an equilibrium volume of 1500 vph and an equilibrium travel time of 35 minutes.

We can also see that this model can be abstracted further. By abstaining from specifying the values of the parameters, we can write something like

$$t = \alpha_1 + \beta_1 v$$

$$v = \alpha_2 + \beta_2 t$$

where by writing α and β in front of the variables we are saying essentially, "there is probably some relationship here, but we don't know what it is yet." That is, the "parameters" α and β are not yet defined, and must be estimated or calibrated—and then validated—before the model can be used to predict future conditions.

Ortúzar and Willumsen describe these practices as follows:

> Calibrating a model requires choosing its parameters, assumed to have a non-null value, in order to optimise one or more goodness-of-fit measures which are a function of the observed data... Estimation involves finding the values of the parameters which make the observed data more likely under the model specification; in this case one more parameters can be judged non-significant and left out of the model. Estimation also considers the possibility of examining empirically certain specification issues; for example, structural and/or functional form parameters may be estimated. ...in essence both procedures are the same because the way to decide which parameter values are better is by examining certain previously defined goodness-of-fit measures.[7]

[7] Ortúzar and Willumsen, p. 18; readers interested in the disciplinary origins of these two approaches to the same problem can find the relevant discussion on the same page.

To illustrate this practice we can continue our example from above. Suppose now that we are interested in forecasting performance of an actual road, that we have a mechanism in place for collecting the values of these variables (traffic volume v and travel time t; for now we will refrain from speculating on the nature and implications of these mechanisms), and that we collect the dataset indicated below.

v (vph)	t (min)
0	15
100	16
1000	22

Clearly these three points do not fit a straight line. Our model is linear, however, so we perform a 'regression' analysis to select parameters whose values cause our linear model to most closely approximate the data we have collected. Presenting and commenting on the various goodness-of-fit measures that can be used in regression analyses is beyond the scope of this paper (although as an algorithm it is so pervasive that with certainty it falls within the field which Galloway seeks to open to scrutiny), but we can select one (a typical one might be "Ordinary Least Squares") and, assuming that with this dataset we consider v the independent variable and t the dependent, obtain values for α_1 and β_1. We can repeat this process for α_2 and β_2 to 'identify'—that is, specify completely—our model for $v(t)$.

To 'validate' the model after it has been calibrated (or after its parameters have been estimated, whichever you prefer) "requires comparing the model predictions with information not used during the process of model estimation"[8]—that is, collecting additional data in order to verify the model's predictive power. I will refrain from presenting the formal methods employed in this process but will illustrate this process with our model for $t(v)$ from above and two additional example datasets:

Dataset 1.

v (vph)	t (min)
1	15.02
110	16.1
1100	22.1

Dataset 2.

v (vph)	t (min)
1	22
105	10
1500	15

If, after calibrating our model, we were to collect Dataset 1 on the road for which our model is supposed to offer meaningful predictions, we might be

[8]Ortúzar and Willumsen, p.18.

reassured; if, on the other hand, we were to collect Dataset 2 on that road, we might be skeptical of our model's ability to offer any such predictions.

Now suppose we have two roads, and drivers are expected to choose between them. To determine the equilibrium distribution of vehicles (and thence the equilibrium travel times on the roads), we assume that users have knowledge of the travel times on each road and will select the road with the shortest travel time. This is called assuming 'Nash equilibrium' or 'user equilibrium,' and it rests on three assumptions:

1. Users prefer shorter trips over longer trips (that is, they obtain greater *utility* from shorter trips);

2. users will act to maximize their own utility at the expense of others', and therefore will select the route with the shortest travel time even if it raises the travel time for the other users on the route; and

3. users have perfect (i.e., complete) information of the system at all times; in this case, they know the exact travel times along both routes.

Generally speaking, these assumptions describe the canonical 'rational' user. In more complex scenarios where users make additional choices (for example, selecting a transportation 'mode'—that is, selecting between driving, walking, cycling, taking the bus, and so on) we assume that users have 'rational preferences,' meaning that the user makes a choice from a set which is *exhaustive*—that is, it covers all possible choices—*mutually exclusive*—each user makes only one choice at a time—and *finite*.[9] Further, we assume that users' preferences over this choice set are *complete*—that is, we can meaningfully compare any two choices—*transitive*—if a user prefers A to B and B to C, the user must prefer A to C—and *continuous*.[10] These six assumptions allow for the construction of a meaningful 'utility function,' which maps choices—quantities of goods consumed, routes or modes chosen, parking spots selected, and so forth—to levels of 'utility,' a constructed measure of well-being. We assume that all users will make use of their information (assumed to be complete and up-to-date at all times) to make choices that maximize their utility.

4 Caveats and complications

The preference axioms are widely acknowledged not to hold in all circumstances—there is a substantial economic literature exploring the situations in which transitivity does and does not hold, for example—but many contemporary transportation modelling approaches still rely on them.

The most obvious failure, however, of the typical modelling approach in the context of driving and parking at UCI is not the failure of the preference

[9] Kenneth Train, *Discrete Choice Models with Simulation*, Cambridge University Press (2003), p. 15.

[10] Continuity is an assumption made for technical convenience which we will not be too concerned about here; I have included it for completeness.

axioms themselves but rather that the assumption of perfect information does not hold. PTS' punishment policies and the policies of the agencies with jurisdiction over the nearby off-campus parking lots are unclear. It is well-known, for example, that many spaces with signs posted reading "Violators cited and towed; enforced 24 hours" are not in fact under 24-hour surveillance, and can be safely used without authorization at night, on weekends, and in some cases even in the early afternoon; detailed information about specific spaces, however, is not widely available. PTS and the other parking authorities rely on panoptic uncertainty and punitive discipline[11] to prevent unauthorized use. Indeed, perfect information—dissemination, for example, of the times at which PTS officers check each parking lot—would lead to a dramatic decline in the functional effectiveness of the disciplinary scheme. By maintaining substantial uncertainty, users are discouraged from unauthorized use of the facilities. Further, by keeping punishments inordinately severe, the *risk* of being caught—the *product* of the probability of being caught and the cost incurred if one is caught—remains high even when users perceive that the *probability* of being caught is low. The result is that in order to obtain reliable information about parking policies one must either engage in long-term sousveillance or subject oneself to a costly and logistically obnoxious process of trial and error—where 'error' is semantically equivalent to 'punishment.'

Why deviance should be punished becomes apparent if we consider what problem the parking system as a whole is designed to solve and the assumptions underlying the theoretical approach to solving it. Parking spaces at UCI are finite (and fixed, over short times) in number, and thus constitute a resource whose allocation is subject to the economic logic of supply and demand. In the neoclassical framing, social welfare (aggregate utility) is maximized when scarce resources are allocated to the most productive uses, which are those uses which commandeer the greatest influx of capital. To solve the optimization problem, the cost of parking should be floated and allowed to equilibrate, and those users who are willing to pay the equilibrium cost should be given the right to make use of the parking infrastructure. Free-riding—the practice of making use of goods whose supply costs have been paid by others—must, in this logic, be assiduously avoided and punished, lest the entire system collapse.

This framing is problematic, however. "The market mechanism," writes Frischmann,

> exhibits a bias for outputs that generate observable and appropriable benefits at the expense of outputs that generate positive externalities. This is not surprising because the whole point of relying on property rights and the market is to enable private appropriation and discourage externalities. The problem with relying on the market is that potential positive externalities may remain unrealized if they cannot be easily valued and appropriated by those that pro-

[11] See Michel Foucault, PANOPTICISM, pp. 195-228 in *Surveiller et punir: Naissance de la prison* (1975, Eng. trans. Alan Sheridan, *Discipline and Punish: The Birth of the Prison*, 1977).

> duce them, even though society as a whole may be better off if those potential externalities were actually produced.[12]

Further, there is no long-term provision problem with existing parking spaces; once created, they continue to exist in a generally usable state without large and continuous capital inflows.

In any case, however, the institutional context within which PTS is situated casts some doubt on the assumption that the parking system is designed to maximize aggregate user utility. Indeed, the fact that there are no mechanisms by which users can hold system administrators directly accountable for providing a baseline utility (or 'user experience') implies that system administrators have strong incentives to design to maximize *their own* utility—that is, to optimize the system for administrative simplicity and, perhaps, maximum capital influx—at the expense of user utility.

The indirect mechanism for providing supplier accountability in the hypothetical neoclassical marketplace is, of course, competition, and the typical assumption in economic modelling is that competition is *perfect*; i.e., if one supplier is providing an unsatisfactory user experience, another supplier will step forward and immediately usurp the first supplier's customer base. Of course, PTS has a monopoly (indeed, in some sense a 'natural monopoly') on administering parking at UCI; the unfortunate scarcity of nearby off-campus parking lots (and the fact that the majority of them employ policies very similar to those of PTS in any case) means that PTS is essentially free from competition—and therefore free not only from direct accountability but also from indirect accountability. If I do not like the parking situation at UCI, I am unlikely simply to pack up and transfer to UCLA; the costs involved (to put it within the economic framework) are far too high.

A final challenge to the validity of the traditional modelling approach comes from an assumption about the choice set—in particular, the assumption of exhaustiveness. Southern California, Orange County, and UCI are all designed around the cultural primacy and ubiquity of the automobile; it is architecturally natural therefore to assume that most users have automobiles. In the utilitarian spirit of modelling (and in the spirit of computational simplicity), '*most*' tends to be code for 'near enough to *all* as makes functionally no difference,' which means that at first blush one might construct an 'exhaustive' mode choice set with only two choices: 'drive' and 'walk.' UC Irvine provides a free shuttle between campus and student residences in the immediate vicinity, so in practice 'bus' is also viable, and is added to the two other modes (users of the free shuttle will presumably navigate the campus on foot). This expanded choice set may cover the majority of the university's constituents (or appear to), so perhaps a mode choice set can be assumed exhaustive if it includes car, bus, and foot traffic. Once this assumption is made, we can assume that nobody loses if cycling, rollerblading, and skateboarding are prohibited on the main campus

[12] Brett Frischmann, An Economic Theory of Infrastructure and Commons Management, pp. 988-989, in *Minnesota Law Review* **89** (2005), pp. 917-1030.

thoroughfare—and once this prohibition is enforced, the assumption, once descriptive, becomes *pre*scriptive, and the assumed subject is fabricated by the institutional logic of surveillance and punishment.

5 Extensions, interventions, and speculations

The space of possible design interventions into a system as complex as the parking infrastructure at UCI is large, and a comprehensive mapping of this space is substantially beyond the scope of this paper. Further, the scope and focus of the most desirable intervention will depend crucially on the manner in which the 'problem' is framed—on whose utility is being maximized, who is accountable to whom for what, what assumptions are made, and so on. I will offer here one very simplistic way to think about possible interventions, which is to describe them according to their position within the system operator/user power relation. I will describe some 'institution-side' interventions, some 'user-side' interventions, and some 'cross-sector' interventions that bridge system operators and users and attempt to catalyze broader discourse around the management of the system.

The most obvious institution-side intervention is simply 'develop better models.' One might imagine a model that includes all viable modes, the wildly fluctuating price of gasoline (as well as the growing student consciousness of its impact on global climate stability and a concomitant growth in reluctance to consume more of it), the possibility of ride-sharing and other forms of coordination and collaboration, the fact that the range of graduate student stipends at UCI straddles the US poverty threshold, user knowledge of imperfect enforcement, and so on. But whether this is likely to result in a more humane user experience is unclear; indeed, unless operators maximize user utility and not their own, it seems likely to result only in more perfect control—augmented by more robust and widespread systems of surveillance, perhaps justified by the need to collect ever-greater amounts of more accurate data in order to calibrate and validate more complex models of user behavior—of system operators over users.

Suppose then that system operators are given a mandate by their supervisors to maximize user utility—to optimize for a better user experience rather than for administrative expedience. This may seem promising, but it relies on top-down analysis of user experience. Here again the need for more data results in the deployment of more numerous and sophisticated surveillance systems—and therefore more rapid, more effective mechanisms for punishment. Even if this approach results in a better user experience for most users, it seems likely that those who remain outside the understood profiles of the analytical model will be even more strongly marginalized. With more accurate models, better surveillance, and more perfect control, the cycle of the descriptive becoming prescriptive becomes tighter and sharper. Even if nobody is marginalized right now, there is little room for change.

There are many conceivable and even promising practice-based user-side interventions. Examples include carpooling and permit-cost sharing; aggregation and dissemination of information regarding surveillance practices; mass civil disobedience;[13] and so on. These are often collective action projects that can lead to new system-wide equilibria if many participants join and new infrastructure customs are created,[14] but which require concerted organizing efforts on the part of their proponents.

Finally, there are cross-sector interventions that seek to catalyze discourse *between* system operators and and users, and in some cases even to erode the distinction between them. The agile software development philosophy, for example, aims to facilitate interaction and collaboration between designers and users in order to provide a design that more closely suits user needs;[15] similarly, the free/open source software community's development practices have long encouraged the blurring of the user/developer distinction.[16] But what would such a transformation look like in the case of a complex institutional context like UCI parking? I wish tentatively to suggest that it might look like deliberative democracy. Of course, large universities and their various agencies and departments are not known for their traditions of deliberative democracy; indeed in the contemporary research climate the university appears to be becoming more administratively-specialized, professionally-bureaucratized, and corporatized rather than less. I wish to claim that as this trend progresses and intensifies we are likely to see a concomitant decline in consideration to user-subject-participant experience from a great many university agencies and departments, not just parking.

6 Conclusion: broader theoretical concerns

We find ourselves in a historical moment in which two trajectories seem to be converging. The first is instrumental rationalization, in which interactions between human beings become governed and motivated by systems of formal, published, and quantitative rules that define crisply the roles and responsibilities of all of their participants.[17] The second is the continuing development and deploy-

[13] Consider e.g., the phenomenon of Critical Mass, in which bicyclists take to the streets en masse, or a hypothetical action in which large numbers of drivers park in campus parking lots without purchasing permits.

[14] See e.g. the practice of 'slugging' in the Washington, D.C. metropolitan area.

[15] Kent Beck et al., MANIFESTO FOR AGILE SOFTWARE DEVELOPMENT, `http://agilemanifesto.org`, last accessed 21 March 2008.

[16] See e.g. Steven Weber, THE POLITICAL ECONOMY OF OPEN SOURCE AND WHY IT MATTERS, in Latham and Sassen, eds., *Digital Formations: IT and New Architectures in the Global Realm* (2006, Princeton University Press), pp. 178-211.

[17] In THE PROTESTANT ETHIC AND THE SPIRIT OF CAPITALISM (1905, Eng. trans. Talcott Parsons, 1958) Max Weber describes "a calculable legal system and...administration in terms of formal rules" as critical to the success of rational capitalism; without them, "adventurous and speculative trading capitalism and all sorts of politically determined capitalisms are possible, but no rational enterprise under individual initiative, with fixed capital and certainty of calculations" (Second Roxbury Edition, 1998, p. 25). Jürgen Habermas in *Technology and Science as "Ideology"* (1968) writes:

> Rationalization means, first of all, the extension of the areas of society subject

ment of technologies generally, and in particular of technologies for recording and surveillance. I have abstained here from approaching more than tangentially an examination of the interdependence of these two trajectories—this has been approached if perhaps not addressed definitively elsewhere, in theoretical literature from various disciplines and with respect to different technologies and technological trajectories,[18] fiction (especially science fiction),[19] film and television,[20] installations,[21] performance,[22] and so on—but it is my hope that this little narrative, and my attempt to examine critically the theoretical frameworks that set the stage for it, will serve as a useful step toward more widespread interrogation of formal models, and of the complex techno-institutional systems—and systems of systems—within which we find ourselves continuously, willingly or unwillingly, interpellated.

> to the criteria of rational decision. Second, social labor is industrialized, with the result that criteria of instrumental action also penetrate into other areas of life (urbanization of the mode of life, technification of transport and communication). Both trends exemplify the type of purposive-rational action, which refers to either organization of means or choice between alternatives. Planning can be regarded as purposive-rational action of the second order. It aims at the establishment, improvement, or expansion of systems of purposive-rational action themselves (collected in Steven Seidman, ed., JÜRGEN HABERMAS ON SOCIETY AND POLITICS: A READER, Beacon, 1989, p. 237).

[18] See e.g. (canonically) Michel Foucault, SURVEILLER ET PUNIR: NAISSANCE DE LA PRISON (1975, Eng. trans. Alan Sheridan, DISCIPLINE AND PUNISH: THE BIRTH OF THE PRISON, 1977); Alexander Galloway, PROTOCOL: HOW CONTROL EXISTS AFTER DECENTRALIZATION (2004); and Wendy Chun, CONTROL AND FREEDOM: POWER AND PARANOIA IN THE AGE OF FIBER OPTICS (2006), the latter two on the internet as a technology of control masquerading in the popular imagination as a technology that enables freedom.

[19] See e.g. (again canonically) George Orwell, NINETEEN EIGHTY-FOUR (1949); Harlan Ellison, *"Repent, Harlequin!" Said the Ticktockman* (1965); and more recently John Twelve Hawks, THE TRAVELER (2005).

[20] See e.g. Chrysalis Visual Programming, MAX HEADROOM: 20 MINUTES INTO THE FUTURE (1985); Harun Farocki, BILDER DER WELT UND INSCHRIFT DES KRIEGES (Eng. IMAGES OF THE WORLD AND THE INSCRIPTION OF WAR, 1989); Steven Spielberg, MINORITY REPORT (2002, based on Philip K. Dick, THE MINORITY REPORT (1956)).

[21] See e.g. Bruce Nauman, GOING AROUND THE CORNER PIECE (1970).

[22] See e.g. Susan Marshall, SPECTATORS AT AN EVENT (1994).