Technology in theatre exists almost exclusively in the spectacle of performance, and though it has largely defined the societies of modern drama, it has rarely enabled new forms of dramatic literature. Technology creates spectacle, serves as subject, yet remains disconnected from the structure of popular and avant garde theatre alike. Directors and designers incorporate new tools and techniques to achieve certain effects in a piece’s realisation, and newly constructed theatres are built to incorporate modern innovations that often prove useful and provocative to their artists. This trend has continued with the advent of digital technology, which enables amazing new uses of lighting, sound, and projection in performance. More adventurous directors and performers have experimented with emerging technologies enabling telepresence, ‘virtual’ theatrical worlds, and many forms of multimedia performance. The great body of this work consists of re-interpretation of traditional texts and creation of new works with either minimal text or none at all. It has not yet extended the rich tradition of dramatic literature, even the seemingly related epic theatre or the ‘algorithmic’ works of Beckett and others. Our own collaboration, between engineer and playwright, has led us to pursue this direction, explained below in the context of a particular work.

The Iliad Project is an ongoing research effort in the UCLA School of Theater, Film and Television to co-develop an original text, design, technology, and performance technique that focuses on the unique characteristics of digital technology as they affect dramatic literature and performance practice. After initial experimentation in design (Burke 2002), we focus on roles of digital technology that can be intrinsic to the script itself, provoking different interpretations by designers and directors rather than prescribing the entire performance experience. The text is extended to include algorithms defining relationships among ‘inputs’ to the play’s world—images, sounds, demographics, and other information—from the audience's everyday world. This ability to include the audience as an important element of the story, and to do so via technology, has become a driving force of our collaboration. We see it as one pathway for the development of drama, making technology as intrinsic as Aristotle’s logic and as captivating as Beckett’s illogic.
Theatre artists have used emerging technologies in their reinterpretation of existing works—for example, David Saltz's Beckett Space at the State University of New York at Stony Brook (Saltz 1999) or Mark Reaney's work at the University of Kansas (Reaney 1999). The Wooster Group and Robert Lepage, among others, have staged highly sophisticated multimedia works with current commercially available technologies. Experimentation with emerging digital technologies in original works, however, has largely been the domain of performance art (Birringer 1999), which offers a rich environment for experimentation because of its holistic creative approach—spectacle, text, and the role of the audience are each designed to serve an overall experience. The vision of this final experience drives the development and integration of each component, including the script, allowing it to rapidly incorporate new forms of technologically enabled or motivated relationships between audience, performer, and author. It is well-suited to be a laboratory for exploring and challenging emerging technologies and their associated cultural perspectives.

Yet this focus on performance art overlooks dramatic literature's own fluidity—how it embeds the opportunity for reinterpretation by directors and designers. The disconnect between digitally-influenced performance practice and modern dramatic literature arises partially from a myopic definition of 'the digital' that focuses on a few particular input and output manifestations of that realm: projections, computer graphics, automated scenery, sound effects, and even particular types of sensing. Advances in each of these areas make media responsive and malleable in ways never before possible. But the power of 'the digital' lies in its broad scope and abstract nature—the fact that mathematical formulas control numerical processing to drive every element of spectacle mentioned above, not the particular manifestations themselves. 'The digital' is an abstract representational arena that can be manipulated at incredible speeds by man-made machines, enabling connections across modal and geographic boundaries, into huge stored datasets, and between anything that can be digitally represented. If it is appropriate for performance and installation art to simultaneously explore both digital processes and specific input/output manifestations, dramatic literature—specifically, the play—can incorporate the processes alone into structured text, leaving the particular 'input and output' open for reinterpretation by directors and designers.

The written play's construction for collective experience (a general feature of performance), its traditional use of mimetic narrative, of showing rather than telling, and its openness for reinterpretation by directors and designers suggest intriguing challenges for digital artists and engineers. For playwrights, emerging technologies allow autonomous systems to be implemented according to the rules of the play—embodying rather than illustrating its world. They can interconnect geographically separate elements and act in response to individual presence, identity, and action at a speed and scale that draws together many individual phenomena into a collective experience. Because digital processes operate on abstract models of the world, they can be designed and specified in a way that allows for meaningful 'reinterpretation' of their inputs and outputs.

Our first attempt at incorporating digitally enabled processes into dramatic literature, this Iliad, begins with a website specified within the script, one that
replaces a more traditional prologue and is accessed by the audience before the performance from home or immediately outside of the venue. In addition to introducing the world of the play, it pulls information from the participants for the purposes of the characters. The minimum requirement for input is a direct survey of the web visitor, but more subtle information might also be measured using either custom-designed or commercially available software: What pages do the visitors look at repeatedly? What path do they follow? How do they read or experience this part of the text? The answers can be incorporated as directorial or design brushstrokes after the structure is established. A database must store the survey responses and usage tracking information for later use onstage, where the survey results, along with audience images and sound bites later culled and indexed by digital means are displayed and redelivered within the political rhetoric of the characters. The website's setup and interaction continues via an e-mail news list, which also serves the characters' purposes. In relation to a more traditional dramatic structure, this serves as a transition from the prologue to the larger body of performance and includes an inciting incident: Helen's kidnapping.

Audiences arriving at the event's location encounter a gallery of photography that elaborates on the themes of the website, and includes more information relating it to the kidnapping. The gallery establishes their role as Achaean constituency and introduces a tame initial form of the Achaean manipulation of recognisable media. 'Photography' is the minimum requirement for output in this space; this detail is open to directorial reinterpretation that may incorporate digital technology, but no further spectacle is required by the play's action. The input requirement is that the participants' tickets allow them to be physically located (with very low precision) and identified in the gallery. This will enable the computer and sensor systems implementing the play's rules to keep records of each person's presence and action in the gallery alongside the existing information about their interaction with the website. A particular implementation might use Radio Frequency Identification (RFID) technology and equip the space with an image capture system to gather snapshots of facial reactions to the gallery's provocative photography for later use in the performance. This gallery functions as a play's more traditional exposition, but must also capture images and simple actions of the participants and store them for future use, gathering the first echoes of the audience's real lives into the machinery of the play itself.

By the time the recognisable 'performance' begins, the audience and the performers will be ready and eager to act upon the consequences of the inciting incident—the kidnapping—without the need for further exposition. The media of a given audience will begin to appear, recontextualised, within the performance: the performers will be supported and even directly prompted by the play's technological systems with information about the participants to dynamically relate to the given audience and situation. For example, when the politicians of the Achaean cause must refer to a map, the map derives its boundaries from the demographics of the attending audience, including their actual addresses. Though the map itself might take many forms in a final staging of the work, our realisation uses Geographic Information System (GIS) software to look up and create different images at the same point in performance for different audiences (see Figures 1 and 2).
Figure 1. Dynamic rendering of the map for one small test audience.

Figure 2. Dynamic rendering of the same map for a different audience.
Marie-Laure Ryan characterises this type of relationship between viewer-participant and a work as 'internal-ontological': the participants are characters within the time and space of the fictional world. She goes on to state that “in this type of system, interactivity must be intense, since we live our lives by constantly engaging with the surrounding world.” (Ryan 2002 601) The more demanding, direct interaction of the website and galleries is interwoven with the collective experience of performance, where the audience experiences the gradually building re-use and re-contextualisation of their information over the course of the play. The story built around the Achaean political machinery justifies each component, and oscillation between components slowly reveals the processes (or, perhaps, the 'poetics') of the piece to the audience, commenting through the story on the system of technology itself that constructs and manipulates the audience's experience using their images, actions, surroundings, and mere presence for the characters' and dramatists' purposes.

As the first traditional act concludes, an interactive intermission gallery—a carnivalesque abstraction of the battles at hand—sustains the event and, like the opening gallery, provides fuel for further dramatic development by observing and interacting with the audience. Technology again culls together the images, sounds, and statistics of an Achaean constituency (the audience) at play. As the second performance act begins, the piece turns on itself, and the audience finds its demographics used to the opposite effect within the story. The reversal is intensified by the acquisitions—echoes of the audience, live media from the city—gathered up until that point. Media from throughout the city of the performance is streamed into the space, and juxtaposed with recently captured images, processed website and gallery responses, and real-time sensor data. When the event concludes, a final gallery, customised to the attending audience, substitutes for a more traditional epilogue.

To describe such a performance, the dramatic text must encompass not only dialogue, situation and action, but define a system of digitally-enabled connections through which the dramatist draws relevance, either directly or indirectly, from the audience’s environment and actions. Combining instructions for human action with algorithmic rules driving digital processes, the text becomes an architecture for performance in which both human action and digital processes intertwine the real and fictional worlds. The use of audience information and data's presence itself within the story is justified by the absurd logic of the characters and their world. Following and extending the progress of modern drama, the audience is integrated into the story in a way that makes them a point of relevance; their unpredictable, fleeting specifics are encompassed by the story but open up an immense variety of interpretations. A particular narrative provides the (hopefully) coherent and continual justification for the audience's technologically-mediated interaction with the play's world. The Brechtian idea that one has to understand the modern machinery of power before writing about it is carried a step further, by actually implementing an absurd but logical extension of the media-manipulation processes that create and maintain power today.

For 'interactive' digital art in general, a narrative approach offers an ancient and traditionally successful method of engaging an audience for extended interaction—now potentially in more than one space and at different levels of
perceived control. Dramatic texts created with digital technology's capabilities for connection-making in mind can take this further, motivating the technology within the action as well as the design of the spectacle. Where performance art tends to decrease or remove text-based structure to gain fluidity of expression, here increased structure is used to justify technological choices within dramatic action, at some loss of fluidity. Justification within the narrative itself allows an audience to better consider the technology's implications within the story, without the distraction of an unclear motivation for its presence.

Digitality is a fluid environment; narrative, as a type of meaning, is a solid structure. To reconcile the two, some compromise will be necessary. Narrative will have to learn to share the spotlight with other types of sensory data... Conversely, the medium will have to give up some of its fluidity to allow narrative meaning to solidify in the mind of the reader.

(Ryan 2002 607)

Given this fluidity of the digital, why do we confine ourselves to only one narrative? In parallel with theatre and performance art's incorporation and criticism of technology, writers of modern literature have experimented with a variety of methods to digitally deliver non-linear text, commonly referred to as 'hypertext.' These two bodies of work have rarely intersected in physically staged works. Primary tools of hypertext authors are branching structures that enable non-linear navigation of a set of text fragments driven by user interaction. They allow multiple, varied readings of a text and find their precursor in literary works like Julio Cortazar's *Hopscotch* and Vladimir Nabokov's *Pale Fire.* This model is both supported and encouraged by the organisation of the world wide web, which allows text and media to be linked together in complex author-defined structures. It is also the underlying organisation of many single- and multi-player computer games now available. Our performance experiments with students suggest that performers delivery of dynamically assembled or chosen text (e.g. by hidden earpiece) is quite possible and interesting, so this seems a natural direction for exploration.

Dramatic literature’s goal of specifying a collective experience confounds many techniques of hypertext, however. In hypertext and ‘non-linear’ novels like *Pale Fire* and *Hopscotch,* branching structures allow the works to encompass multiple points of view and provide many paths of discovery within the text. To some, this approach parallels the real world more directly than traditional forms: the rejection of a single plot “signifies the recognition that the world is a web of possibilities and that the work of art must reproduce this physiognomy” (Eco 1989 114). For audiences to experience this in practice as well as understand it in theory, however, requires them to actually explore multiple paths within a work— to ‘reread’ the text, following different paths and comparing the experiences. The concept of the user's increased power is present when multiple choices are given and one chosen. (Indeed, this will impact the reader's perception of the work even within a single reading.) However, the story's multifaceted nature is revealed only if sections are reread with different choices made.

Therefore, although digitally-supported voting on story choices— navigation of a dramatic hypertext— seems to offer the opportunity for ‘collective’ decision-making by the audience, those choices collapse structurally into a linear form when audience experience is considered, because there is no opportunity for re-reading.
Figure 3. A computer-generated map of the cross-references within Nabokov’s novel *Pale Fire*. 
Figure 3 shows a map of the many cross-references between the sections of commentary, which is also the main narrative, in Pale Fire. Any single reading of the text, even one that goes back over certain sections, would trace only a single path. Though one could imagine a work in which actors re-performed certain sections in a different order, the self-directed discovery of the branching literary text does not appear to translate well to the stage. Performance renders a single ‘reading’ that is indistinguishable from an event in which no choice at all existed, except for the presence of the choice.

Unless its presence alone is necessary to the story, what purpose can story-voting serve without re-reading? What remains is the audience’s presumption that their opinion might have mattered, the question of whether it really did, and the frustration of an often unjustified omnipotence. One of the authors recently had the opportunity to sit alone in an immersive multimedia experience—a cinematic-style educational game—designed for an audience of about forty people. Alone, his vote was all that mattered. Even in this case, in order to build dramatic tension and progress the story, none of the voting choices in the middle of this carefully constructed experience could solve the problem posed by the story, because if it had been solvable the story would have been finished (and incomplete) only a few minutes into the experience. Even if performers, designers and writers were enabled by digital technology to handle an unlimited set of choices, in order for collective decision to be feasible, only a few could be presented to allow consensus. In this case, how can the interactors “retain a reasonable freedom of action throughout the performance without taking the plot in a direction for which there is no ready-made, logically coherent response stored in the system?” (Ryan 2002 592)

The remaining motivation, then, is conceptual, and we at least are hard-pressed to engage an audience for any significant length of time through purely theoretical means. Like Ryan, we don’t intend to...

...discourage conceptual art and experimental literature, but as long as... authors limit themselves to this route, they should not be surprised to see the medium confined to a narrow cultural niche.

(Ryan 2002 605)

Though Ryan addresses the authors of hypertext, her words could easily apply to any genre. Theatre is already slipping out of the public sphere, often unable to capture the imagination, intellect, and attention of audiences now accustomed to the swiftness of digital interconnection and vivid images of modern media. At the same time, its audience remains larger and arguably more varied than that of performance art, where most critical performative explorations of technology are occurring. Can combined technique expand the audiences of both? Purely conceptual art is important, but over as soon as it is understood; performance art and ‘traditional’ theatre can strive for both concept and work itself, and bring motivated, critical use of technology to works accessible on several levels:

There is no contradiction in assuming both

(a) that one must appreciate the whole structure of a work as the declaration of a poetics, and

(b) that such a work can be considered as fully realised only when its poetic project can be appreciated as the concrete, material, and perceptibly enjoyable
The work fulfils its fullest aesthetic value only insofar as the formed product adds something to the formal model (so that the work manifests itself as the ‘concrete formation’ of a poetics). The work is something more than its own poetics (which can be articulated also in other ways), since the very process by which a poetic model acquires a physical form adds something to our understanding and our appreciation. (Eco 1989 176–177)

What, then, does the digital offer to the collective experience of performance that can be incorporated into a dramatic text? Clearly one of the most intriguing and powerful capabilities of digital technology is its ability to support individual access and input, and we struggle to reconcile this idea with the structure of the dramatic text. Story branching, though well-supported by digital technology, is difficult to use effectively to show or suggest multiple perspectives. One apparent reason is that the audience remains unaware of the field of possibilities from which choices can be made, as those exist within the play’s world, which cannot be collectively re-read, skinned, or accessed out of performance sequence.

In our Iliad, the lives and world of the audience provide that field of possibilities: one of which each audience member has intimate prior knowledge. We construct a re-arrangement of their details for the purposes of the characters, with the belief that the story will open into new and resonant interpretations through each audience, through the small fibres connecting individuals into the story by digital technology. In Figure 4, once choices are made in performance between story sections (Figure 4A), the audience sees only the ‘collapsed’ structure (Figure 4B) and is not aware of or able to access other paths of the story. If external information is used from the world of the audience (Figure 4C), though the collapse of possibilities occurs when a particular choice is acted upon, their prior knowledge of and engagement with the field of possibilities allows them to see the

Figure 4. Branching story structure, and the audience as a source of information for non-branching narrative.
choice within its context and, in our story, to come to recognise the process of cut-up that the Achaeans (and on another level, the authors) use to create and manipulate their experience.

Little about the details that are incorporated into the performance can be predicted, so their presence and interrelationships must be justified within the world of the play with only basic knowledge of content; the political machinery of the play's characters, which reuses anything it can find for its own purposes, aligns with this consideration. At this stage in our struggle to incorporate digital technology intrinsically into a dramatic text, we find the necessarily absurd but absolutely self-consistent logic of the play's characters and their causes, which are both dependent on and independent of the specifics of the audience, brings us back to the current cusp of modern drama. Though Brechtian in its reference to reality, this re-use and re-arrangement of real-world specifics moves beyond a purely didactic technique because manipulation of information at the abstract level of computer software allows and even encourages the real world's technological processes to be amplified, distorted, and extended into the particular logic of the performance—the domain of absurdism.

Absurd story structures, such as Ionesco's, were already deeply rooted in the evolution of technology and often referenced the machinery of political power, power that has always been constructed upon its own self-consistent logic and grows further in distance from reality as its bureaucracy increases. A similar intrinsic and almost megalomaniacally self-consistent logic can be found in many complex technologies, and both are embodied in the media systems that implement our Iliad. The authors of modern drama were reacting to the Industrial Revolution, World War I, and World War II, as we react to today's mechanisms of power in technology and media. Alfred Jarry's King Ubu already amplified, distorted, and extended the world's processes and trappings of power, and following it there is clearly a path of reactions to the world's altering perspectives as the development of technology exploded. Waiting for Godot stripped away technology and politics, yet paradoxically showed how these factors have affected man's psyche. Like Jarry with Ubu, Beckett portrays the brutality of the human spirit, and by maintaining a celebratory tone, his characters are allowed to vaguely allude to profound philosophical questions through a parade of vague specifics, never truly answering a thing. Ionesco's characters in The Chairs attempt to tell the world of their total human experience, yet nobody is there to listen. Absurdity's construction of completely logical illogic continues to shine through all forms and genres of dramatic literature, including our own, as they continue to react to a changing society.

Digital technology allows these elements of modern drama to be drawn together in new ways: it can embody and execute 'logical' processes and simultaneously blur the boundaries between specifics constructed within the play's world and elements from the real world of the audience that are gathered and recontextualised dynamically. A reaction as much to the role of technology in modern society as to its potential impact on the dramatic text, our Iliad moves between the gathering of information (e.g. overtly on the website, covertly in the galleries) and the dynamic and absurd re-presentation of content customised from
Theatre of context

The ‘demographics’ of the audience. Lev Manovich finds a similar “oscillation between interactivity and illusion” to be a structural feature of modern society:

While modernist avant-garde theatre and film directors deliberately highlighted the machinery and conventions involved in producing and keeping the illusion in their works—for instance, having actors directly address the audience or pulling away the camera to show the crew and the set—the systematic ‘auto-deconstruction’ performed by computer objects, applications, interfaces, and hardware does not seem to distract the user from giving into the reality effect. (Manovich 2002 208)

He goes on to define a new ‘metarealism’ that contains its own critique inside itself:

Metarealism is based on oscillation between illusion and its destruction, between immersing a viewer in illusion and directly addressing her. In fact, the user is put in a much stronger position of mastery than ever before when she is ‘deconstructing’ commercials, newspaper reports of scandals, and other traditional noninteractive media. The user invests in the illusion precisely because she is given control over it... The oscillation analysed here is not an artifact of computer technology but a structural feature of modern society... This may explain the popularity of this particular temporal dynamics in interactive media, but it does not address another question: Does it work aesthetically? Can Brecht and Hollywood be married? Is it possible to create a new temporal aesthetics, even a language, based on cyclical shifts between perception and action?

The power structure that exists between author, actor, and audience-participant within this new type of dramatic work mimics the society and the new media that Manovich describes. Our Iliad tries to find a structure that uses this oscillation between individual interaction and performance to allow the collectively experienced event (for ‘mass’ consumption) to intrinsically incorporate specific information about the audience members (demographics) into the action.

Glimmers of this technique exist already in performances that use live images of the audience; consider the presence of a single live video camera selectively pointed at the audience, with its images shown on stage. If the live image’s presence is justified by the story itself and is not solely a design or directorial brushstroke, the same dissolution of boundaries between the play’s world and reality occurs, without disconnection from the characters and their logic, a feature of the metarealism described above. If the justification extends beyond a moment, and is intrinsic to the whole of the experience—if it, like the details of Ionesco and Beckett, arises naturally from the play’s world and is utterly necessary in order to achieve its ends—then the presence of the audience, recontextualised by technology, might perhaps play a role in some new type of open-ended catharsis.

To achieve this in the example of a single live camera, one can imagine that the text’s author must provide instructions for when to turn the camera on and off, where to point it, as well as creating a story that encompasses the presence of the live image, regardless of what it shows. In a manner different than a film’s shot list, the author might suggest where to point the camera and when, even without being able to control what would be on camera at that moment. If these rules were codified, executed automatically by machinery programmed with when and where to capture and re-display images, the number of cameras and sensors expanded, and
the resulting images were combined with other information gathered throughout the experience, placing fragments of the audience’s real-world lives into the midst of the play’s action at a speed mimicking the real world’s networks of information, we arrive at our Iliad.

In it, we explore an arena that is built more on processes than specific media: modern processes of media recombination are incorporated in the script, which deals in functional relationships between information, as in the example described earlier of the creation of geographic boundaries referenced in performance based on the addresses of the attending audience. Rules and algorithms built into new dramatic literature can define the gathering (when and what to capture), manipulation (how to alter and juxtapose it) and delivery (re-presentation) of information in the audience’s world to achieve dramatic goals in the plays, while leaving open the possibility for (re)interpretation by directors and designers of many input and output details. Outside of drama, the use of carefully chosen but seemingly arbitrary ‘specifics’ gathered from the audience is also not without precedent:

The contemporary novel has long tried to dissolve the plot (here understood as a sequence of univocal connections necessary to the final denouement), to construct pseudo-adventures based on the ‘stupid’ and inessential facts. Everything that happens to Leopold Bloom, Mrs. Dalloway, and Robbe-Grillet’s characters is both ‘stupid’ and inessential. And yet, looked at from a different narrative standpoint,

Figure 5. The currently planned system for realisation of The Iliad Project.
all their experiences appear quite essential to the expression of the action, to the psychological, symbolic, or allegorical development that implies a certain vision of the world. This vision, this implicit discourse that can be understood in a number of ways, and that results in a variety of different and complementary solutions, is what we call the openness of a narrative work: the rejection of a plot signifies the recognition that the world is a web of possibilities and that the work of art must reproduce this physiognomy.

Whereas theatre and the novel have long been progressing in this direction (I am thinking of works such as those by Ionesco, Beckett, and Adamov, and The Connection, by Gelber), cinema, another art based on plot, has been shying away from it.

(Eco 1989 114-115)

The potential absence of plot in a new drama that clips and reuses information about its audience and their real-world surroundings should not be misinterpreted as a lack of story. If anything, the story itself takes on a more important role, being comprised of a clear series of events that are choreographed to lead to the finale. As with the works Manovich mentions, only glimpses of relevance may be perceived during the course of the story, and perhaps taken as inessential additions at first—the initial sight of one's image on a screen may only evoke a gasp, giggle, or grimace—but the final action can now draw upon the audience's exposure to continual re-contextualisation of information from their own lives over the course of the entire set of events, yielding a conclusion with open-ended and self-reflexive relevance.

Although Beckett and Ionesco point out the human errors of putting too much faith in technology, or any construction for that matter, the advancements that were occurring during their times shaped their work. Einstein's theory of relativity shattered the modern world and thrust the planet into a post-modern conundrum. Today we exist against a continual backdrop of technological advancement that seems to grow in autonomy and ability to re-present our own images back to us, as the Achaeans (and later, the Trojans) do to the audience of our Iliad. From health to democracy to thought, what is available to us comes via technology, and our own contributions to these are input via technology. Yet as the lists of choices grow, the sources of these choices become fewer and fewer, and with every touch of the mouse or the switch of a remote control, we receive updated, personalised stimuli. Every product we purchase is scanned and used for the purposes of marketing to those who are purchasing. In some ways, however, we are a little luckier than Beckett and Ionesco—the technology that shapes our world can be used on the stage, and we can construct our drama around actual processes instead of proxies, incorporating the audience within these systems' absurd extension of our world.
References