First and Last

First and Last reflects divergence and convergence in organic systems.
The installation consists of audio-visual artificial worlds, from natural landscapes to fractal universes. Viewers can participate into worlds over internet using computers or on site with phones or PDA by using avatars with limited life spans.
Avatars can move, propose and refuse to mate. By mixing and varying parent characteristics the offspring extends avatar life and viewer participation time.

A Tower of Babbelon

A way to see this work is how it connects existing elements. The goal is not so much to invent all new things, but to compose a new meaningful whole of different elements so that they will complement each other in novel ways. There are already massively multi-player on-line roleplaying games (mmorpg), where people participate in different worlds. Also, there are public displays with which people can interact with using their mobile phones, also with game-like content (famously on TV). Furthermore, socially critical works and communities live on the net. We take a look at those areas, how we see their current state and why and how certain parts of them will take place in the installation.

Computer games are technologically at the forefront in both the quality of real-time visualisations and fluency of network interaction. Games like Unreal Tournament 2003 and Eve-Online utilize recent advances in graphics cards and feature efficient servers where virtual worlds are hosted for the gamers. Additional tools, such as IRC and voice-over-IP (TeamSpeak etc.) make playing over a high-bandwidth computer network a very engaging experience. The content, i.e. gameplay, can be described as virtual sports. Perhaps similarly to traditional sports, the action is not in relation with things happening elsewhere/otherwise in the real world. In First and Last, such connections will be explored in two directions, as elaborated in the following.

Mobile phones (and PDAs) already outnumber the desktop computers and are increasingly doing so. They introduce originally computed-based applications such as information organizing, communication networks, media processing and games to many people who are not interested nor able to use more powerful, yet more cumbersome desktop computers.

However, there is a tendency to separate mobile services from similar, perhaps already existing ones in the stationary computing world. One clear and much discussed reason for this is of course the differing contexts and hence the needs of a mobile user. Another derives from the fact that on the Internet people are not used to pay, but over mobile phone networks the operators charge for each service. For example, e-mail does not cost per message sent (not to mention any length limits), whereas sending an mms does. Besides all that and other reasons for the separation (such as technical differences), it is known that same services can well be made usable from both stationary computers and mobile phones / PDAs. First and Last invites audience to participate in the same worlds in both ways. A social motivation for this is to try to connect computer gamers, often separated in their dedicated communities, with non-computer non-gamers, who might just be passing by the installation on the street.

An additional type of connection in the system is to other, external systems. In particular, common news / economic databases are mined to determine some variables, such as stock exchange indexes, currency exchange rates etc. Also, analogous to how physical sensors can read environmental information at the installation site, the condition of the network is monitored (e.g. the latency between First and Last main server and Whitehouse.Gov). These variables can be mapped to basically any features of the artificial worlds, but they may often be non-critical: e.g. dollar vs. euro determining wind direction, latency in the network the colour of the sky. These kinds of mappings, or ones to more trivial things, reflect how such strongly

communicated (in case of economic figures) news in the mass media form and shape common consciousness about things that remain remote and seem irrelevant to actual actions of people in the everyday lives. Artistic expression is also a means to connect game worlds and entertaining virtual environments to information systems commonly used in boring everyday office work.

Finally, artificial life has already been demonstrated in different systems throughout the years, and we do not expect to make a (theoretical) breakthrough in that area - our implementation and use of evolutionary programming technologies will be innovative and esthetically motivated. For the sake of simplicity the idea is to limit the use of GA and GP constructs to proven and well-understood ones. We find that many basic ideas there are still new to most people and not that much is artistically explored. Also the applications in commercial games are rare and in their early form. Most importantly, we plan to contextualise them in intellectually and emotionally meaningful settings where artifacts communicate to people and people can learn to communicate with each other.

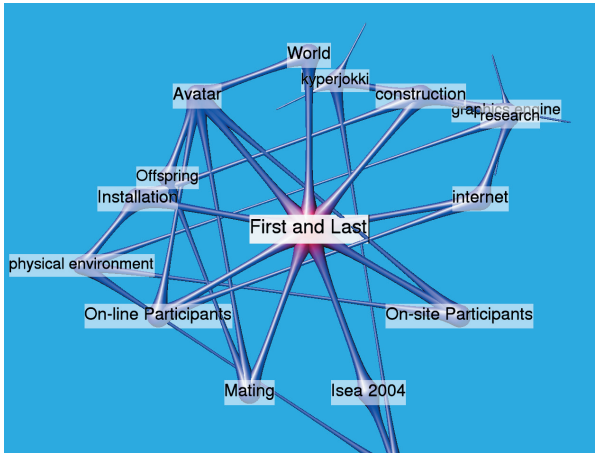


Image 1. Connections between different areas in the project.

Why Isea?

1. Some of you guys sent one of us guys a request for proposal.

2. In Kyperjokki we have often enough discussed ideas compiled in here.

3. Building Kyperia needs all hands on deck and especially international audiences for its worlds to proliferate. We are especially interested in the 'mid-field' between traditional visual and musical arts and the modern game and club cultures.

4. We realize the enormity of building and developing a virtual community such as Kyperia. Setting up installations to it, like First and Last, is technically demanding and oftentimes beyond the capabilities and interests of local institutions.

5. In the words of a famous mountain climber, when asked why he climbed to the top: 'Because it was there'.

A never ending journey through worlds in Kyperia

The installation consists of a series of artificial worlds, ranging from videoscapes to fully abstract spaces (e.g. from natural landscapes to fractal universes) that represent the developmenvt of a fictional universe. We call them worlds. Viewers can participate in worlds remotely over the Internet from their personal computers or on site with suitable mobile devices. Installation can take place in any public place with high bandwidth internet access, enough room and facilities for projecting a view to the world. Viewers are given a basic selection of avatars that act as their agent s in worlds, each world has initially avatars matching its appearance. Avatars have limited lifespans but they can cross worlds when activated.

Basic possible user interactions are moving the avatar in four directions, proposing to mate and refusing a mating proposition. Mating, when accepted, replaces the parents with their offspring. Their appearances and properties are a crossover of the mated parents' and their lifespans are reset to full length. To simplify the odds of participants surviving a change of the worlds any two avatars can mate and get more game time by seeking to switch properties - i.e. evolve.

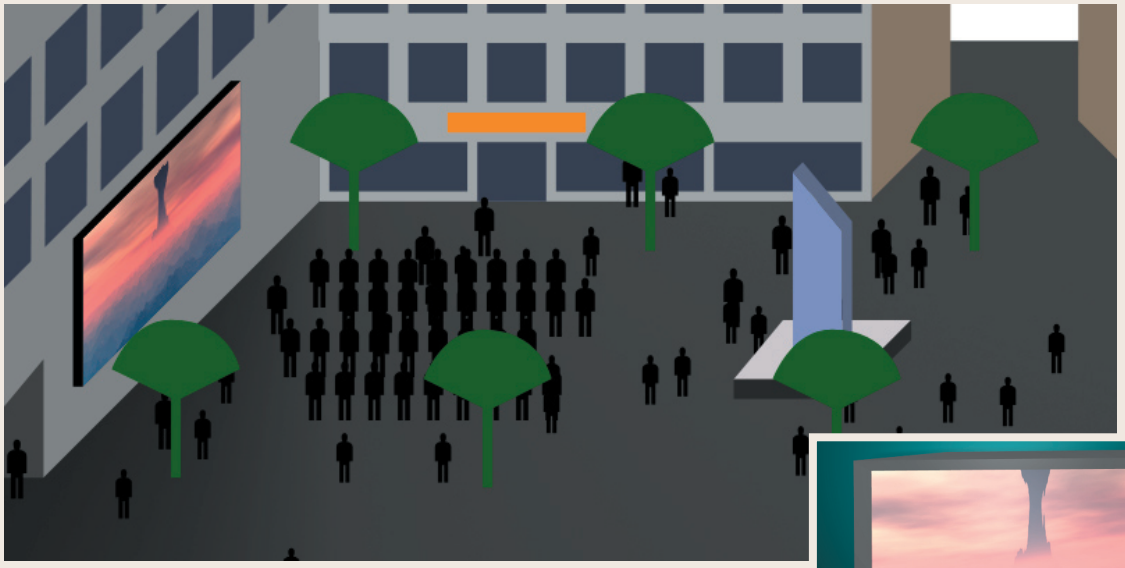
What's Behind the Curtain

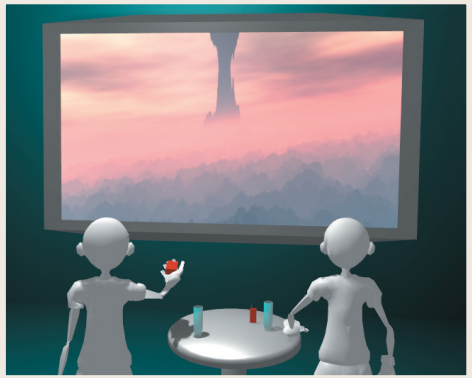
All worlds put together form a virtual reality - Kyperia - that exists and lives in the web as a community site (network of sites in the future hopefully). Kyperia is divided into worlds that are represented by places - whatever is displayed on the big screen or computer display. Places are populated by props, tools and viewer or computer controlled

agents - places have their associated soundscapes and other properties. On the display the agents are represented by avatars (micons, animations etc.); tools and props are basically represented as inanimate images. In Kyperia agents use tools to perform tasks and props pasted on a background form and decorate the place of a world for the viewer. Kyperia offers a more complex gameplaying interface for the computer user. For practical reasons (ease of use, minimal instructions etc.) the user interface for mobile on-site viewers is limited. More sophisticated mobile clients will be made available for later installations.

All of Kyperia is governed by the following rules. 1. The mating restriction with only two crossovered children. Mating rules and restriction with only two crossovered children apply at the time of this writing only to on-site remote controlled avatars. We have some ideas how to allow crossbreeding between Kyperia game-character type of agents and thin on-site mostly avatar entities but nothing to tell yet. 2. Agents can only exist in a place - no place like home (database), 3. they can move between places by permission. I.e. a place permits agents to enter, sometimes taxing the agent for permission. 4. Agent is always permitted to its birthplace without a fee. 5. On-site avatars have shorter individual lifespans than the total world lifetime is, in order to avoid stagnation into homogeneity. 6. If the produced children do not differ from their parents enough, their aging will speed up. 7. Individual worlds may extend and complement these locally as long as the global rules are not compromised or undermined.

Kyperia with its inhabitants is displayed for the installation audience. Kyperia is implemented with open source software and peer-to-peer networking in mind. We will welcome all simultaneous set-ups and development of new worlds as long as it does not interfere with the basic rules and, more importantly, requires from us only a download address with packages and installation instructions with some sample worlds. We aim to build an international virtual community so that when an installation such as First and Last is advertised, it will hopefully attract a multitude of Kyperia inhabitants. For example an intresting possibility is to have a band of webplayers' agents spontaneously play music live at the installation place.





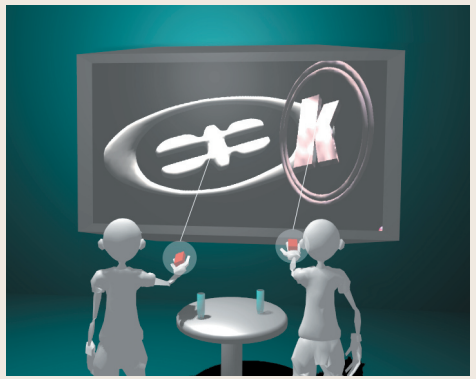


Image 2. Public display. The installation is planned for a public space, like street or a cafe, where many people may see it and several participate in it using mobile devices. It is a viewport to the worlds where things happen also autonomously and controlled by on-line remote participants.

Candidate Worlds for Public Display

In the age of tv reruns we circulate effectively 10-20 worlds continuously on the public display for the set-up period. Each world has seasons (scenarios, modes) that vary during its projection time creating dramatic suspenses and reliefs. Transitions from a world to another are subtle and may take up to half an hour of time. The worlds vary from natural to symbolistic and from very simple to quite complex.

For one, there are game-like natural simulations. In *FlyingWorld*, participants guide gliders or snowflakes and mating is about shapes and flying capabilities. *PlantWorld* is inhabited by growing trees, flowers and fantasy flora which cultivate to gain different locations and patterns of growth.

On the symbolistic side, there is e.g. *LogoWorld* where each avatar is a logo resembling those of corporations, brands and/or monetary currencies. Mating mechanisms there draw from the logic of mergers, branding and economic integration. Quite a different example is the *PictureBookWorld*, which is purposefully primitive in appearance and features imagery from ancient civilizations of e.g. Egypt and Rome, medieval tournaments and so-called pagan cultures. And of course a *PornWorld*, if not else to see what becomes of the cross-overs of pricks, dildos and other paraphemalia..)

Designing environments that base on, or at least emphasize, audio is a challenge we look forward to tackling with the partners. Pieces are there, as mixing audio and genetic and other algorhitms for varying tunes are known, but especially representing the different avatars in the public space is difficult.

A set of computer-based environments is not complete without fractals, so we have planned a *MandelbrotWorld* where places are different sets and participants kinetic textures.

Finally, there are sketches about special worlds that focus on special aspects that, after some experiments, may become features of many worlds. Instances of *MoralWorld* implement moral theories, where things like good/bad, karma and entropy are evaluated as states of the worlds and visualized for viewers. Another is *FoodWorld*, where, besides the default time constraint, beings need to eat (or else be eaten).

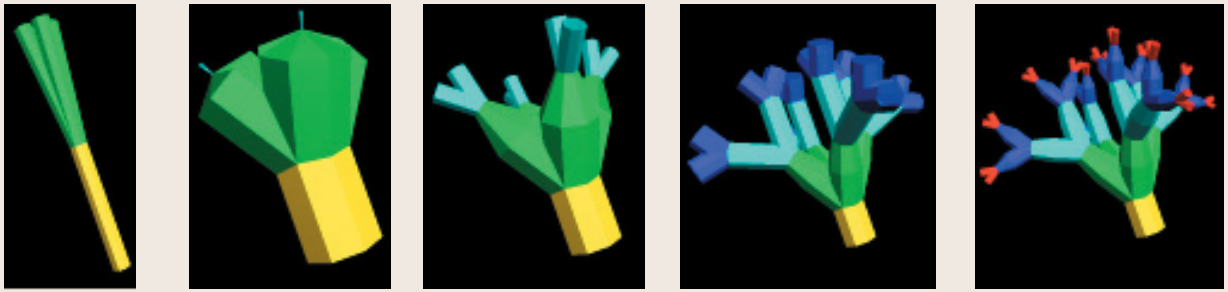


Image 3. The worlds may include dynamic elements, such as growing plants, which can mix characteristics and be affected by the environment.

System Design

Locally large displays and projections are controlled by a computer, which is connected also to bluetooth and wireless lan base stations that provides the link for capable mobile devices.

We expect the organizers to provide the network connection, the display device and audio devices for the public installation and a places for the computers behind the scenes. We are seeking partners/ funding for the server and network components.

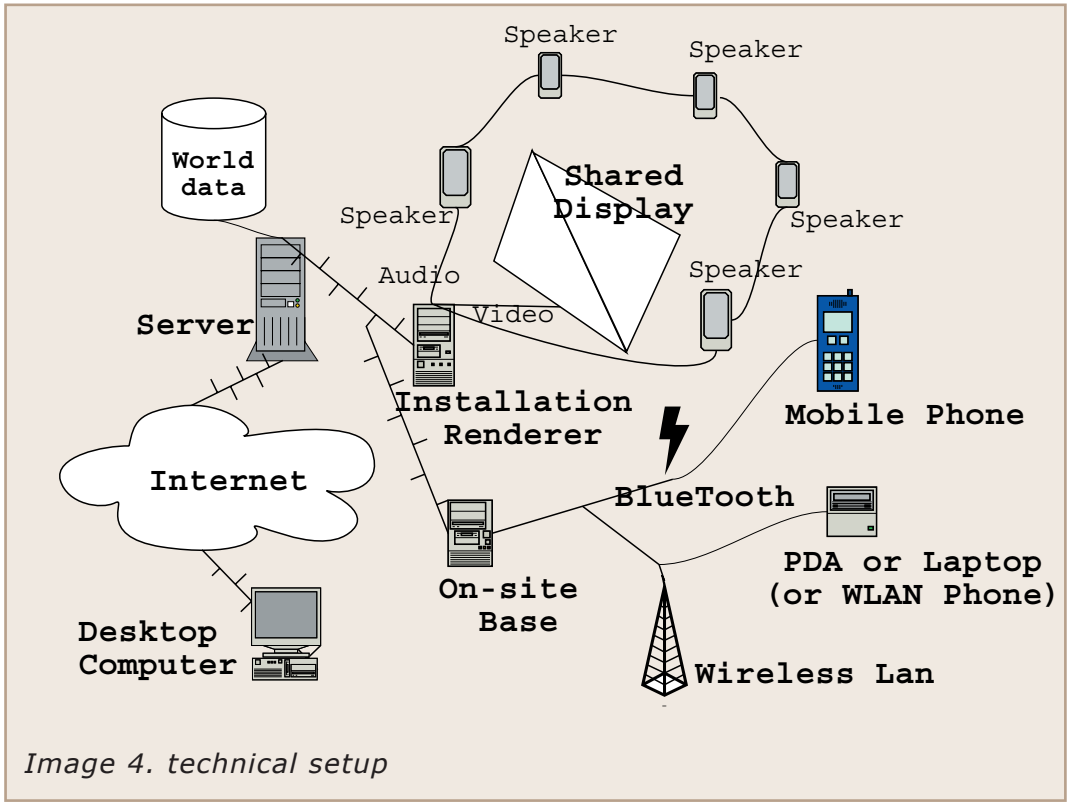


Image 4. technical setup

Server

For the first release, one server will suffice. It will be located both physically and networkwise near the installation site to guarantee it will always work there. A normal poweful server computer will suffice for serving a large number of participants (hundreds).

Installation renderer and Installation network

At the installation site, a computer with the best affordable graphics and audio cards feeds the display and sound devices. It can use the same client that remote participants, but has special camera controls/presets designed for the public display where several participants must see their avatars. A more advanced installation can be built using several displays. There may be several installation sites using the same server (or later perhaps the network of them).

For mobile clients there are basestations for nearby participants. Both bluetooth and wirelesslan will be supported. The installation setup provides connections to the server from those networks.

Desktop client

For remote participants, there is a client program similar to existing on-line game applications (e.g. unreal tournament, eve online, ultima online etc.) that can be the same which are used for installations with public displays, but tailored for a single player. The view is focused on the own avatar, showing the surrounding part of the environment and nearby avatars.

There may be additional features, e.g. for examining the states of the worlds.

Mobile client

Participants at the / an installation site use a remote control application. Besides an appropriate application in a mobile phone or a PDA, this could be also a dedicated physical item, as expored in ubiquitous computing projects such as Tangible-Bits. For example, small blocks with similar connectors than in puzzle pieces could be used by the participants to couple with the selected partner by connecting the blocks. The blocks would include some controllers (e.g. joystick) for moving, a sensor for identifying the coupling with other blocks and a bluetooth module for data connection.

Organizing the Organism of Worlds

The art of doing the simplest thing that could possibly work.

(D)evelopment has Started

We try avoid excessive planning, although we are familiar with a wealth of design methodologies and planning techniques (perhaps just because...). In planning and storyboarding we adhere to the Agile Modeling (AM) principles such as document only when necessary. We like to organise the implementation work loosely, adopting principles like *release early, release often, test while you work* from eXtreme Programming (XP) paradigm.

Open source tools are just fine for us. In order to cultivate collective initiative and innovation we have to be able to offer as much of the environments as economically as possible, so open source software platforms come naturally. We endeavour to offer a bulk of worlds in Kyperia as open sourced content. That is another story.

We have already started negotiations with some local partners within the relevant business and research fields. However we are openly welcoming all collaboration in as much as we can cope with our limited resources. We will provide access to our FirstAndLast wiki upon request to our collaborators - wiki is our group work environment.

Release Plan:

* prealpha experiments are currently being worked on
    - o testing different engines, ideas for contents

* alpha1 by the end of 2003
    - o functional multiplayer server, clients
    - o at least two different functional worlds, changing between them

* alpha2-.. early 2004
    - o steps towards beta

* beta1 in May 2004
    - o many worlds
    - o full functionality

-> finalisation for publication

Project Partners

As of this writing we have already started collaborating with the following.

Gamelot

http://www.gamelot.fi/ mobile games, mobile content, multiplayer gaming.

Gamelot Ltd. creates Internet and mobile solutions specializing in game and entertainment products. The company's main focus is in online-games, which are developed using our competence and expertise on crossmedia content and Internet applications.

PAC

http://www.pac.fi/ Professional Audio Company - soundscapes, shared audio.

PAC Ltd. is a provider of audio software, audio content and integrated software/content solutions for the mobile environment. Their technology enables the creation, delivery and modification of rich, interactive mobile audio content and covers the whole mobile audio value chain from production to playback.

Ludocraft

http://ludocraft.oulu.fi/ game design, implementation and research.

LudoCraft, Game Design & Research Unit in University of Oulu has recently published AirBuccaneers game (mod for UT2003). More information can be found from: http://ludocraft.oulu.fi/airbuccaneers . In addition to this the unit has knowledge and experience from various areas of game design and development.

Key Concepts

Agent
A program that performs information gathering or tasks in the background. Typically, an agent is given a very small and well-defined task. In computer science, there is a school of thought that believes that the human mind essentially consists of thousands or millions of agents all working in parallel. To produce real artificial intelligence, this school holds, we should build computer systems that also contain many agents and systems for arbitrating among the agents' competing results.

Attribute
properties manifest themselves through attributes and functions.

Avatar
A visual representation of an agent. Agent's virtual clothing. A collection of properties that make up the visual reprentation of an agent.

Crossover
happens when two strands of dna first align themselves and cross each other. The strands break at crossover point and finally reassemble to form a new pair of aligned dna strands. In this context, crossover is the act of rearranging agents' properties.

Installation
this is the general term for the collection of equipment, software etc. and their arrangement for a public set-up. Oftentimes is used to refer to a particular set-up.

Kyperia
Our world of worlds. A virtual reality for multiplayer gameplaying and immersive participation. The eternity project of Kyperjokki.

Mating
in this context mating is the reproduction of new synthesized avatars that replace the players' agents current ones.

OffSpring
The children of the parents that mated. In case of Avatars, which participants use, prolong the user life.

Place
Agents exist only in some place. A place is a displayable unit of a world, not all places are displayed - however.

Property
is a conceptualization of an attribute. Mating mixes portions of partners' properties.

Prop
The purpose of prop is to generate atmosphere and landmark a place. Props are not directly handled by agents, although the sys-

tem may move them and change their properties. Props have physical attributes such as size, texture, opacity, hardness, weight, density, reflectivity, etc.

Season
Like the world itself, worlds in Kyperia are enlivened by seasonal change.

Soundscape
Places are have related soundscapes to convey atmophere, to create dramatic effects and to enhance immersion.

Tool
Tools are passive elements like props that populate places. In addition to properties of props they have properties and functions but to function they need a user, an operating agent or the system.

Transitioneffect
When a world ends and another starts they are joined by a transition effect. Their purpose is to let viewers anticipate and adapt to the change. E.g. imagine a thunderstorm slowly rising and coming on from the horizon bringing about the new world.

Viewer
by viewer usually we refer to the installation audience members. Sometimes the desktop client user is referred to as the viewer. This should be obvious from the context.

World
Kyperia is divided into worlds. World is a self-contained collection of things, active and passive. In this case: agents, places, tools and props.

References

Alatalo, T. & Peraho, J. (2001). Designing Mobile-aware Adaptive Hypermedia. *A position paper at the Third Workshop on Adaptive Hypertext and Hypermedia*, the Hypertext 2001 session

Alatalo, T., & Siponen, M.T., (2002), Addressing the Personalization Paradox in the Development of Electronic Commerce Systems. *Post-Proceedings of the E-Business Research Forum (eBRF)*, Tampere, Finland.

Davis, Lawrence, Handbook of Genetic Algorithms, New York, N.Y., Van Nostrand Reinhold, 1991.

Benja Fallenstein, Tuomas J. Lukka, Hermanni Hyytiälä, Toni Alatalo (2003) Storm: Using P2P to make the desktop part of the Web. *The fourteenth conference on Hypertext and Hypermedia*, August 26-30, 2003 Nottingham UK.

Manninen T. (2002) Contextual Virtual Interaction as Part of Ubiquitous Game Design and Development. *Personal and Ubiquitous Computing 6(5-6)*. Björk S., Holopainen J., Ljungstrand P. and Mandryk R. (eds.) Springer-Verlag. pp. 290-406

Manninen T. (2002) Towards Communicative, Collaborative and Constructive Multi-player Games. *In Proceedings of Computer Games and Digital Cultures Conference*. Mäyrä, F. (ed). June 7-8, Tampere, Finland, Tampere University press, pp. 155-169

Manninen T. (2003) Interaction Forms and Communicative Actions in Multiplayer Games. *Game Studies Journal, 3(1)*, http://www.gamestudies.org/0301/manninen/

Michalewicz, Zbigniew, Genetic algorithms + Data structures = Evolution programs, Berlin, Springer Verlag, 1992.

Salo, Heikki, Crusades in Mediaspheres Crusade I - II , several installations in museums and galleries in Finland, 1994-97.

Salo, Heikki, Genetic algorithms in programming (in Finnish) 2nd Nordic Workshop on Genetic Algoritms GP-tutorial, Vaasa 1996.

Stapledon, Olaf, First and Last of Men, London, 1930.