Appendix A

Original Contributions

This dissertation integrates and builds on previous research published in the following proceedings and journals:
Bollen (1994)
Bollen (1995)
Bollen and Heylighen (1996)
Heylighen and Bollen (1996)
Bollen and Heylighen (1997)
Bollen and Heylighen (1998)
Bollen et al. (1998)
Bollen, Vandesompel, and Rocha (1999)
Bollen (1999)
Bollen (2000)

This chapter will briefly list the original contributions made specifically in this dissertation.

1. Hypertext and WWW

(a) Proposal to study human hypertext design and navigation as two processes relying on a body of shared knowledge on concept relations.

(b) Relation between human hypertext navigation and Human Problem Solving.

2. Mental Models for Hypertext

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(a) Analysis of hypertext design as application of Designer's Mental Model of associative relations between documents.
(b) Representation of Designer's Mental Model by weighted, directed graph.
(c) Operationalization of Designer's Mental Model by structural proximities derived from hyperlink patterns in hypertext.
(d) Analysis of human hypertext navigation in terms of application of User's Mental Models of associative relations between documents.
(e) Representation of User's Mental Models by weighted directed graphs.
(f) Analysis of user group preferences by Collective Mental Models.
(g) Representation of Collective Mental Models by weighted, directed graph.

3. Hill-Climbing Model of Human Hypertext Navigation

(a) Proposal to analyse human hypertext navigation in terms of interaction between hyperlink structure and User's Mental Model.
(b) Proposal to model hypertext navigation as Hill-Climb search in hyperlink structure based on User's Mental Model.
(c) Algorithmic formalization of Hill-Climb Model of human hypertext navigation based on matrix representation of User's Mental Model and hypertext network structure.
(d) Proposal to model transition of user strategies from recreational to goal-directed by selection and target relaxation, and the use of hyperlink selection probability distributions.

4. Experimental Methodology

(a) Comparison of HCM model path predictions to user navigation paths reconstructed from a web site's log files.
(b) Generation of CMM representation from user request sequences in web log.
(c) HCM simulation software to predict user navigation paths.
(d) Demonstration of presence of hill-climb strategy in hypertext navigation by analysis of PGAS weight values of navigation path intermediate positions.
(e) Demonstration of relation between navigation path's start and target association weight, and navigation efficiency.

5. Automated Generation of Hyperlinks

(a) Analysis of adaptive information systems in terms of Designer and User Mental Models

(b) Proposal to generate hyperlink structure from representation of users' Collective Mental Model for hyperlink design rather than Designer Mental Model.

(c) A system for the automated generation of hyperlinks from user hyperlink traversal patterns.

(d) Application of a set of learning rules for hyperlink weights that dynamically change hypertext network during user interaction.

(e) Reduction of hypertext systems to word networks for purposes of quantitative study.

(f) Evaluation of adaptive hypertext systems by a measure of reliability and validity of network development.

(g) Use of simulation of user hyperlink selection behavior to assess re-test reliability and validity of adaptive hypertext system.

(h) Assessment of concept relation validity in adaptive hypertext by comparison to word association norm data.

6. Implementation of Spreading Activation Recommendation system operating on CMM generated from user request sequences.
Appendix B

PCP Labels and Titles

| ABSTRACT (Abstraction), ACT (Principia Cybernetica Meetings), ACTION (Action), ADAPNET (Adaptive hypertext network), ADAPSYS (Adaptive system), ADHYEXP (The Adaptive Hypertext Experiment), AGENT (Agent), ALEVOMOD (Artificial Life Evolutionary Models), ALINDEX (Alphabetical Index), ANALYST (Analytic vs. Systemic Approaches), ANNOHELP (Guidelines for making annotations), APPEVMOD (Applied Evolutionary Modeling), ARIST (Aristocratic rule), ASYMILL (Asymmetric Transitions: an illustration), ASYMTRANS (The Principle of Asymmetric Transitions), ATHEISM (Atheism), ATTRACTO (Attractors), AUTHORIT (Authority), AUTOCAT (The Principle of Autocatalytic Growth), BARTER (Barter), BEAUTIF (The feeling of beautiful), BELGUL (Belgium: Overview), BELGUL2 (Belgium: society, character and culture), BESWEB (Principia Cybernetica Web and the "Best of the Web" awards), BIOEVL (Biological Evolution), BIOGRAFJB (Biographical Sketch - J. Bollen), BIOIMM (Biological immortality), BIOLEXAM (Biological examples of MSTs), BLINCTRL (Blind control), BLINDVAR (The Principle of Blind Variation), BOARD (Editorial Board), BOOLNET (Kauffman’s NK Boolean networks), BRUSSEL (Things to see in Brussels), BVS (Blind Variation and Selective Retention), CAMPBEL (In Memoriam Donald T. Campbell), CAPITAL (Capitalism), CAS (Complex Adaptive Systems), CAUSE (Causality), CHAOS (Deterministic Chaos), CHINNEG (Change and Information Overload: negative effects), CLOSURE (Closures), CLUSTERW (Cluster Analysis of Word Associations), COGNAILL (Links on Cognitive Science and AI), COGNEVOL (Cognitive Evolution (stages)), COHERENC (Coherence), COLBRAIN (Collective brain of humanity), COLGRAN (collaborative granularity), COLL (Collaborators Needed), COLLFLIT (Collaborative Filtering), COLLUTIL (Collective Utility), COMMAND (Command), COMMUN (Communication), COMPGROW (The Growth of Complexity), COMPLEXI (What is complexity?), COMPREX (Self-organization and complexity in the natural sciences), COMPTABL (Correspondence between Organism and Society), COMSELLI (Links on Complexity, Self-organization and Artificial Life), COMWEBII (Links on Computer Interfaces and the Web), CONBUILD (Consensus Building), CONCEPT (Concept), CONFLICT (Conflict), CONFORM (Conformity) |
FUN (The feeling of funny), FUTDEVLI (Links on Future Development), FUTEVOL (The Future of Humanity), FUZZY (Fuzzy logic and sets), GABORA (About Liane Gabora), GATHER (Gathering a variety of contributions), GBRMAINREF (References on the Global Brain / Superorganism), GBRAISUB (Subscription to the Global Brain mailing list), GENETALG (Genetic Algorithms), GENMODEV (General Models of Evolution), GOAL (Goal), GOD (God), GODEXIST (Arguments for and against the Existence of God), GROWTH (Growth), HAPPINES (Happiness), HARMOSCL (The Harmonic Oscillator as a Control System), HELPTAS (Tasks with which you can help), HEYBIO (F. Heylighen: Biographical Sketch), HEYL (Home page of Francis Heylighen), HIERARCH (Hierarchy), HIGHTVAL (Highest values), HISTEVL (The History of Evolution), HISTOREC (Historic record), HISTORY (History of the Principia Cybernetica Project), HOmorastisis, HOMOMORP (Homomorphism), HOWWEB (How to use Principia Cybernetica Web), HUMFREE (Human Freedom), HUMLANG (Human language), HUMRIGHT (Human Rights), HYPERC (Hypercycles), IAC (IAC - International Association for Cybernetics), IDENINDI (The Identity of the Indistinguishables), IMAGIN (Imagination), IMMORT (Will for immortality), INDCOLL (Individualism vs. collectivism), INDENCL (Links on Indexes and Encyclopedias), INDEX (Search), INDUTIL (Utility), INFINITY (Infinity), INFOJB (Johan Boßen), INFORM (Information), INSECSC (Insect Societies), INSTMEAN (Instrumental meaning), INSTVAL (Institutionalization of values), INTDIF (Integration and differentiation), INTERFAC (Direct Interfaces into the Global Brain), INTFREE (Integration and freedom), INTRO (Introduction to Principia Cybernetica), INTUIT (Intuition), INVAR (Invariance), IRRIT (Irritability), ISOMCTRL (Other Definitions of Control), JMDEWAEL (About Jean-Marc Dewaele), JOSLYN (About Cliff Joslyn), JOURNALS (Cybernetics and Systems Journals), JUDIT (Judiciary), KASCHO (From Kant to Schopenhauer), KNOW (Knowledge), KNOWSEL (Knowledge Selection Criteria), KNOWSOL (Knowledge Structuring), LANG (Language), LEARNING (Learning), LEARNWEB (Learning Webs), LEGIS (Legislative power), LINGACT (Four types of linguistic activities), LINKTYPE (Links and Link Types), LISTSV (PCP-discuss usage instructions), MACHINE (Machine), MACRBOOK ("The Macrobook", a book on the systems approach), MAIL (Principia Cybernetica Mailing Lists), MANIFESTO (The Cybernetic Manifesto), MARKET (Market), MASTHEAD (Principia Cybernetica Masthead), MATHEM (Mathematical Modeling of Evolution), MATHMPG (Mathematical Methods of Population Genetics), MEANIST (Meaning Goes First), MEANING (Meaning), MEANLIFE (What is the meaning of life?), MEANMET (The meaning of metaphysics), MEASFOR (Measuring formality through word frequencies), MEEMEVOL (Mnemonic Evolution), MEMENET (Memes on the Net), MEMES (Memes), MEMETY (Symposium on Memetics), MEMGEN (Competition between Memes and Genes), MEMIN (Memes: Introduction)
REGUL (Regulation), RELATED (Sites Related to Princpia Cybernetica), RELIGION (Religion), REQCONS (Law of Requisite Constraint), REQHIER (Law of Requisite Hierarchy), REQKNOW (The Law of Requisite Knowledge), REQVAR (The Law of Requisite Variety), REVWIR (Principia Cybernetica in "Wired" magazine), SAMPNEWS (Sample Issue of 2-monthly PCP-news), SCICONC (Basic Concepts of Science), SCIEVOL (Science in evolution), SCIVAL (Science and human values), SCIVIEW (Scientific worldview), SCOPE MST (The scope of MST), SEARCHERR (Common Search Errors), SELECT (Selection), SELFKNOW (Self-knowledge), SELFORG (Self-organization), SELRET (The Principle of Selective Retention), SELVAR (The Principle of Selective Variety), SEMAN (On Semantic Analysis and Consensus Building), SEMANAL (Semantic Analysis), SEMANT (Semantics), SEMCONT (Semantic Control), SEMOTER (Semiotic Terms), SEMNET (Hyper-text web as a semantic network), SENTENCE (Sentence), SEPPPOWER (Separation of powers), SEX (Sexuality as a Metasystem Transition), SINGULAR (The Socio-technological Singularity), SLAVERY (Slavery), SOCEVOL (Social Evolution), SOCIALISM (Socialism), SOCIETIES (Cybernetics and Systems Societies), SOCIETY (Human society), SOCINT (Social Integration), SOCIOBIO (Sociobiology), SPACE (Space), SPECCTRL (Special Cases of Control), SPINGLE (Spin-glass model of evolution), SPIRSYS (Spiritual system), SPREADACT (Finding words through spreading activation), STABCOOP (Evolutionary stability of cooperation), STATE (State of the world), STATEM (Statement), STATINF (Statement of infiniteness), SUBJ (Subject of knowledge: "I"), SUBMNODE (Submitting Nodes for Inclusion in Principia Cybernetica), SUBOPTIM (The problem of sub optimization), SUBSCR (PRNCYB-L Subscribers), SUPERBRAIN (Human super-brain), SUPBRAIN (From World-Wide Web to Super-Brain), SUPORGLI (The Social Superorganism and its Global Brain), SURVIV (Survival), SYMBIMST (Symbiosis a Metasystem Transition), SYMBOL (Symbol), SYNTAX (Syntax), SYSAPP (Basic Concepts of the Systems Approach), SYSCONC (Systems Concepts), SYSERS (Sysers), SYSTHEOR (What is Systems Theory?), TECACELE (Technological acceleration), THEORIES (Theories versus facts), TESIS (About "Representation and Change"), THINKING (Human thinking), TIME (Time), TOC (Table of Contents), TOOLMAKE (Making tools), TRIALERR (The trial-and-error method), TRIBE (Primitive tribe), TRUTH (Truth), TURCIBIO (Biographical Notes on Valentin Turchin), TURCHIN (About Valentin Turchin), ULTRAMST (Ultra-Metasystems), UMLEB (About Stuart Umpleby), UNSEMLAN (Universal Semantic Language), USANNOT (User Annotations), VARIETY (Variety), VERIFIC (Verification), VICARSEL (Vicarious Selectors), VISIFUT (Popular Visions of the Future), VUBULB (The Free University of Brussels), WEBCONAN (Web Connectivity Analysis), WEBORG (Web Organization), WEBRESEA (PCP Research on Intelligent Webs), WEBSTRUCT (Structure of Princpia Cybernetica), WFISSUE (Special Issue on "The Quantum of Evolution"), WORLVIEW (What is a world view?), ZESUGAM (Zero sum games)