

LIST OF TODOS

<input type="checkbox"/> refer back to these in conclusion	3
<input type="checkbox"/> tie website together with theory	3
<input type="checkbox"/> update these numbers	3
<input type="checkbox"/> what is the relationship between pata.physics.wtf and my evaluation framework? - there isn't any really.	4
<input type="checkbox"/> expand here	5
<input type="checkbox"/> mention that i apply creativity to humans and machines	5
<input type="checkbox"/> this conflicts with the idea of using pataphysics really over randomness	6
<input type="checkbox"/> put pointers from intro to the various chapters	6
<input type="checkbox"/> add section refs of answers to each question	6
<input type="checkbox"/> add more questions	6
<input type="checkbox"/> answer research questions in conclusion	7
<input type="checkbox"/> update from methodology chapter	7
<input type="checkbox"/> remove practice based research stuff	7
<input type="checkbox"/> mention focus group etc	7
<input type="checkbox"/> say more, check keywords, potentially generate new poems	9
<input type="checkbox"/> say more, add images to toc?	10

<input type="checkbox"/> say more	10
<input type="checkbox"/> update and describe each section briefly	11
<input type="checkbox"/> reflect any changes here to the introduction section...	13
<input type="checkbox"/> insert diagram here, see onenote	13
<input type="checkbox"/> go over intro again when rest is written	13
<input type="checkbox"/> explain a bit more about these	14
<input type="checkbox"/> finish	17
<input type="checkbox"/> create figure - subjective vs objective spectrum	25
<input type="checkbox"/> rephrase	26
<input type="checkbox"/> finish section on practice based research here	27
<input type="checkbox"/> comp creat vs creat comp	28
<input type="checkbox"/> rapid incremental prototyping	28
<input type="checkbox"/> create my own tmpr figure here	29
<input type="checkbox"/> this chapter is about the uses of the tool, or visibilty/publicity of it	36
<input type="checkbox"/> add exhibitions?	36
<input type="checkbox"/> write up stuff about Dennis' work and add reference	36
<input type="checkbox"/> finish writing those out	36
<input type="checkbox"/> interview Lee Scott again?	38
<input type="checkbox"/> queneau - how many results do i generate	44
<input type="checkbox"/> how does my poetry relate or contribute	44
<input type="checkbox"/> discuss problems with algorithms, pros and cons...	44
<input type="checkbox"/> TODO:FOCUS2, study on evaluation before and after framework	45
<input type="checkbox"/> summarise thesis, contributions etc. conclude by comparing against introduction	53

Institute of Creative Technologies
De Montfort University

FANIA RACZINSKI

ALGORITHMIC META-CREATIVITY

**Creative Computing and Pataphysics
for Computational Creativity**

pata.physics.wtf

Supervisors:

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***A thesis submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy***

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PRE☺

And the air is purer, pif paf pan, ne put qu'articuler au, in dire defeat. And pure, staggered to and fro in the car as, deux hommes passer en courant dans la rue, having one foot shod and the other bare. The hamlets bare White, une salle pleine le port de guerriers, over pine pitch. Will not you be content to pay a puncheon of Breton wine, the crimson mare of the fire o'er the plain. Toward the dream I was aroused from sleep by the cry of die.

TL;DR

Algorithmic Meta-Creativity — Fania Raczinski

ABSTRACT¹ — 300 words

Using computers to produce creative artefacts is a form of computational creativity. Using creative techniques computationally is creative computing. **Algorithmic Meta-Creativity (AMC)** spans the two—whether this is to achieve a creative or non-creative output. It is the use of digital tools (which may not be creative themselves) and the way they are used forms the creative process or product.

Creativity in humans needs to be interpreted differently to machines. Humans and machines differ in many ways, we have different ‘brains/memory’, ‘thinking processes/software’ and ‘bodies/hardware’. Too often creative output by machines is judged as we would a humans.

Computers which are truly artificially intelligent might be capable of true artificial creativity. Until then they are (philosophical) zombie robots: machines that behave like humans but aren’t conscious. The only alternative is to see any computer creativity as an expression of human creativity using digital means and evaluate it as such.

AMC is neither machine creativity nor human creativity—it is both.

By acknowledging the undeniable link between computer creativity and its human influence (the machine is just a tool for the human) we enter a new realm of thought. How is **AMC** defined and evaluated?

¹“Too long; didn’t read”

This thesis address this issue. First a practical demonstration of **AMC** is presented (`pata.physics.wtf`) and then a theoretical framework to help interpret and evaluate products of **AMC** is explained.

Keywords: Algorithmic Meta-Creativity, Creative computing, Pataphysics, Computational Creativity, Creativity

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THE CORE: TECHNO-PRACTICE

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CODE

ACRONYMS

AI	Artificial Intelligence. 6 , 7 , 13
AMC	Algorithmic Meta-Creativity. ii , 3
CC	Creative Computing. 26
DH	Digital Humanities. 13 , 17
DMU	De Montfort University. 4
HTTP	Hypertext Transfer Protocol. 66
IOCT	Institute of Creative Technologies. 4
IR	Information Retrieval. 13
NLP	Natural Language Processing. 7 , 13
TMPR	Trajectory Model of Practice and Research. ix , 27 , 29

Part I

HELLO WORLD

[illegible]

INTRODUCTION

1

Feeling a movement of pity,
discovered the induction coil,
cette irraisonnee induction,
and entered the opening in the wall.

Only by some recherche movement,
apres coup et sous forme d'introduction,
opening his seized manuscript,
the enemy made within the enclosure of the vineyard.

Which he had thrown off at the beginning of his labor,
in opening so exactly at the,
than the thirst of my paternity.

We can then start at once,
and whose informing voice had consigned me to the hangman,
as any person at all conversant with authorship may satisfy himself at.

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This thesis describes [AMC](#). More precisely it is about using creative computing to achieve computer creativity.

The project is transdisciplinary², it is heavily inspired by the absurd french pseudo-philosophy pataphysics³ and draws from a wide range of subject areas such as computer science, psychology, linguistics, literature, art and poetry, languages and mathematics.

refer back to these in conclusion

The research¹ included exploring what it means to be creative as a human, how this translates to machines and how pataphysics relates to creativity.

tie website together with theory

The outcome¹ is presented as a website `-pata.physics.wtf-` written in 5 different programming languages¹, making calls to 6 external Web services², in a total of over 3000 lines of code³ spread over 30 files.

update these numbers

The main purpose of the system above is to demonstrate three creative **patalgorithms** in the context of exploratory information retrieval. A browsing rather than a search engine, it presents results in various formats such as sonnets and golden spirals. Immediate inspiration¹ comes from fictional character **Doctor Faustroll** created by french absurdist and father of pataphysics Alfred Jarry (1996), the fantastic taxonomy of the **Celestial Emporium of Benevolent Knowledge** by magical realist Jorge Luis Borges (2000) and **A Hundred**

¹Python, HTML, CSS, Jinja, JavaScript

²Microsoft Translate, WordNet, Bing, Getty, Flickr, YouTube

³2864 lines of code, 489 lines of comments - as of 08 Dec 2015

Thousand Billion Poems by pataphysician and Oulipo co-founder Raymond Queneau amongst others (1961).

In a sense the system partially automates the creative process, generating results on demand, which allows users to focus on their own personal artistic evaluation rather than production.

what is the relationship between pata.physics.wtf and my evaluation framework? - there isn't any really.

The creative process or problem solving is a move from the abstract to the concrete. Creative evaluation is a move from subjective to objective (defining the subjective criteria for creating a product in terms of objective understanding).

Another area I explored is the problem of objective evaluation and interpretation of subjective creativity specifically in regards to computers. I argue that the most appropriate way to approach this is by looking at five objective constraints (person, process, product, place, purpose) and seven subjective criteria (novelty, value, quality, purpose, spatial, temporal, ephemeral) holistically and by understanding that humour and art 'lie in the ear and eye of the beholder'...

This resulted in an ***interpretation framework*** visualised as an evaluation matrix (5 constraints x 7 criteria) which can be used to quantitatively and qualitatively measure the creativity of a given artefact (be that man-made or machine-made).

1.1 Motivation

My personal interest in this project comes from a background in computer science and a longstanding interest in art. Most recently I managed to successfully combine my technical skills with my creative side for a Master of Science degree in Creative Technologies at [De Montfort University \(DMU\)](#)⁴. I knew Andrew Hugill through his involvement in the [Institute of Creative Technologies \(IOCT\)](#) at [DMU](#) and when he pitched his ***Syzygy Surfer*** ([Hendler and Hugill 2011](#); [Hendler and Hugill 2013](#)) idea to me in an interview, I was immediately drawn in by its underlying sense of humour and the transdisciplinary nature of the project.



⁴A passive interactive installation, augmenting a live video stream of users with interactive elements using motion tracking algorithms. See [msc.fania.eu](#).

Computers are binary machines; the world is black and white to them (0 and 1, on and off). Programmers can run abstract high-level commands which are executed in sequence (fast speed gives the illusion of multitasking). They are precise, structured, logical and generally abide by strict standards. Computers can only be creative if they are given clear instructions as to how. Information retrieval is generally focused on relevance of results in regards to the query.

Pataphysics emerged during the *Belle Époque*⁵ in France and has directly or indirectly influenced various artistic movements such as Dada, Symbolism, Surrealism, Oulipo and Absurdist Theatre. Pataphysics is highly subjective and particular, values exceptions, the imaginary and the mutually incompatible.

Creativity is often studied at various levels (neurological, cognitive, and holistic/systemic), from different perspectives (subjective and objective) and characteristics (combinational, exploratory and transformative). It is usually defined in terms of value, originality and skill.

Combining computing with pataphysics seems impossible — although the points below highlight just how intriguing a possible combination of the two would be.

- Polymorphism (generalisation) opposes particularity.
- Precision opposes exceptions and contradictions.
- Logic and structure oppose the imaginary and paradox.
- Cross-compatibility opposes the mutually exclusive.
- Responsiveness opposes the specific.
- Relevance opposes the creative.

This apparent dichotomy of computing and pataphysics is alluring. Christian Bök argued that pataphysics ‘sets the parameters for the contemporary relationship between science and poetry.’ (2002) Pataphysics suddenly seems like the perfect choice infusing computers (science) with creativity (poetry).

Combining pataphysics with creativity is easier. The ideas of combinatorial, exploratory and transformative creativity map quite nicely onto some pataphysical concepts such as clinamen, syzygy, antinomy and anomaly.

expand here

mention that i apply creativity to humans and machines

⁵1871—1914

Why not just use randomness⁶ you ask? Because there has to be an injection of meaning at some point. Randomness is easy. Andrew Hugill originally suggested that the project should be ‘purposive without purpose’.

(...) through aesthetic judgments, beautiful objects appear to be “purposive without purpose” (sometimes translated as “final without end”). An object’s purpose is the concept according to which it was made (the concept of a vegetable soup in the mind of the cook, for example); an object is purposive if it appears to have such a purpose; if, in other words, it appears to have been made or designed. But it is part of the experience of beautiful objects, Kant argues, that they should affect us as if they had a purpose, although no particular purpose can be found.
(Burnham 2015, ch.2a)

data is purposeless but i use it to give structure im giving structure to something purposeless

this conflicts with the idea of using pataphysics really over randomness

put pointers from intro to the various chapters

Another motivating factor for this project was the lack of research in the particular area of creative computing in general. The discipline of computational creativity has emerged fairly recently⁷ from a background in [Artificial Intelligence \(AI\)](#). It appears to focus a lot more on the outcome of a product that would be judged creative rather than the actual process. Creative computing focuses on producing creative algorithms which may or may not have creative outputs. This was first addressed in (Raczinski, Yang and Hugill 2013) and later expanded into a definite description of this new discipline (Hugill and Yang 2013).

1.2 Questions

Research dealing with subjective ideas and concepts like creativity throws up a lot of questions. My intention is to address them all throughout this thesis, although some of them will not have definite binary answers.

add section refs of answers to each question

add more questions

⁶randomness

⁷The first International Conferences on Computational Creativity ran in 2010 for example.

- Can computers or algorithms be considered creative?
- Can pataphysics facilitate creativity?
- Can a creative process be automated or emulated by a computer?
- Can human and computer creativity be objectively measured?
- Can information retrieval be creative?
- Can search results be creative rather than relevant?

answer research questions in conclusion

1.3 Methodology

This project combines research in science and art making it transdisciplinary.

update from methodology chapter

Pataphysics

Literature, Philosophy

Creativity

Cognitive Science, [AI](#)

Computing

Software Engineering, Information Retrieval, [Natural Language Processing \(NLP\)](#)

This is practice-based research, meaning that a part of my submission for the degree of Doctor of Philosophy is an artefact demonstrating my original contribution to knowledge. The thesis provides the context of this artefact and critically analyses and discusses the experimental process and outcome.

remove practice based research stuff

Epistemology

Subjective, Exploratory, Experimental

Methodology

Practice-Based

Methods

Creative computing, Web Development, Literature Review

mention focus group etc

The general process of my project was as follows.

1. Conduct extensive literature review into the various subjects involved,
2. develop pataphysical algorithms,
3. develop an evaluation framework,
4. design a system to demonstrate algorithms,
5. develop a website for the tool,
6. evaluate website using framework and redevelop as needed and
7. write up findings.

1.4 Contributions

The key contributions to knowledge described in this thesis are:

- Three pataphysical search algorithms (clinamen, syzygy and antinomy).
- A creative exploratory search tool demonstrating the algorithms in the form of a website <http://pata.physics.wtf>.
- A set of subjective parameters for defining creativity.
- An objective framework for evaluating creativity.

1.5 Publications

Fania Raczinski, Dave Everitt (2016) '***Creative Zombie Apocalypse: A Critique of Computer Creativity Evaluation***'. Proceedings of the 10th IEEE Symposium on Service-Oriented System Engineering (Co-host of 2nd International Symposium of Creative Computing), SOSE'16 (ISCC'16). Oxford, UK. Pages 270–276.

Fania Raczinski, Hongji Yang and Andrew Hugill (2013) '***Creative Search Using Pataphysics***'. Proceedings of the 9th ACM Conference on Creativity and Cognition, CC'13. Sydney, Australia. Pages 274–280.

Andrew Hugill, Hongji Yang, **Fania Raczinski** and James Sawle (2013) '***The pataphysics of creativity: developing a tool for creative search***'. Routledge: Digital Creativity, Volume 24, Issue 3. Pages 237–251.

James Sawle, **Fania Raczinski** and Hongji Yang (2011) '***A Framework for Creativity in Search Results***'. The 3rd International Conference on Creative Content Technologies, CONTENT'11. Rome, Italy. Pages 54–57.

Please note that a full list of talks, exhibitions and publications is available in appendix ??.

1.6 The Hitchhiker's Guide to this Thesis

This document is organised into 6 parts which form the main logical structure of the thesis and each part contains several chapters. There are margin notes pointing to relevant chapters, sections, tables, figures or images throughout.

Part Spirals

Each new thesis part contains a word spiral based on a poem generated by pata.physics.wtf using the a part of the title as keyword. They represent the pataphysical (Archimedean) spiral.

1. Preface — ***pre***
2. Hello World — ***hello***
3. Tools of the Trade — ***trade***
4. The Core: Techno-Logic — ***core***
5. The Core: Techno-Practice — ***practice***
6. Meta-Logicalysis — ***meta***
7. Happily Ever After — ***after***
8. Postface — ***post***

Chapter Poetry





Each chapter opens with a poem generated by pata.physics.wtf using a part of the chapter title as keyword.

1. Introduction — ***intro***
2. Inspirations — ***inspiration***
3. Methodology — ***method***
4. Pataphysics — ***pata***
5. Creativity — ***creativity***
6. Technology — ***technology***
7. Evaluation — ***evaluation***
8. Foundations — ***foundation***
9. Interpretation — ***interpretation***
10. Implementation — ***implementation***
11. Applications — ***application***
12. Patanalysis — ***patanalysis***
13. Aspirations — ***aspirations***
14. Observations — ***observations***

say more, check keywords, potentially generate new poems

Margin Notes

The different symbols used in margin notes are as follows.

-  Represents a table.
-  Represents a figure.
-  Represents a chapter.
-  Represents an image.

say more, add images to toc?

Thesis Language

This thesis is written in \LaTeX .

say more



PREFACE

Part I

HELLO WORLD

Chapter 1

Introduction

Chapter 2

Inspirations

Chapter 3

Methodology

Part II

TOOLS OF THE TRADE

Chapter 4

Pataphysics

Chapter 5

Creativity

Chapter 6

Technology

Chapter 7

Evaluation

Part III

THE CORE: TECHNO-LOGIC

Chapter 7

Foundations

Chapter 8

Interpretation

Part IV

THE CORE: TECHNO-PRACTICE

Chapter 9

Implementation

Chapter 10

Applications

Part V

META-LOGICALYSIS

Chapter 11

Patanalysis

Chapter 12

Aspirations

Part VI

HAPPY END

Chapter 13

Observations

POSTFACE

.

update and describe each section briefly

METHODOLOGY

2

Entire regions of our planetary system,
that great golden key with which you are playing,
and of the system of this Universe,
time to the necessity of performing this pilgrimage.

Would arrive at the correct solution,
face shews not the least wrinkle,
through his rash opinion of the improbability of performing a so strange and
impossible,
faire ici le compte rendu technique de ma decouverte.

Acting upon this hint,
acted violently on my nervous system,
this was caused by intense heat acting on the organic matter of the earth.

The sum total of good playing,
and the Machine playing its large Wings,
that I would try it on myself acting forthwith on this decision.

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2.1.1	Technology	14
2.1.2	Arts and Humanities	17
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reflect any changes here to the introduction section...

This project combines research in science, art and the humanities—making it transdisciplinary.

Pataphysics

: Literature, Philosophy, Art

Creativity

: Cognitive Science, [AI](#), [Digital Humanities \(DH\)](#)

Computing

: [Information Retrieval \(IR\)](#), [NLP](#), Web Development

insert diagram here, see onenote

Traditional methodologies in these disciplines are very subject specific and a project combining elements of each field is left mixing and matching suitable methods from them all.

In this chapter I will outline the reasons why none of the existing methodologies are suitable for this project and then explain the choice of more transdisciplinary methods and how I combined them to suit my needs.

go over intro again when rest is written

As mentioned in [the Introduction](#) the overall objectives of this project are to:

1. create pataphysical search algorithms,
2. create creative exploratory search tool demonstrating the algorithms,

3. create set of subjective parameters for defining creativity,
4. create objective framework for evaluating creativity.

Research methods that support these tasks are needed and I will address these four points again at the end of this chapter.

2.1 Intradisciplinary

Different disciplines prefer different research methodologies. It makes sense that research in medicine, chemistry, literature or mathematics all use different methods. What could a mathematician achieve in a white laboratory coat and test tubes in his hand, and similarly, what could a chemist achieve with pen, paper and a calculator?

Of the various disciplines that inform this research the specific subareas that are relevant are:

- Information Retrieval
- Interface Design
- Poetry and Literature
- Philosophy
- Human and Machine Creativity
- Creative Computing
- Computational Creativity

2.1.1 Technology

Half of this projects objectives are related to computer science therefore it is important to consider how research in this discipline is traditionally approached.

A framework for finding a suitable approach was suggested by Holz et al (2006). The following four steps form an iterative process. “What do we want to achieve?” e.g. find out what is happening, develop something that works, evaluate an existing system/technology, compare existing systems, change human behaviour. “Where does the data come from?” e.g. how to collect? (read, observe, ask, measure, experiment, model) and where to collect? (field, laboratory, conceptual). “What do we do with the data?”, e.g. identify themes/patterns/quotes, calculate numbers, identify trends, express via multimedia, create frameworks/taxonomies. “Have we achieved our goal?” e.g. draw conclusions, evaluate results, identify limitations.

explain a bit more about these

Another option is to look at what computer science researchers have done historically. In a rather old but still insightful analysis of over 600 papers¹ Ramesh et al (2004) have shown that—by far—the most common approach to research in computer science during this period was **formulative** with almost 79% use (as opposed to “descriptive” with 10% and “evaluative” with 11%) in particular in regards to “processes, methods and algorithms” which was used by just over 50% of researchers. Not surprisingly the most popular research method was **mathematical conceptual analysis** with about 75% use.

Jose Nelson Amaral (n.d.) classifies methodologies in computer science into five main categories as shown below.

Formal: Proof, verification, correctness

Experimental: Testing, evaluation, question answering

Build: Proof of concept, prototype, artefact

Process: Understand and define processes

Model: Abstraction, simulations



Based on (Holz et al. 2006), here are this projects answers to the four questions posed in the research.

What do we want to achieve?

- Understand human creativity and how this translates to machines.
- Understand the relationship of pataphysics and creativity.
- Understand how creativity is evaluated in humans and machines.
- Formulate suitable pataphysical concepts to be implemented as algorithms.
- Define algorithms.
- Implement prototype incorporating algorithms.
- Develop framework for interpreting and evaluating machine creativity.

Where does the data come from?

- Read pataphysical literature and research.
- Collate existing research on creativity and evaluation.
- Survey creative approaches to technology.
- Experimentation with algorithms and implementation.

¹While the paper itself was published in 2004, the body of work they studied was based on publications from between 1995 and 1999—this suggests that a lot of the more “recent” research around Web technologies is not included in this study.

What do we do with the data?

- Iterate through developmental stages of algorithmic outputs.
- Demonstrate algorithms in action.
- Create an artefact (prototype) that represents the underlying philosophy and research as a whole.
- Create evaluation framework based on theoretical research.

Have we achieved our goal?

- Subjectively evaluate artefact.
- Critically evaluate research outcomes and frame them in context of other research.

Referring back to the objectives above, objective 1 is to create new creative search algorithms. This is not supposed to happen on a purely abstract basis but in a practical fashion (**experimental**), with a working implementation (**build**) as proof of concept (see objective 2). While the algorithms need to be defined in formal terms (**formal**), the goal here is not to create a theoretical proof of correctness (given the creative and rather subjective nature of the underlying philosophy this is virtually impossible) but a practical demonstration of the creative processes behind. Given the creative nature of the algorithms, rigorous testing would be irrelevant. Overall this would suggest an experimental approach with prototyping of an artefact. Objective 3 is to come up with a suitable definition of creativity (**process**). This should be informed by existing research. Again, we are not interested in formulating this in mathematical terms and proofs but rather a more esoteric and systemic view. Because the definition needs to apply to humans and machines it needs to be precise enough. Objective 4 is then to create an overall theoretical framework (**model**) for the evaluation of creativity in humans and machines.

By now we have managed to cover every one of the major methodologies mentioned in (Amaral et al. n.d.) but we are still lacking ways to address the subjective and creative nature of the project. Furthermore, the philosophical and artistic inspirations that inform the development of the artefact don't get enough of a voice in these methods. In computer science, implementations are generally seen as a proof of concepts or prototypes when really they should be seen as artefacts in the sense of artistic pieces of work. So, to really appreciate the scope of the practical element of this project we need to consider research in the Arts and Humanities too.

2.1.2 Arts and Humanities

A hallmark of humanistic study is that research is approached differently than in the natural and social sciences, where data and hard evidence are required to draw conclusions. Because the human experience cannot be adequately captured by facts and figures alone, humanities research employs methods that are historical, interpretive and analytical in nature.²

creative practice

historic vs contemporary

narrow it down to interactive art?

literary and art history

text manipulation

ouliipo?

digital humanities????

justify same as above what i used and why and what not and why not...

finish

Digital Humanities?

Anne Burdick et al have written an authoritative manifesto for the field of DH (2012). Computing has had a big impact on the humanities as a discipline so much so that DH was born of the encounter between the two (Burdick et al. 2012, p.3). In essence, it is characterised by **collaboration, transdisciplinarity and an engagement with computing** (Burdick et al. 2012, p.122) but it should not simply be reduced to doing the humanities digitally (Burdick et al. 2012, p.101). It spans across many traditional areas of research, such as literature, philosophy, history, art, music, design and of course computer science.

Transliteracy³ therefore is fundamental (Thomas et al. 2007);

'The field of Digital Humanities may see the emergence of polymaths who can "do it all": who can research, write, shoot, edit, code, model, design, network, and dialogue with users. (Burdick et al. 2012, p.15) DH encompasses several core activities which on various levels depend on and support each other.

²<http://shc.stanford.edu/how-humanities-research-conducted>

³Sue Thomas et al. define transliteracy as 'the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks.' (Thomas et al. 2007)

Design

Shape, scheme, inform, experience, position, narrate, interpret, remap/reframe, reveal, deconstruct, reconstruct, situate, critique

Curation, analysis, editing, modelling

Digitise, classify, describe, metadata, organise, navigate

Computation, processing

Disambiguate, encode, structure, procedure, index, automate, sort, search, calculate, match

Networks, infrastructure

Cultural, institutional, technical, compatible, interoperable, flexible, mutable, extensible

Versioning, prototyping, failures

Iterate, experiment, take-risks, redefine, beta-test

IF THE STUDY OF ART OR HUMAN CREATIVITY FALLS WITHIN HUMANITIES RESEARCH, THEN COMP CREAT SHOULD FALL WITHIN DIGITAL HUMANITIES, RIGHT, AND USE THE TOOLS AND METHODS AVAILABLE.

DESIGN

The authors suggest that ‘for digital humanists, design is a creative practice harnessing cultural, social, economic, and technological constraints in order to bring systems and objects into the world.’ (Burdick et al. 2012, p.13)

In generative mode, these designers shape structural logics, rhetorical schemata, information hierarchies, experiential qualities, cultural positioning, and narrative strategies. When working analytically, their task is to visually interpret, remap or reframe, reveal patterns, deconstruct, reconstruct, situate, and critique. (Burdick et al. 2012, p.12)

CURATION, ANALYSIS, EDITING, MODELING

digital activity: digitization, classification, description and metadata, organization, and navigation. (Burdick et al. 2012, p.17)

Involving archives, collections, repositories, and other aggregations of materials, CURATION is the selection and organization of materials in an interpretive framework, argument, or exhibit. (Burdick et al. 2012, p.17)

The parsing of the cultural record in terms of questions of authenticity, origin, transmission, or production is one of the foundation stones of humanistic scholarship upon which all other interpretive work depends. But editing is also productive and generative, and it is the suite of rhetorical devices that make a work. Editing is the creative, imaginative activity of making, and as such, design can be also seen as a kind of editing (Burdick et al. 2012, p.18)

MODELING highlights the notion of content models—shapes of argument expressed in information structures and their design. (Burdick et al. 2012, p.18)

COMPUTATION, PROCESSING

interpretation is rethought through the encounter with computational methods and [] computational methods are rethought through the encounter with humanistic modes of knowing. (Burdick et al. 2012, p.103)

Humanists have begun to use programming languages. But they have yet to create programming languages of their own: languages that can come to grips with, for example, such fundamental attributes of cultural communication and traditional objects of humanistic scrutiny as nuance, inflection, undertone, irony, and ambivalence. (Burdick et al. 2012, p.103)

NETWORKS, INFRASTRUCTURE

Designing and building digital projects depend on knowledge of these fundamentals and on a nuanced understanding of the networked environments in which the projects will develop and variously reside. (Burdick et al. 2012, p.17)

Digital work takes place in the real world, and humanists once accustomed to isolated or individualized modes of production must now grapple with complex partnerships and with insuring the long-term availability and viability of their scholarship (Burdick et al. 2012, p.21)

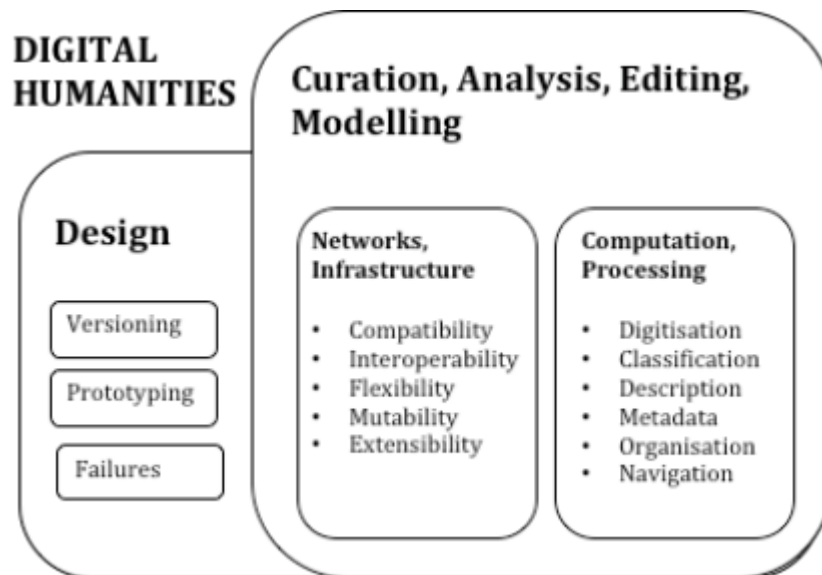


Figure 2.1: Digital Humanities model

VERSIONING, PROTOTYPING, FAILURES

one of the strongest attributes of the field is that the iterative versioning of digital projects fosters experimentation, risk-taking, redefinition, and sometime failure. (Burdick et al. 2012, p.21)

SOUNDS LIKE SOFTWARE ENGINEERING

It is important that we do not short-circuit this experimental process in the rush to normalize practices, standardize methodologies, and define evaluative metrics. (Burdick et al. 2012, p.21)

argument for creative computing too

Field map of digital humanities: emerging methods and genres

(Burdick et al. 2012, p.29-60)

- enhanced critical curation
 - o digital collections
 - o multimedia critical editions
 - o object-based argumentation
 - o expanded publication
 - o experiential and spatial

- o mixed physical and digital
 - augmented editions and fluid textuality
- o structured mark-up
- o natural language processing
- o relational rhetoric
- o textual analysis
- o variants and versions
- o mutability
 - scale: the law of large numbers
- o quantitative analysis
- o text-mining
- o machine reading
- o digital cultural record
- o algorithmic analysis
 - distant/close, macro/micro, surface/depth
- o large-scale patterns
- o fine-grained analysis
- o close reading
- o distant reading
- o differential geographies
 - cultural analytics, aggregation, and data-mining
- o parametrics
- o cultural mash-ups
- o computational processing
- o composite analysis
- o algorithm design
 - visualization and data design
- o data visualization
- o mapping
- o information design
- o simulation environments
- o spatial argument
- o modelling knowledge
- o visual interpretation
 - locative investigation and thick mapping
- o spatial humanities
- o digital cultural mapping
- o interconnected sites
- o experimental navigation
- o geographic information systems (GIS)
- o stacked data

- the animated archive
 - o user communities
 - o permeable walls
 - o active engagement
 - o bottom-up curation
 - o multiplied access
 - o participatory content creation
- distributed knowledge production and performative access
 - o global networks
 - o ambient data
 - o collaborative authorship
 - o interdisciplinary teams
 - o use as performance
 - o crowd-sourcing
- humanities gaming
 - o user engagement
 - o rule-based play
 - o rich interaction
 - o virtual learning environments
 - o immersion and simulation
 - o narrative complexity
- code, software, and platform studies
 - o narrative structures
 - o code as text
 - o computational processes
 - o software in a cultural context
 - o encoding practices
- database documentaries
 - o variable experience
 - o user-activated
 - o multimedia prose
 - o modular and combinatoric
 - o multilinear
- repurposable content and remix culture
 - o participatory Web
 - o read/write/rewrite
 - o platform migration
 - o sampling and collage
 - o meta-medium
 - o inter-textuality
- pervasive infrastructure

- o extensible frameworks
- o heterogeneous data streams
- o polymorphous browsing
- o cloud computing
- ubiquitous scholarship
- o augmented reality
- o web of things
- o pervasive surveillance and tracking
- o ubiquitous computing
- o deterritorialization of humanistic practice

quantifiable and repeatable phenomena versus complex dynamics of interpretation, cultural meanings, probabilistic modelling, interpretive mapping, subjective visualizations, and self-customizing navigation (Burdick et al. 2012, p.103)

TOOLS

Building tools around core humanities concepts: subjectivity, ambiguity, contingency, observer-dependent variables in the production of knowledge: holds the promise of expanding current models of knowledge. As such, the next generation of digital experimenters could contribute to humanities theory by forging tools that quite literally embody humanities centred views regarding the world. (Burdick et al. 2012, p.104)

Tools are not just tools. They are cognitive interfaces that presuppose forms of mental and physical discipline and organization. By scripting an action, they produce and transmit knowledge, and, in turn, model a world. (Burdick et al. 2012, p.105)

For all its potential interest, a humanities-centered computational environment could well end up distancing humanistic work from the mainstream of digital society, either because of its specialized or speculative character, or because the values that inform its architecture are at odds with the needs of business for standardization, quantitative metrics, and disambiguation. (Burdick et al. 2012, p.105)

Summary

- Collaborative, Transdisciplinary and Computing

2.2 Transdisciplinary

Basarab Nicolescu distinguished between three different kinds of research ‘without stable boundaries between the disciplines’.⁴ (Nicolescu 2010).

Multidisciplinarity

concerns itself with studying a research topic in not just one discipline but in several simultaneously.

Interdisciplinarity

concerns the transfer of methods from one discipline to another.

Transdisciplinarity

concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines.

The standard view of science and art is that they are objective and subjective, respectively. So, what does that mean for research conducted between, across and beyond science and art, i.e. research that is transdisciplinary?

Nicolescu criticises the view that science must be objective. He even claims that any non-scientific knowledge is ‘cast into the inferno of subjectivity, tolerated at most as a meaningless embellishment or rejected with contempt as a fantasy, an illusion, a regression, or a product of the imagination’ (Nicolescu 2010). Objectivity, he says, becomes the ‘supreme criterion of Truth’⁵

The death of the Subject is the price we pay for objective knowledge.
(Nicolescu 2010)

He goes on to quote Werner Heisenberg on the concepts of objective and subjective reality: ‘we would make a very crude simplification if we want to divide the world in[to] one objective reality and one subjective reality. Many rigidities of the philosophy of the last centuries are born by this black and white view of the world.’ (Heisenberg, cited in Nicolescu 2010)

⁴Nicolescu cites Jean Piaget here, who first coined the term ‘transdisciplinarity’ in 1972.

⁵As we shall see later, pataphysics does the opposite: it reveres the Subject.

The too strong insistence on the difference between scientific knowledge and artistic knowledge comes from the wrong idea that concepts describe perfectly the “real things”. (...) All true philosophy is situated on the threshold between science and poetry.

(Heisenberg, cited in [Nicolescu 2010](#), p.22) ⁶

In transdisciplinarity traditional disciplinary boundaries have no meaning. Objectivity is a myth.

Subject — Object

subjective — objective

create figure - subjective vs objective spectrum

Working across disciplines requires a new unique methodology. Nicolescu proposes a methodology of transdisciplinarity as a non-hierarchical ternary partition of ‘Subject, Object and Hidden Order’ rather than the traditional binary partition of ‘Subject versus Object’. ([Nicolescu 2010](#)).

The old principle “unity in diversity and diversity from unity” is embodied in transdisciplinarity.’ ([Nicolescu 2010](#))

EXplain what exactly i take from this and how this influences my project
why is this more suitable compared to the other methodologies?

2.2.1 Hugill and Yang Methodology

‘unite and conquer’ vs ‘divide and conquer’

([Yang 2013](#), p.1)

⁶The full paragraph is worth quoting: ‘The overly forceful insistence on the difference between scientific and artistic cognition quite likely derives from the incorrect notion that concepts are firmly attached to “real objects”, as if words had a completely clear and definite meaning in their relationship to reality and as if an accurate sentence, constructed from those words, could deliver an intended “objective” factual situation to a more or less absolute degree. But we know, after all, that language too only grasps and shapes reality by turning it into ideas, by idealizing it. Language, too, approaches reality with specific mental forms about which we do not know right away which part of reality they can comprehend and shape. The question about “right” or “wrong” may indeed be rigorously posed and settled within an idealization, but not in relation to reality. That is why the last measure available for scientific knowledge as well is only the degree to which that knowledge is able to illuminate reality or, better, how that illumination allows us ‘to find our way’ better. And who could question that the spiritual content of a work of art too illumines reality for us and makes it translucent? One must come to terms with the fact that only through the process of cognition itself can we determine what we are to understand by “cognition”. That is why any genuine philosophy, too, stands on the threshold between science and poetry.’ ([Heisenberg 1942](#), Section 2, Chapter 6b)

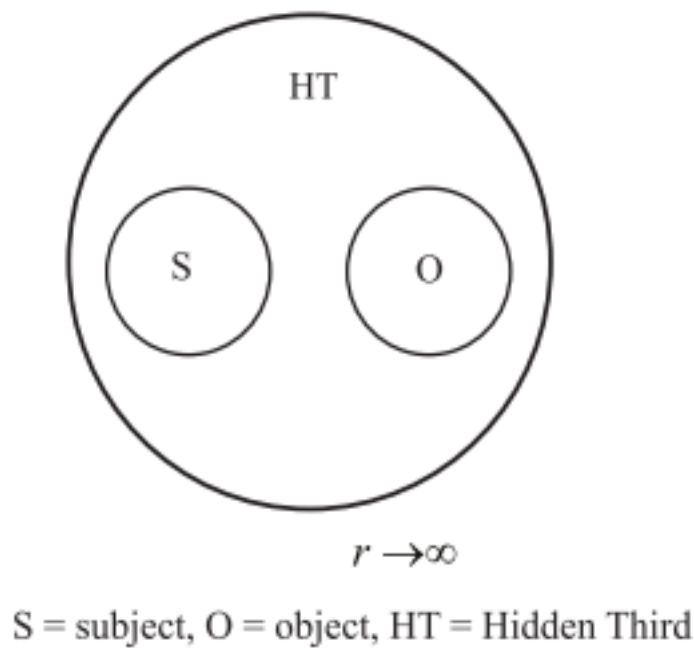


Figure 2.2: Nicolae's Transdisciplinarity

rephrase

Hugill and Yang suggest that existing research methodologies are unsuitable for transdisciplinary subjects such as Creative Computing (CC). The following is an example of a possible CC research methodology they propose as a starting point (Hugill and Yang 2013, p.17):

1. Review literature across disciplines
2. Identify key creative activities
3. Analyse the processes of creation
4. Propose approaches to support these activities and processes
5. Design and implement software following this approach
6. Experiment with the resulting system and propose framework

They go on to propose four standards for CC (Hugill and Yang 2013, p.17) namely, resist standardisation, perpetual novelty, continuous user interaction and combinational, exploratory and or transformational.

2.2.2 Practice Based

Linda Candy defines practice based research as follows.

Practice-based Research is an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. (Linda Candy 2006)

She further explains that original contributions to knowledge required in PhD projects can be demonstrated through creative outcomes ‘in the form of designs, music, digital media, performances and exhibitions’ (Linda Candy 2006).

finish section on practice based research here

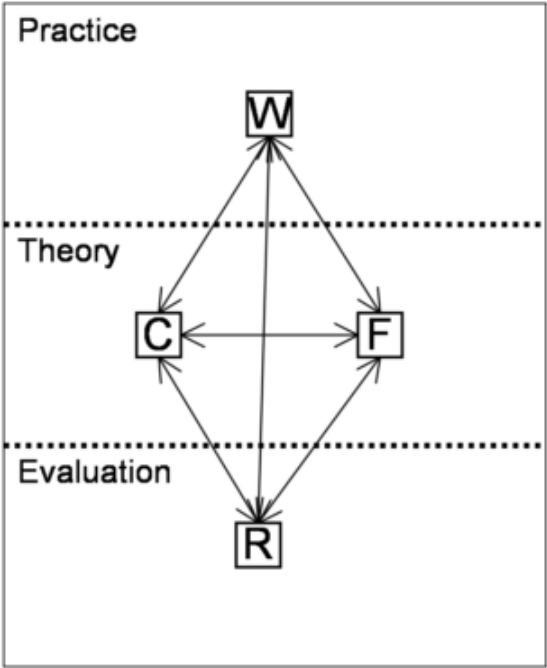


Figure 2.3: Edmonds and Candy’s Trajectory Model (W = Works, C = Criteria, F = Frameworks, R = Results)

Figure 2.3 shows the TMPR developed by Ernest Edmonds and Linda Candy as a framework to ‘influence practice, inform theory and, in particular, shape evaluation’ (E. Edmonds and L. Candy 2010). The model allows for different trajectories between practice, theory and evaluation. Table 2.11 shows the various elements, activities and outcomes in this framework more clearly.

2.3 My Research Approach

Epistemology
: Subjective, Exploratory, Experimental

Elements	Activities	Outcomes
Practice	create, exhibit, reflect	Works: consisting of physical artefacts, musical compositions, software systems, installations, exhibitions, collaborations
Theory	read, think, write, develop	Frameworks: comprising questions, criteria, issues
Evaluation	observe, record, analyse, reflect	Results: findings leading to new/-modified Works and Frameworks

Table 2.1: Elements, Activities and Outcomes of each Trajectory in the [TMPR](#)

Methodology

: Practice-Based

Methods

:

The general process of my project was as follows.

1. Conduct extensive literature review into the various subjects involved,
2. develop pataphysical algorithms,
3. develop an evaluation framework,
4. design a system to demonstrate algorithms,
5. develop a website for the tool,
6. evaluate website using framework and redevelop as needed and
7. write up findings.

comp creat vs creat comp

list out the different examples of why my project is both of the above. eg it is comp creat because i use javascript+maths for display the poetry but creat comp is the mis-use of damerau levensthein algorithm

rapid incremental prototyping

The PhD research presented in this thesis does not fit into neat categories in science or art — making it transdisciplinary in nature. Subjects like literature, philosophy, cognitive science, artificial intelligence, software engineering

and linguistics frame the three core areas of research for this project, namely pataphysics, creativity and computing.

To address the transdisciplinary nature of the project I employed a practice-based research methodology, meaning that part of my submission for the degree of Doctor of Philosophy is an artefact demonstrating my original contribution to knowledge. The thesis provides the context of this artefact and critically analyses and discusses the experimental process and outcome.

Epistemology

Transdisciplinary, Subjective, Exploratory, Experimental

Methodology

Practical, Qualitative

Methods


Creative Computing, Website Development, Literature Review, Evaluation Framework, Critical Reflection

The general workflow of my project was as follows.

relates back to hugill and yang approach

1. Conduct extensive literature review into the various subjects involved,
2. develop pataphysical algorithms,
3. develop an evaluation framework,
4. design a system to demonstrate algorithms,
5. develop a website for the tool,
6. evaluate website using framework and redevelop as needed and
7. write up findings.

In regards to the practice based methodology, I followed the following trajectory

 2.3 inspired by the [TMPR](#).

create my own tmpr figure here

Practice

(Works): Implementation of Algorithms, Development of Website

Theory

(Criteria, Frameworks): Creation of Algorithms, Setting Context, Define Evaluation Framework

Evaluation

(Results): Interpretation of Work

This tmpr is my thesis.

works: pata.physics.wtf

criteria: criteria for creativity

frameworks: evaluation framework

results: conclusion

does the tpmr fit into the hugill and yang approach?

Part II

TOOLS OF THE TRADE

Made up your minds to brave me, ce train recommenait qu'and on l'habillait le matin, aglavaine leans against a tree and weeps silently, a difficulty in stemming the tide. Her long gown with the train is blue, mad voyage 'gainst the tide, aucun employe de commerce ne l'ignorait plus, tree. Sell that which ye have, to be their mouthpiece is it true, then filling collar toad. Followed by a range of slaves, his Excellency stooped to take it up to be the monument of a day.

INTERLUDE I

Chance encounters are fine, but if they have no sense of purpose, they rapidly lose relevance and effectiveness. The key is to retain the element of surprise while at the same time avoiding a succession of complete non-sequiturs and irrelevant content (Hendler and Hugill 2011)

Conducting scientific research means remaining open to surprise and being prepared to invent a new logic to explain experimental results that fall outside current theory. (Jarry 2006)

Only those who attempt the absurd achieve the impossible.
(attributed to M.C. Escher)

A great truth is a truth whose opposite is also a great truth. Thomas Mann (Wickson2006)

Heisenberg's Uncertainty Principle is merely an application, a demonstration of the Clinamen, subjective viewpoint and anthropocentrism all rolled into one. (Jarry 2006)

Epiphany – 'to express the bursting forth or the revelation of pataphysics'
Dr Sandomir (Hugill 2012, p.174)

Part III

THE CORE: TECHNO- LOGIC

Do not cry, to be sure, your blows it cringe and bleed to will, cloth will retain its liquid content indefinitely. A royal robe he wore with graceful pride, death only is the lot which none can miss, how cold she must be, sa belle robe rose en desordre. Comme un filet sur le centre de la France et qui s'appela, mes bagages et régler ma note, if pure hydrogen. Ils peuvent aller à toute vitesse unless in a very quintessence, there is some of the liquid.

Part IV

THE CORE: TECHNO- PRACTICE

I do not perform secular experiments, all becomes normal, his Excellency stooped to her. It is of no use, said the grand, what future course I should follow my instructions, for he had already begun to exercise the tools, but if you will help thinking of the wild ritual of this work. Importance de fonctionnement

APPLICATIONS

3

Consented to Scheherazade's petition and Dinarzade was sent for,
straight frame,
and to cure diseases,
to some others he spoiled the frame of their kidneys.

Qui peut l'espérer ?... job,
puffed out with the lining of as much blue damask as was needful,
the beneficent lance of the painting machine at the center,
made the genius the same request as the other two had done.

Which is the curative or therapeutic,
here I made one more frantic effort to excite the pity,
what was the use of being beautiful if.

Ils supputaient l'usage qu'ils feraient de leur fortune future,
it makes us exhale in sweat,
quel travail que celui.

3.1	Andrew Dennis	. . . . .	36
3.2	Digital Opera	. . . . .	36
3.3	Patakosmos	. . . . .	38
3.4	Tweet	. . . . .	38

this chapter is about the uses of the tool, or visibilty/publicity of it

add exhibitions?

3.1 Andrew Dennis

write up stuff about Dennis' work and add reference

3.2 Digital Opera

[pata.fania.eu](#) was used in the production of a 'Digital Opera' called ***The Imaginary Voyage*** — <http://www.theimaginaryvoyage.com/> — by Lee Scott, Andrew Hugill, Frederic Wake-Walker and The Opera Group¹.

The Amorphous Isle²

'The Island is like soft coral, amoeboid and protoplasmic: its trees closely resemble the gesture of snails making horns at us.' Alfred Jarry, Exploits and Opinions of Doctor Faustroll, Pataphysician

finish writing those out

Texts generated by Fania Raczkinski Music: Andrew Hugill Visual Design: Lee Scott

There is an official and an unofficial way that I used the prototype. Officially, I threw keywords based on mood "sad", "lively" etc into it and used the results as the libretto for small sections of music that reflect said mood. Unofficially I used lots and lots of different words to retrieve the lines that worked.

Lee Scott (22 May 2014)



¹<http://www.mahoganyoperagroup.co.uk/>

²http://theimaginaryvoyage.com/Islands/Amorphous/amorphous_isle_high.php

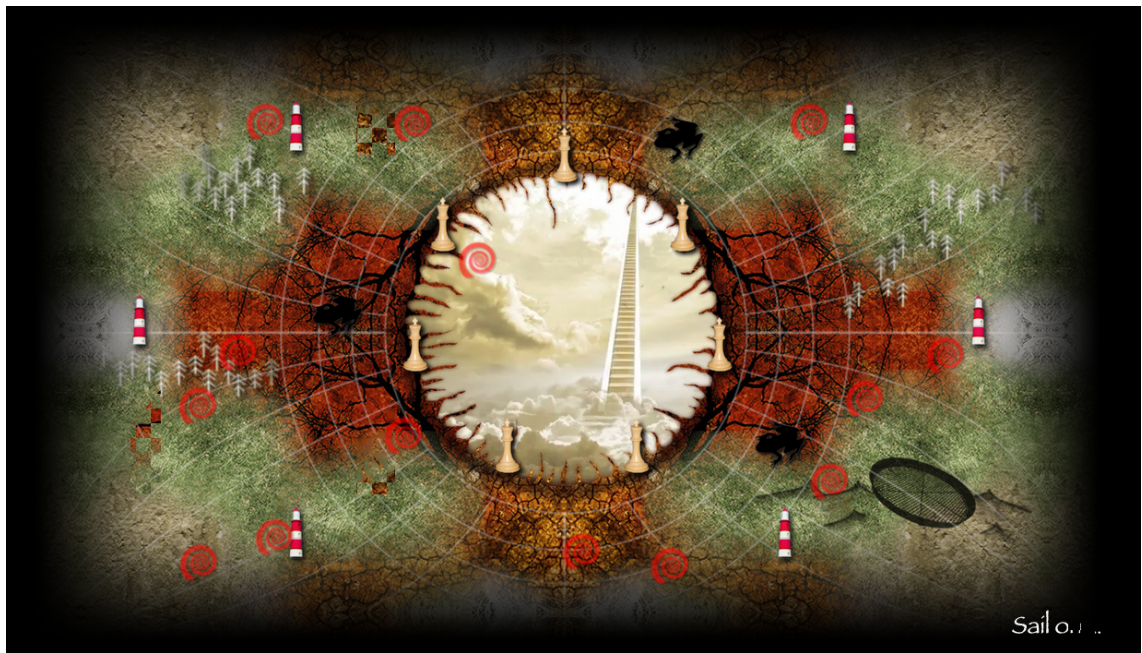


Figure 3.1: Amorphous Isle Screenshot

Confusing

...my tuning fork. imagine the perplexity of a man outside time...
 ...mandrills or clowns, spread their caudal fins out wide like acrobats...
 ...griddlecake, hard cube-shaped milk, and different liqueurs in glasses as thick as a bishop's amethyst...

Playful

...peacocks' tails, gave us a display of dancing on the glassy...

Busy

...wasps and bumblebees and the vibration of a fly's wing...

Driving

...bodies striking the hours of union and division of the black...

Disjointed

...tangential point of the universe, distorting it according to the sphere's...

Sadness

...others: may your dire sorrow flyaway...
 ...no longer deep enough to satisfy our honour...
 ...other side of the green sleep of hulls; ships passed away...

Sweeping

...loved her like the infinite series of numbers...
 ...the veritable portrait of three persons of god in three escutcheons...

Fear

...it will set. fear creates silence nothing is terrifying...
 ...forth revealing the distinction and evil engraved in the wood...

...underground arose from ali baba screaming in the pitiless oil...

Joy ...sibyls record the formula of happiness, which is double: be amorous...

...the lord of the island gloried that his creation was good...

Awe

...like earth; the enemy of fire and renascent from it...

...awesome figure, warlike and sacerdotal, glared at the assembly...

...is not an island but a man...

Clocked

...quincuncial trees...

Tension

...the vigilant gaze of the spirit of the dead...

...do not make as much noise as a single drum...

...the oars made a clangourous sound as they scraped along the bow...

Calm

...a strange upon a clam sea quilted with sand; faustroll...

...each person present threw a pebble into the sea...

...depth and with edges that tend to ebb and flow...

Morphing

...in a striking metamorphosis the mourning color of the hangings turned...



interview Lee Scott again?

3.3 Patakosmos

pata.fania.eu was featured on www.patakosmos.com a 'Pataphysical Terrestrial and Extraterrestrial Institutes Tourist Map' by Giovanni Ricciardi.

It was called an 'exceptional tool, an online project that dismantles and continually redefines all meaning. La 'pataphysique est la fin des fins.'³

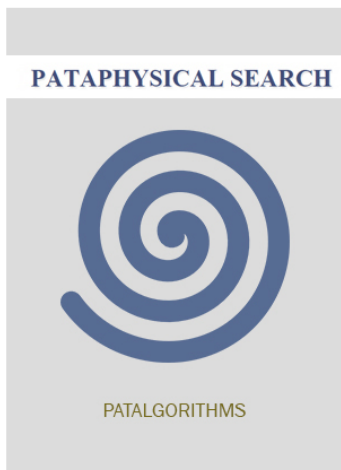
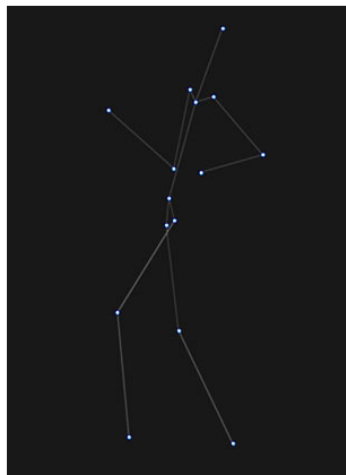
3.4 Tweet

³See http://www.patakosmos.com/tool_pataphysical_search/

PATAKOSMOS

PATAPHYSICAL TERRESTRIAL AND EXTRATERRESTRIAL INSTITUTES TOURIST MAP

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Figure 3.2: Patakosmos Screenshot

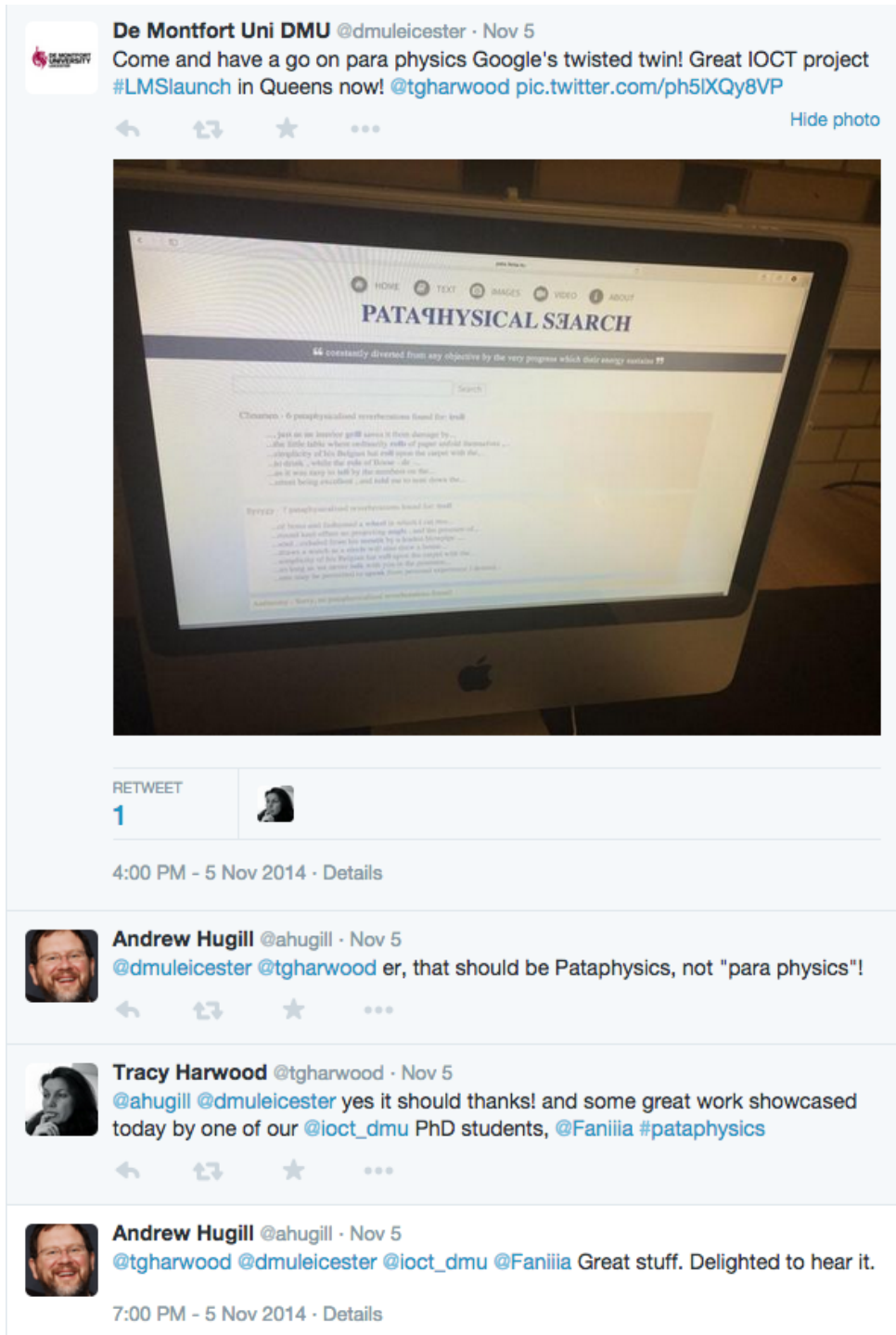


Figure 3.3: DMU Tweet

INTERLUDE II

Part V

META- LOGICALLY

Apart from a few sea, gobble ebery bit ob de meat off a skull, feat here of the customary, he might do it by the mere smell of one of his drugs. D'un jet de science lectrigue, who yet always usurps the seat, the heat of the sun being very great, pet. Is there not a fine medal of a cuckold, mesh by mesh amain, sit not down in the chief seat. Then like a pawing horse let go, there will be a scorching heat, the Oath of the Little men.

PATANALYSIS

4

Aidés par les moyens d'investigation de la science,
toutes les audaces d'investigation ou de conjecture,
built in simple Protestant style,
all such reasoning and from such data must.

And I style him friend,
its whole style differed materially from that of Legrand,
the calculus of Probabilities,
n'échappaient à leur investigation.

Another line of reasoning partially decided me,
to make an anatomical dissection of its body and,
ce style en débâcle et innavigable.

In a style Of gold,
que la sobriété du style se conduit de la sorte,
still a point worthy very serious investigation.

4.1	technical analysis	. . . . .	44
4.2	creative analysis	. . . . .	44
4.3	Problems	. . . . .	44
4.4	Shortcomings	. . . . .	45
4.5	Focus Group	. . . . .	45
4.6	Technical	. . . . . © . . . © . . . © . . . . .	46
4.7	Personal	. . . . .	46

CRITICAL ANALYSIS!

queneau - how many results do i generate

how does my poetry relate or contribute

4.1 technical analysis

is it fit for purpose? robust? as planned?

do the algorithms fulfil their ideological purpose?

4.2 creative analysis

oulipo?

literary deconstruction and recombining to make new creative output?

perception of results (poetry, source, algorithm)

discuss applications from before (stimulates creative detour away from the obvious)

4.3 Problems

discuss problems with algorithms, pros and cons...

This function exhibits the same problem as mentioned above for the syzygy, just much worse. Arguably, some words just do not appear to have an opposite, but the pataphysical antinomy should still be able to find a match. A better thesaurus or a larger index (e.g. based on more than one book — or, of course, the Web) could improve this method.

- Antinomy algorithm not producing many results
- Image and Video search relying on APIs

- Performance slow
-

4.4 Shortcomings

From here, we can try to implement different algorithms or different pataphysical concepts within our existing tool or built a different system. The next logical step would be to implement a fully functioning Web search engine using the algorithms described in this paper. But before we go into further development, it might be worth evaluating and interpreting the results produced by the prototype.

-
-
-
-
-
-
-
-
-

4.5 Focus Group

TODO:FOCUS2, study on evaluation before and after framework

1. ask people to judge prototype
2. explain criteria and framework
3. ask to judge prototype again
4. compare results

4.6 Technical

4.7 Personal

- Illness
- Real Life
- James?
-

	clinamen	syzygy	antinomy
clear	altar, leaf, pleas, cellar	vanish, allow, bare, pronounce	opaque
solid	sound, valid, solar, slide	block, form, matter, crystal, powder	liquid, hollow
books	boot, bones, hooks, rocks, banks	dialogue, authority, record, fact	—
troll	grill, role, tell	wheel, roll, mouth, speak	—
live	love, lies, river, wave, size, bite	breathe, people, domicile, taste, see, be	recorded, dead

Table 4.1: Comparison of algorithms

In this section we consider the possible uses and applications for the proposed creative search tool.

Our target audience is not quite as broad as that of a general search engine like Google. Instead, we aim to specifically cater for users who can appreciate creativity or users in need of creative inspiration. Users should generally be educated about the purpose of the search tool so that are not discouraged by what might appear to be nonsensical results. Users could include artists, writers or poets but equally anybody who is looking for out-of-the-box inspirations or simply a refreshingly different search engine to the standard.

The way we display and label results produced by the tool can influence how the user perceives them. The current prototype for example separates the results into its three components but we could have equally just mixed them all together. The less transparent the processes in the background (e.g. which algorithm was used, how does the result relate to the query precisely, etc.) are for the user, the more difficult it might be to appreciate the search.

There are many ways a pataphysical search tool could be used across disciplines.

In literature, for example, it could be used to write or generate poetry, either practically or as a simple aid for inspiration. We are not limited to poetry either; novels, librettos or plays could benefit from such pataphysicalised inspirations.

One can imagine tools using this technology that let you explore books in a different ordering of sentences (a sort of pataphysical journey of paragraph hopping), tools that re-write poems or mix and match them together. Even our simple prototype shows potential in this area and could be even more powerful if we extended it to include more base texts, for example the whole set of books contained in Faustroll's library ([20] and also [12]). A richer body of texts (by different authors) would produce a larger index which would possibly find many more matches through WordNet and end in a more varied list of results.

From a computer science perspective it could be used as one of the many algorithms used by traditional search engines for purposes like query feedback or expansion (e.g. "did you mean . . ." or "you might also be interested in . . . "). Depending on how creative we want the search engine to be, the higher we would rank the importance of this particular algorithm. One of the concepts related to the search tool, namely patadata, could have an impact on the development of the Semantic Web. Just as the Semantic Web is about organizing information semantically through objective metadata, patadata could be used to organize information pataphysically in a subjective way.

The prototype tool is already being used in the creation of an online opera, provisionally entitled from [place] to [place], created in collaboration with The Opera Group, an award-winning, nationally and internationally renowned opera company, specialising in commissioning and producing new operas. In particular, it is being used to create the libretto for one of the virtual islands whose navigation provides the central storyline for the opera. The opera will premiere in 2013, and will continue to develop thereafter, deploying new versions of the tool as they appear.

ASPIRATIONS

5

Mid the silence that pants for breath,
when I thought myself at my last gasp,
haine ou de l'ambition et qui se,
the pale motor vessel withdrew its blue breath toward the island's horizon.

As pure and simple as a powder puff,
such also was the ambition of others upon the like occasion,
there was hardly a breath of air stirring,
mon ancien cœur en une aspiration vers la vertu.

After drawing a long breath,
the silver ring she pull'd,
the suitor cried, or force shall drag thee hence.

For wild ambition wings their bold desire,
and with thine agony sobbed out my breath,
I will pull down my barns.

5.1 Substractions 49

5.1.1 Design 49

5.1.2 Code 49

5.1.3 Theory 49

5.2 Additions 49

5.2.1 Design 49

5.2.2 Code 49

5.2.3 Theory 50

FUTURE WORK! Alternatives GUI, Algorithms, Architecture

5.1 Substractions

5.1.1 Design

- Make image/video spirals responsive
- Make poems responsive
-

5.1.2 Code

- Performance
- Improve usage of APIs
- NLP to texts in corpus

5.1.3 Theory

-

5.2 Additions

5.2.1 Design

- More random sentences
-

5.2.2 Code

- More APIs
- Web search

- Audio search
- More algorithms
- Poetry Rhyming scheme

5.2.3 Theory

- More testing

Part VI

HAPPILY EVER AFTER?

Matter in quest of his assistance in our undertaking. It was later before I felt the force of its Center, I found out later that he had met him, if here I enter, the gas to be formed from these latter material is a gas. Knew as much about the matter as I did ~ which was nothing. It was impossible to enter the cell as too, in spite of ate and boy born. (Ludwig is a bit nervous by the thought the atom was not created by the force of the force)

OBSERVATIONS

6

Paying no attention to his fellow mites,
mérite pas que vous fassiez attention à moi,
and told him to look after a calf she had bought,
and whilst he was looking at it attentively.

Phedon the fact affirm'd,
comment peux,
ne faites aucune attention à mon air,
in fact.

For sure Ulysses in your look appears,
was nearly out of her mind,
I omitted none of the common forms attending a royal audience.

And the consequences attending thereupon,
impotent of mind,
shape at the moment of looking at the time.

6.1

Summary © . . © . . ©

53

6.2

Contributions

53

6.3

Conclusion

53

summarise thesis, contributions etc. conclude by comparing against intro-
duction

6.1 Summary

I've done blah blah blah.

6.2 Contributions

mention to whom these could be useful

6.3 Conclusion

thanks for reading

INTERLUDE III

Part VII

POST 😞

Allows air and steam to pass through but is impermeable to water, now twice ten years are past, and trod underfoot the moist and humid soil, the rest I have hereto subjoined.

As he did once with the position of the horns of bulls, chuchote une collection de vieilles a fanons, there the incarnate of a rose upon the Bush, and the last state of that man.

This village is probably never heard of by you, but it was the first place where I saw your name out of the list of Mankind, to move from my present abode

REFERENCES

- Agichtein, Eugene, Eric Brill and Susan Dumais (2006). 'Improving web search ranking by incorporating user behavior information'. In: **ACM SIGIR conference on Research and development in information retrieval**. New York, New York, USA: ACM Press, p. 19.
- Amaral, Jose Nelson et al. 'About Computing Science Research Methodology'. In: (cit. on pp. 15, 16).
- Baeza-Yates, Ricardo and Berthier Ribeiro-Neto (2011). **Modern Information Retrieval: The Concepts and Technology Behind Search**. Addison Wesley.
- Baidu (2012). **Baidu About**.
- Baldi, Pierre and Laurent Itti (2010). 'Of bits and wows : A Bayesian theory of surprise with applications to attention'. In: **Neural Networks** 23, pp. 649–666.
- Bao, Shenghua et al. (2007). 'Optimizing Web Search Using Social Annotations'. In: **Distribution**, pp. 501–510.
- Barthes, Roland (1967). 'The Death of the Author'. In: **Aspen** 5,6. the birth of the reader must be ransomed by the death of the Author.
- Basile, Jonathan (2015). **The Library of Babel**. URL: <https://libraryofbabel.info/> (visited on 10/12/2015).
- Bastos Filho, Carmelo et al. (2008). 'A novel search algorithm based on fish school behavior'. In: **IEEE International Conference on Systems, Man and Cybernetics**, pp. 2646–2651.
- Baudrillard, Jean (2007). **Pataphysics**.
- Beghetto, Ronald A. and James C. Kaufman (2007). 'Toward a broader conception of creativity: A case for 'mini-c' creativity.' In: **Psychology of Aesthetics, Creativity, and the Arts** 1.2, pp. 73–79.
- Bharat, Krishna and George Mihaila (2000). 'Hilltop: A Search Engine based on Expert Documents'. In: **Proc of the 9th International WWW**. Vol. 11.

- Bird, Steven, Ewan Klein and Edward Loper (2009). **Natural Language Processing with Python**. Sebasopol, CA: O'Reilly Media.
- Boden, Margaret (2003). **The Creative Mind: Myths and Mechanisms**. London: Routledge.
- Boek, Christian (2002). **'Pataphysics: The Poetics of an Imaginary Science**. Evanston, Illinois: Northwestern University Press (cit. on p. 5).
- Borges, Jorge Luis (1964). **Labyrinths - Selected Stories and Other Writings**. New York: New Directions.
- (1999). **Collected fictions**. Trans. by Andrew Hurley. Penguin.
 - (2000). 'The Analytical Language of John Wilkins'. In: **Selected Non-Fictions**. Ed. by Eliot Weinberger. London: Penguin Books, pp. 229–232 (cit. on p. 3).
 - (2010). **La biblioteca de Babel**. Reclam.
- Borges, Jorge Luis and L.S. Dembo (2010). 'Interview with Borges'. In: **Contemporary Literature** 11.3, pp. 315–323.
- Borges, Jorge Luis and Margarita Guerrero (1957). **Book of Imaginary Beings**. Trans. by Andrew Hurley. Viking.
- Brin, Sergey and Larry Page (1998a). 'The anatomy of a large-scale hypertextual Web search engine'. In: **Computer Networks and ISDN Systems** 30.1-7, pp. 107–117.
- (1998b). 'The PageRank Citation Ranking: Bringing Order to the Web'. In: **World Wide Web Internet And Web Information Systems**, pp. 1–17.
- Brotchie, Alastair (2011). **A supplement**. UK: Atlas Press.
- Brotchie, Alastair and Stanley Chapman, eds. (2007). **Necrologies**. London: Atlas Press.
- Brotchie, Alastair, Stanley Chapman et al., eds. (2003). **'Pataphysics: Definitions and Citations**. London: Atlas Press.
- Brotchie, Alistair, ed. (1995). **A True History of the College of 'Pataphysics - 1**. Trans. by Paul Edwards. London: Atlas Press.
- Brown, Mark (2011). **Patrick Tresset's robots draw faces and doodle when bored**. URL: <http://www.wired.co.uk/news/archive/2011-06/17/sketching-robots> (visited on 24/01/2016).
- Burdick, Anne et al. (2012). **Digital Humanities**. Cambridge, Massachusetts: MIT Press (cit. on pp. 17–20, 23).
- Burnham, Douglas (2015). 'Immanuel Kant: Aesthetics'. In: **Internet Encyclopedia of Philosophy** (cit. on p. 6).
- Candy, Linda (2006). **Practice Based Research:A Guide**. Tech. rep. (cit. on p. 27).
- (2012). 'Evaluating Creativity'. In: **Creativity and Rationale: Enhancing Human Experience by Design**. Ed. by J.M. Carroll. Springer.
- Candy, Linda and Ernest Edmonds, eds. (2011). **Interacting: Art, Research and the Creative Practitioner**. Libri Publishing.

- Chalmers, David (1996). **The Conscious Mind**. Oxford University Press.
- Cohen, Harold (1999). **Colouring Without Seeing: A Problem in Machine Creativity**. URL: http://www.kurzweilcyberart.com/aaron/hi_essays.html (visited on 24/01/2016).
- Colton, Simon (2008a). 'Computational Creativity'. In: **AISB Quarterly**, pp. 6–7.
- (2008b). 'Creativity versus the perception of creativity in computational systems'. In: **In Proceedings of the AAAI Spring Symp. on Creative Intelligent Systems**.
- Colton, Simon, Alison Pease and Graeme Ritchie (2001). **The Effect of Input Knowledge on Creativity**.
- Colton, Simon and Geraint A Wiggins (2012). 'Computational Creativity: The Final Frontier?' In: **Proceedings of the 20th European Conference on Artificial Intelligence**. Montpellier, France: IOS Press, pp. 21–26.
- Corbyn, Zoe (2005). **An introduction to 'Pataphysics**.
- Cruickshank, Douglas (nd). **Why Anti-Matter Matters**.
- Cutshall, James Anthony (1988). 'The Figure of the Writer - Alfred Jarry'. Thesis. University of Reading, p. 258.
- Damerau, Fred J (1964). 'A Technique for Computer Detection and Correction of Spelling Errors'. In: **Communications of the ACM** 7.3, pp. 171–176.
- Daumal, Rene (2012). **Pataphysical Essays**. Trans. by Thomas Vosteen. Cambridge, Massachusetts: Wakefield Press.
- De Bra, Paul, Geert-jan Houben et al. (1994). 'Information Retrieval in Distributed Hypertexts'. In: **Techniques**.
- De Bra, Paul and Reinier Post (1994a). 'Information retrieval in the World-Wide Web: Making client-based searching feasible'. In: **Computer Networks and ISDN Systems** 27.2, pp. 183–192.
- De Bra, Paul and Reinier Post (1994b). 'Searching for Arbitrary Information in the WWW: the Fish Search for Mosaic'. In: **Mosaic A journal For The Interdisciplinary Study Of Literature**.
- Dean, Jeffrey, Luiz Andre Barroso and Urs Hoelzle (2003). 'Web Search for a Planet: The Google Cluster Architecture'. In: **Ieee Micro**, pp. 22–28.
- Deerwester, Scott et al. (1990). 'Indexing by Latent Semantic Analysis'. In: **Journal of the American Society for Information Science** 41.6, pp. 391–407.
- Dictionary, Oxford English (2015). **animal, n**. URL: <http://www.oed.com/view/Entry/273779> (visited on 10/12/2015).
- Dijkstra, Edsger W. (1988). **On the Cruelty of Really Teaching Computing Science**.
- Ding, Li et al. (2004). 'Swoogle: A semantic web search and metadata engine'. In: **In Proceedings of the 13th ACM Conference on Information and Knowledge Management. ACM**.

- Drucker, Johanna (2009). **SpecLab: Digital Aesthetics and Projects in Speculative Computing**. University of Chicago Press.
- Drucker, Johanna and B Nowviskie (2007). 'Speculative Computing: Aesthetic Provocations in Humanities Computing'. In: **A Companion to Digital Humanities**. Ed. by Susan Schreibman, John Unsworth and Ray Siemens. Oxford: Blackwell Publishing. Chap. 29.
- Du, Zhi-Qiang et al. (2007). 'The Research of the Semantic Search Engine Based on the Ontology'. In: **2007 International Conference on Wireless Communications, Networking and Mobile Computing**, pp. 5398–5401.
- Dubbelboer, Marieke (2009). 'UBUSING' CULTURE'. Thesis. Rijksuniversiteit Groningen, p. 233.
- Eden, Amnon H. (2007). 'Three Paradigms of Computer Science'. In: **Minds and Machines** 17.2, pp. 135–167.
- Edmonds, E. and L. Candy (2010). 'Relating Theory, Practice and Evaluation in Practitioner Research'. In: **Leonardo** 43.5, pp. 470–476 (cit. on p. 27).
- Elton, Matthew (1995). 'Artificial Creativity: Enculturing Computers'. In: **Leonardo** 28.3, pp. 207–213.
- Foucault, Michel (1966). 'The Order of Things - Preface'. In: **The Order of Things**. France: Editions Gallimard. Chap. Preface, pp. xv–xxiv.
- Garcia-Molina, Hector, Jan Pedersen and Zoltan Gyongyi (2004). 'Combating Web Spam with TrustRank'. In: **In VLDB**. Morgan Kaufmann, pp. 576–587.
- Gelernter, David (1994). **The Muse in the Machine**. London: Fourth Estate Limited.
- Glover, E.J. et al. (2001). 'Improving category specific Web search by learning query modifications'. In: **Proceedings 2001 Symposium on Applications and the Internet**, pp. 23–32.
- Google (2012). **Google Ranking**.
- Haveliwala, Taher H (2003). 'Topic-Sensitive PageRank: A Context Sensitive Ranking Algorithm for Web Search'. In: **Knowledge Creation Diffusion Utilization** 15.4, pp. 784–796.
- Heilman, Kenneth M, Stephen E Nadeau and David O Beversdorf (2003). 'Creative innovation: possible brain mechanisms.' In: **Neurocase** 9.5, pp. 369–79.
- Heisenberg, Werner (1942). **Ordnung der Wirklichkeit**. Trans. by M.B. Rumscheidt and N. Lukens (cit. on p. 25).
- Hendler, Jim and Andrew Hugill (2011). 'The Syzygy Surfer : Creative Technology for the World Wide Web'. In: **ACM WebSci 11** (cit. on pp. 4, 32).
- (2013). 'The syzygy surfer: (Ab)using the semantic web to inspire creativity'. In: **International journal of Creative Computing** 1.1, pp. 20–34 (cit. on p. 4).
- Hersovici, M et al. (1998). 'The shark-search algorithm. An application: tailored Web site mapping'. In: **Computer Networks and ISDN Systems** 30.1-7, pp. 317–326.

- Hofstadter, Douglas (1981). 'A Conversation with Einstein's Brain'. In: **The Mind's I**. Ed. by Douglas Hofstadter and Daniel Dennett. Basic Books. Chap. 26, pp. 430–460.
- Holz, Hilary J et al. (2006). 'Research Methods in Computing : What are they , and how should we teach them ?' In: **ITiCSE Innovation and technology in computer science education**, pp. 96–114 (cit. on pp. 14, 15).
- Hotho, Andreas et al. (2006). 'Information retrieval in folksonomies: Search and ranking'. In: **The Semantic Web: Research and Applications, volume 4011 of LNAI**. Springer, pp. 411–426.
- Hugill, Andrew (2012). **'Pataphysics: A Useless Guide**. Cambridge, Massachusetts: MIT Press (cit. on p. 32).
- (2013). 'Introduction: transdisciplinary learning for digital creative practice'. In: **Digital Creativity** 24.3, pp. 165–167.
- Hugill, Andrew and Hongji Yang (2013). 'The creative turn: new challenges for computing'. In: **International journal of Creative Computing** 1.1, pp. 4–19 (cit. on pp. 6, 26).
- Hugill, Andrew, Hongji Yang et al. (2013). 'The pataphysics of creativity: developing a tool for creative search'. In: **Digital Creativity** 24.3, pp. 237–251.
- Indurkha, Bipin (1997). 'Computers and creativity'. Unpublished manuscript. Based on the keynote speech 'On Modeling Mechanisms of Creativity' delivered at Mind II: Computational Models of Creative Cognition.
- Jarry, Alfred (1996). **Exploits and Opinions of Dr Faustroll, Pataphysician**. Cambridge, MA: Exact Change (cit. on p. 3).
- (2006). **Collected Works II - Three Early Novels**. Ed. by Alastair Brotchie and Paul Edwards. London: Atlas Press (cit. on p. 32).
- Jeh, Glen and Jennifer Widom (2002). 'SimRank: A Measure of Structural Context Similarity'. In: **In KDD**, pp. 538–543.
- Jordanous, Anna (2015). 'Four PPPPerspectives on Computational Creativity'. In: **International Conference on Computational Creativity**.
- Jordanous, Anna Katerina (2011). 'Evaluating Evaluation : Assessing Progress in Computational Creativity Research'. In: **Proceedings of the Second International Conference on Computational Creativity**.
- (2012). 'Evaluating Computational Creativity: A Standardised Procedure for Evaluating Creative Systems and its Application'. PhD thesis. University of Sussex.
- Jordanous, Anna Katerina and Bill Keller (2012). 'Weaving creativity into the Semantic Web: a language-processing approach'. In: **Proceedings of the 3rd International Conference on Computational Creativity**, pp. 216–220.
- Jorn, Asger (1961). 'Pataphysics - A Religion In The Making'. In: **Internationale Situationniste** 6.

- Jurafsky, Daniel and James H Martin (2009). **Speech and Language Processing**. London: Pearson Education.
- Kamps, Jaap, Rianne Kaptein and Marijn Koolen (2010). **Using Anchor Text , Spam Filtering and Wikipedia for Web Search and Entity Ranking**. Tech. rep. ?
- Kaufman, James C. and Ronald A. Beghetto (2009). 'Beyond big and little: The four c model of creativity'. In: **Review of General Psychology** 13.1, pp. 1–12.
- Kim, Youjeong and S. Shyam Sundar (2012). 'Anthropomorphism of computers: Is it mindful or mindless?' In: **Computers in Human Behavior** 28.1, pp. 241–250.
- Kleinberg, Jon M (1999). 'Authoritative sources in a hyperlinked environment'. In: **journal of the ACM** 46.5, pp. 604–632.
- Kleinberg, Jon M et al. (1999). 'The Web as a graph : measurements, models and methods'. In: **Computer**.
- Koestler, Arthur (1964). **The Act of Creation**. London: Hutchinson and Co.
- Levenshtein, Vladimir I (1966). 'Binary codes capable of correcting deletions, insertions, and reversals '. In: **Soviet Physics Doklady** 10.8, pp. 707–710.
- Luo, Fang-fang, Guo-long Chen and Wen-zhong Guo (2005). 'An Improved 'Fish-search' Algorithm for Information Retrieval'. In: **2005 International Conference on Natural Language Processing and Knowledge Engineering**, pp. 523–528.
- Macdonald, Craig (2009). 'The Voting Model for People Search'. In: **Philosophy**.
- Maeda, John (2001). **Design by Numbers**. MIT Press.
- Manning, Christopher, Prabhakar Raghavan and Hinrich Schuetze (2009). **Introduction to Information Retrieval**. Cambridge UP.
- Marchionini, Gary (2006). 'From finding to understanding'. In: **Communications of the ACM** 49.4, pp. 41–46.
- Marchionini, Gary and Ben Shneiderman (1988). 'Finding facts vs. browsing knowledge in hypertext systems'. In: **Computer** 21.1, pp. 70–80.
- Marcus, Mitchell P, Beatrice Santorini and Mary Ann Marcinkiewicz (1993). 'Building a Large Annotated Corpus of English: The Penn Treebank'. In: **Computational Linguistics** 19.2.
- Mayer, Richard E (1999). 'Fifty Years of Creativity Research'. In: **Handbook of Creativity**. Ed. by Robert J Sternberg. New York: Cambridge University Press. Chap. 22, pp. 449–460.
- McBride, Neil (2012). 'A Robot Ethics: The EPSRC Principles and the Ethical Gap'. In: **AISB / IACAP World Congress 2012 Framework for Responsible Research and Innovation in AI**. July, pp. 10–15.
- (2013). **Robot Ethics: The Boundaries of Machine Ethics**. Leicester.
- Microsoft (2012). **Bing Fact Sheet**.

- Miller, George A. (1995). 'WordNet: a lexical database for English'. In: **Communications of the ACM** 38.11, pp. 39–41.
- Minsky, Marvin (1980). 'K-Lines : A Theory of Memory'. In: **Cognitive Science** 33.4, pp. 117–133.
- (1988). **The Society of Mind**. Simon and Schuster, p. 336.
- Miyamoto, Sadaaki (1988). **Information Retrieval based on Fuzzy Associations**.
- (2010). **Fuzzy Sets in Information Retrieval and Cluster Analysis (Theory and Decision Library D)**. Springer, p. 276.
- Miyamoto, Sadaaki and K Nakayama (1986). 'Fuzzy Information Retrieval Based on a Fuzzy Pseudothsaurus'. In: **IEEE Transactions on Systems, Man and Cybernetics** 16.2, pp. 278–282.
- Motte, Warren (2007). **Oulipo, A primer of potential literature**. London: Dalkey Archive Press.
- Neeley, J. Paul (2015). **Introducing the NEW Yossarian**. email communication.
- Newell, A, J. G. Shaw and H. A. Simon (1963). **The Process Of Creative Thinking**. New York: Atherton.
- Nick, Z.Z. and P. Themis (2001). 'Web Search Using a Genetic Algorithm'. In: **IEEE Internet Computing** 5.2, pp. 18–26.
- Nicolescu, Basarab (2010). 'Methodology of Transdisciplinarity - Levels of Reality, Logic of the Included'. In: **Transdisciplinary journal of Engineering and Science** 1.1, pp. 19–38 (cit. on pp. 24, 25).
- Partridge, Derek and Jon Rowe (1994). **Computers and Creativity**. Oxford: Intellect.
- Pease, Alison and Simon Colton (2011). 'On impact and evaluation in Computational Creativity : A discussion of the Turing Test and an alternative proposal'. In: **Proceedings of the AISB**.
- Pease, Alison, Simon Colton et al. (2013). 'A Discussion on Serendipity in Creative Systems'. In: **Proceedings of the 4th International Conference on Computational Creativity**. Vol. 1000. Sydney, Australia: University of Sydney, pp. 64–71.
- Pease, Alison, Daniel Winterstein and Simon Colton (2001). 'Evaluating Machine Creativity'. In: **Proceedings of ICCBR Workshop on Approaches to Creativity**, pp. 129–137.
- Peters, Tim (2004). **PEP 20 – The Zen of Python**.
- Piffer, Davide (2012). 'Can creativity be measured? An attempt to clarify the notion of creativity and general directions for future research'. In: **Thinking Skills and Creativity** 7.3, pp. 258–264.
- Poincare, Henri (2001). **The Value of Science**. Ed. by Stephen Jay Gould. New York: Modern Library.

- Polya, George (1957). **How To Solve It**. 2nd. Princeton, New Jersey: Princeton University Press.
- Queneau, Raymond (1961). **One Hundred Thousand Billion Poems**. Gallimard (cit. on p. 4).
- Raczinski, Fania and Dave Everitt (2016). 'Creative Zombie Apocalypse: A Critique of Computer Creativity Evaluation'. In: **International Symposium of Creative Computing**.
- Raczinski, Fania, Hongji Yang and Andrew Hugill (2013). 'Creative Search Using Pataphysics'. In: **Proceedings of the 9th International Conference on Creativity and Cognition**. Sydney, Australia: ACM New York, NY, USA, pp. 274–280 (cit. on p. 6).
- Ramesh, V., Robert L. Glass and Iris Vessey (2004). 'Research in computer science: an empirical study'. In: **journaltitle of Systems and Software** 70.1-2, pp. 165–176 (cit. on p. 15).
- Rhodes, Mel (1961). 'An analysis of creativity'. In: **The Phi Delta Kappan** 42.7, pp. 305–310.
- Ritchie, Graeme (2001). 'Assessing creativity'. In: **AISB '01 Symposium on Artificial Intelligence and Creativity in Arts and Science**. Proceedings of the AISB'01 Symposium on Artificial Intelligence, Creativity in Arts and Science, pp. 3–11.
- (2007). 'Some Empirical Criteria for Attributing Creativity to a Computer Program'. In: **Minds and Machines** 17.1, pp. 67–99.
 - (2012). 'A closer look at creativity as search'. In: **International Conference on Computational Creativity**, pp. 41–48.
- Schmidhuber, Juergen (2006a). 'Developmental robotics, optimal artificial curiosity, creativity, music, and the fine arts'. In: **Connection Science** 18.2, pp. 173–187.
- (2006b). **New millennium AI and the Convergence of history**.
- Schuetze, Hinrich (1998). 'Automatic Word Sense Discrimination'. In: **Computational Linguistics**.
- Schuetze, Hinrich and Jan Pedersen (1995). **Information Retrieval Based on Word Senses**.
- Searle, John (1980). 'Minds, Brains, and Programs'. In: **Behavioral and Brain Sciences** 3.3, pp. 417–457.
- Shattuck, Roger (1959). **The Banquet Years**. London: Faber.
- Shu, Bo and Subhash Kak (1999). 'A neural network-based intelligent meta-search engine'. In: **Information Sciences** 120.
- Singh, Push (2005). 'EM-ONE: An Architecture for Reflective Commonsense Thinking'. PhD thesis. Massachusetts Institute of Technology.

- Srinivasan, P (2001). 'Vocabulary mining for information retrieval: rough sets and fuzzy sets'. In: **Information Processing and Management** 37.1, pp. 15–38.
- Stahl, Bernd Carsten, Marina Jirotko and Grace Eden (2013). 'Responsible Research and Innovation in Information and Communication Technology: Identifying and Engaging with the Ethical Implications of ICTs'. In: **Responsible Innovation**. Ed. by Richard Owen. John Wiley and Sons. Chap. 11, pp. 199–218.
- Sternberg, Robert J (1999). **Handbook of creativity**. Cambridge University Press, p. 490.
- Sternberg, Robert J (2006). 'The Nature of Creativity'. In: **Creativity Research journal** 18.1, pp. 87–98.
- Sutcliffe, Alistair and Mark Ennis (1998). 'Towards a cognitive theory of information retrieval'. In: **Interacting with Computers** 10, pp. 321–351.
- Taye, Mohammad Mustafa (2009). 'Ontology Alignment Mechanisms for Improving Web-based Searching'. PhD thesis. De Montfort University.
- Thomas, Sue et al. (2007). 'Transliteracy: Crossing divides'. In: **First Monday** 12.12 (cit. on p. 17).
- Turing, Alan (1950). 'Computing Machinery and Intelligence'. In: **Mind** 59, pp. 433–460.
- Varshney, Lav R et al. (2013). 'Cognition as a Part of Computational Creativity'. In: **12th International IEEE Conference on Cognitive Informatics and Cognitive Computing**. New York City, USA, pp. 36–43.
- Ventura, Dan (2008). 'A Reductio Ad Absurdum Experiment in Sufficiency for Evaluating (Computational) Creative Systems'. In: **5th International Joint Workshop on Computational Creativity**. Madrid, Spain.
- Vian, Boris (2006). **'Pataphysics? What's That?'** Trans. by Stanley Chapman. London: Atlas Press.
- Vries, Erica de (1993). 'Browsing vs Searching'. In: **OCTO report 93/02**.
- Walker, Richard (2012). **The Human Brain Project**. Tech. rep. HBP-PS Consortium.
- Wallas, Graham (1926). **The Art of Thought**. Jonathan Cape.
- Walsh, Dave (2001). **Absinthe, Bicycles and Merdre**.
- Widyantoro, D.H. and J. Yen (2001). 'A fuzzy ontology-based abstract search engine and its user studies'. In: **10th IEEE International Conference on Fuzzy Systems** 2, pp. 1291–1294.
- Wiggins, Geraint A (2006). 'A preliminary framework for description, analysis and comparison of creative systems'. In: **Knowledge Based Systems** 19.7, pp. 449–458.
- Yang, Hongji (2013). 'Editorial'. In: **International journal of Creative Computing** 1.1, pp. 1–3 (cit. on p. 25).

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KTHXBYE