

RANDOM

1.1 RANDOM SENTENCES

in posthumous collaboration
the decomposing brain goes on working after death and it is its dreams that are
→ Paradise
plagiarism by anticipation
the applause of silence is the only kind that counts
to understand pataphysics is to fail to understand pataphysics
duration is the transformation of a succession into a reversion
god is the tangential point between zero and infinity
laughter is born out of the discovery of the contradictory
ha ha
the aesthetic of formal constraint
the unique imaginary solution to the absence of problems
the contemporary relationship between science and poetry
a huge and elaborately constructed hoax
only those who attempt the absurd achieve the impossible
the random is opposed to the deterministic
pure multiplicity irreducible to any other sort of unity
persistence and perseverance to buttress a fleeting existence
enfolding a subject laterally, associatively
a doctrine of correspondences, counterpoised by the exotic charm of another
→ system of thought
double negative is necessary to stop the mind believing
the absence of contradictory evidence is not proof of a theory's validity
very wrong in very important ways
no one point of view is final
unification of opposites
an athletic aesthetics of intuitive and instantaneous judgements
constantly diverted from any objective by the very progress which their energy
→ sustains
imagination envisions the reconciliation of the individual with the whole
behind the illusion lies knowledge
a biomolecular bibliomecha of breathtaking beauty
indubitably coherent yet absolutely nonsensical

stylistic and formal experimentation can not be dismissed as purely apolitical
 variable phoneme sequences in suspension within a cloud of relative epi-
 → cultural etymologies
 speculative solutions for imaginary problems
 nonsense is nonsense only when we have not yet found the point of view from
 → which it makes sense
 laughter is the discord between tensions being resolved
 read with intention to rewrite
 a fractal geometry of momentums
 minimizing energy, crystallizing latent structure, pleasure is understood as a
 → practice, and accumulates as experience
 don't fall out of love
 the 'something like', the pseudo
 the text transforms itself as soon as it is understood
 adaptation of archaic mental structures to new environments
 a beautifully controlled yet hideously wasteful catastrophe
 driven by compulsive urgency to constantly reconceive the whole idea
 writing the unrightable wrongs
 prisoners of conscience
 machina sapiens negotiating the transformation of what is mortal into what is
 → immortal
 database hyper-archive applications stimulating relaxation
 smelling of the rain it falls on the way down
 a thousand ways to greet the dawn
 how far up the chain can you put this without ambiguity
 a gentle kitten is licking the inside of my heart
 was this constrained by you, or restrained by the concept
 adjoining always antiquated permutation
 joint ventures can go too far away
 nowhere to be found here and elsewhere
 engender links to a balancing veneration
 coerce to do as a sizeable unprocessed primer
 plain up be a best concoction in the words
 the farcical pandemonium of technology
 it is not true that there were any nails
 this discovery opens the door into a completely new anti-world
 extending as far beyond metaphysics as the latter extends beyond physics
 turn the world upside down and inside out
 the law of the ascension of a vacuum toward a periphery
 the anti-world God not only plays dice, he spells his name backwards
 in the absence of a butler, where does the gun fit in
 space is defined by simultaneity
 time is a flowing stream, a liquid in uniform rectilinear motion
 space is a solid, a rigid system of phenomena
 the deceleration of our habitual duration conserved by inertia
 a perfect elastic solid
 movement into the past consists in the perception of the reversibility of
 → phenomena
 relativity is absolute
 all observations depend on viewpoint and the scale of the scientist

the clinamen, subjective viewpoint and anthropocentrism all rolled into one
 the identity **of** opposites
 making negatives **do** the work **of** positives
 in this year eighteen hundred and ninety-eight
 the twenty-seven equivalents
 the virgin, the bright, and the beautiful today
 the fifth letter **of** the first word **of** the first act
 voices asymptotic towards death
 an epiphenomenon is that which is superinduced upon a phenomenon
 concerning the amorphous isle
 like soft coral, amoeboid and protoplasmic
 searching desperately under the quinuncial trees for the venerable absent one
 the night computed its hours
 a remarkable epizootic disease
 the eternal nothingness
 love looks exactly like an iridescent veil and assumes the masked face **of** a
 → chrysalis
 in a telepathic letter
 homo est deus
 $\$ \infty - a + a + 0 = \$ \infty$
 with the aim **of** computing the qualities **of** the French
 the inferno **of** subjectivity

1.2 HEISENBERG QUOTE

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 illuminates 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)

1.3 DIGITAL HUMANITIES METHODOLOGY FIELD MAP

The full *Field map of digital humanities: emerging methods and genres* by Burdick et al. (**Burdick2012**).

- enhanced critical curation
 - digital collections
 - multimedia critical editions
 - object-based argumentation
 - expanded publication
 - experiential and spatial
 - mixed physical and digital
- augmented editions and fluid textuality
 - structured mark-up
 - natural language processing
 - relational rhetoric
 - textual analysis
 - variants and versions
 - mutability
- scale: the law of large numbers
 - quantitative analysis
 - text-mining
 - machine reading
 - digital cultural record
 - algorithmic analysis
- distant/close, macro/micro, surface/depth
 - large-scale patterns
 - fine-grained analysis
 - close reading
 - distant reading
 - differential geographies
- cultural analytics, aggregation, and data-mining
 - parametrics
 - cultural mash-ups
 - computational processing
 - composite analysis
 - algorithm design
- visualization and data design
 - data visualization
 - mapping
 - information design
 - simulation environments
 - spatial argument
 - modelling knowledge
 - visual interpretation
- locative investigation and thick mapping
 - spatial humanities
 - digital cultural mapping
 - interconnected sites
 - experimental navigation
 - geographic information systems (GIS)
 - stacked data
- the animated archive
 - user communities
 - permeable walls
 - active engagement
 - bottom-up curation
 - multiplied access
 - participatory content creation
- distributed knowledge production and performative access
 - global networks
 - ambient data
 - collaborative authorship
 - interdisciplinary teams
 - use as performance
 - crowd-sourcing
- humanities gaming
 - user engagement
 - rule-based play
 - rich interaction
 - virtual learning environments

- immersion and simulation
- narrative complexity
- code, software, and platform studies
 - narrative structures
 - code as text
 - computational processes
 - software in a cultural context
 - encoding practices
- database documentaries
 - variable experience
 - user-activated
 - multimedia prose
 - modular and combinatoric
 - multilinear
- repurposable content and remix culture
 - participatory Web
- read/write/rewrite
- platform migration
- sampling and collage
- meta-medium
- inter-textuality
- pervasive infrastructure
 - extensible frameworks
 - heterogeneous data streams
 - polymorphous browsing
 - cloud computing
- ubiquitous scholarship
 - augmented reality
 - web of things
 - pervasive surveillance and tracking
 - ubiquitous computing
 - deterritorialization of humanistic practice

1.4 PENN TREEBANK

CC Coordinating conjunction

CD Cardinal number

DT Determiner

EX Existential *there*

FW Foreign word

IN Preposition/subordinating conjunction

JJ Adjective

JJR

Adjective, comparative

JJS

Adjective, superlative

LS List item marker

MD

Modal

NN Noun, singular or mass

NNS

Noun, plural

NNP

Proper noun, singular

NNPS

Proper noun, plural

PDT

Predeterminer

POS

Possessive ending

PRP

Personal pronoun

PP\$

Possessive pronoun

RB Adverb

RBR

Adverb, comparative

RBS	WDT
Adverb, superlative	<i>wh</i> -determiner
RP Particle	WP <i>wh</i> -pronoun
SYM	WPS
Symbol (mathematical or scientific)	Possessive <i>wh</i> -pronoun
TO {to}	WRB
UH Interjection	<i>wh</i> -adverb
VB Verb, base form	# Pound sign
VBD	\$ Dollar sign
Verb, past tense	.
VBG	,
Verb, gerund/present particle	:
VBN	(Left bracket character
Verb, past particle) Right bracket character
VBP	" Straight double quote
Verb, non-3rd ps. sing. present	' Left open single quote
VBZ	" Left open double quote
Verb, 3rd ps. sing. present	' Right close single quote
	" Right close double quote

1.5 THINKING COMPUTERS

1. Can computers think?

- Can computers have free will?
- Can computers have emotions?
- Can computers be creative?
- Can computers understand arithmetic?
- Can computers draw analogies?
- Can computers be persons?
- Is the brain a computer?
- Can computers reason scientifically?
- Are computers inherently disabled?
- Should we pretend that computers will never be able to think?
- Does God prohibit computers from thinking?

2. Can the Turing test determine whether computers can think?

- Is failing the test decisive?
- Is passing the test decisive?
- If a simulated intelligence passes, is it intelligent?
- Have any machines passed the test?
- Is the test, behaviouraly or operationally construed, a legitimate intelligence test?
- Is the test, as a source of inductive evidence, a legitimate intelligence test?
- Is the neo-Turing test a legitimate intelligence test?
- Does the imitation game determine whether a computer can think?
- Can the Loebner Prize stimulate the study of intelligence?
- Other Turing test arguments

3. Can physical symbol systems think?

- Does thinking require a body?
- Is the relation between hardware and software similar to that between human brains and minds?
- Can physical symbol systems learn as humans do?
- Can the elements of thinking be represented in discrete symbolic form?
- Can symbolic representations account for human thinking?
- Does the situated action paradigm show that computers can't think?
- Can physical symbol systems think dialectically?
- Can a symbolic knowledge base represent human understanding?
- Do humans use rules as physical symbol systems do?
- Does mental processing rely on heuristic search?
- Do physical symbol systems play chess as humans do?
- Other physical system arguments

4. Can Chinese Rooms think?

- Do humans, unlike computers, have intrinsic intentionality?
- Is biological naturalism valid?
- Can computers cross the syntax-semantics barrier?
- Can learning machines cross the syntax-semantics barrier?
- Can brain simulators think?
- Can robots think?
- Can a combination robot/brain simulator think?
- Can the Chinese Room, considered as a total system, think?
- Do Chinese Rooms instantiate programs?
- Can an internalized Chinese Room think?
- Can translations occur between the internalized Chinese Room and the internalizing English speaker?
- Can computers have the right causal powers?
- Is strong AI a valid category?
- Other Chinese Room arguments

5. Can connectionist networks think?

- Are connectionist networks like human neural networks?
- Do connectionist networks follow rules?
- Are connectionist networks vulnerable to the arguments against physical symbol systems?
- Does the subsymbolic paradigm offer a valid account of connectionism?
- Can connectionist networks exhibit systematicity?
- Other connectionist arguments

6. Can computers think in images?

- Can images be realistically be represented in computer arrays?
- Can computers represent the analog properties of images?
- Can computers recognize Gestalts?
- Are images less fundamental than propositions?
- Is image psychology a valid approach to mental processing?
- Are images quasi-pictorial representations?
- Other imagery arguments

7. Do computers have to be conscious to think?

- Can computers be conscious?
- Is consciousness necessary for thought?
- Is the consciousness requirement solipsistic?
- Can higher-order representations produce consciousness?
- Can functional states generate consciousness?
- Does physicalism show that computers can be conscious?

- Does the connection principle show that consciousness is necessary for thought?

8. Are thinking computers mathematically possible?

- Is mechanistic philosophy valid?
- Does Gödel's theorem show that machines can't think?
- Does Gödel's theorem show that machines can't be conscious?
- Do mathematical theorems like Gödel's show that computers are intrinsically limited?
- Does Gödel's theorem show that mathematical insight is non-algorithmic? [REDACTED]
- Can automata think?
- Is the Lucas argument dialectical?
- Can improved machines beat the Lucas argument?
- Is the use of consistency in the Lucas argument problematic?
- Other Lucas arguments

(Horn2009)

1.6 OULIPO

- | | | |
|--------------------------|-----------------------------|-------------------------------|
| • x mistakes y for z | • n + 7 | imparmigianisation [REDACTED] |
| • word ladder | • multiple sonnet | • homovocalism |
| • univocalism | • multiple-choice narrative | • homosyntactical translation |
| • transplant | • melting snowball | • homosemantic |
| • threnodials | • measures | translation |
| • tautogram | • mathew's algorithm | • homophony |
| • spoonerism | • machines for writing | • homophonic |
| • sonnet | • liponymy | translation |
| • snowball | • lipolexe | • homomorphism |
| • sestina | • lipogram | • homolexical |
| • septina | • lescurean permutations | translation |
| • rhopalic verse | • left-handed lipogram | homoconsonantism [REDACTED] |
| • quenina | • larding | • holorhyme |
| • pumection | • isopangram | • heterosexual |
| • prisoner's restriction | • isomorphism | rhyme |
| • precooked language | • isogram | • heterogram |
| • perverse | • irrational sonnet | • haikuisation |
| • perverb | • inventory | • grammatical |
| • permutation | • intersective novel | translation |
| • paronomasia | • inclusion | • graeco-latin |
| • pangram | | bi-square |
| • palindrome | | • franglais |
| • oligogrammatic poem | | • eye-rhyme |
| | | • equivoque |

- epithalamium literature
- eodermdrome clinamen
- end-to-end chronogram
- elementary chimera
- morality cento
- eclipse canada dry
- deunglitsch braised rhyme
- delmas's method boolean poetry
- definitional beautiful outlaw
- literature beautiful in-law
- cylinder bananagram
- constraint axiomatic writing
- combinatorial avalanche
- assonance
- asphyxiation
- arborescent text
- aphorism
- antonymy
- anterhymes
- analogue lexicon
- anagram
- algol poetry
- alexandrine
- acrostic
- acronymic poetry

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CODE

2.1 INDEX

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    ↳ Go to TOC

```

2.2 CLINAMEN WITH UP TO 3 ERRORS, FAUSTROLL CORPUS

clear

afar, ahead, Alas, altar, appear, bar, beam, beard, bears, beat, beer, ble, bleed, blew, bluer, bread, break, Caesar, calvary, can, canal, care, cedar, cellar, chair, charm, cheek, chen, chere, chern, choir, clad, claim, clasp, claws, clean, clear, clearly, clerks, climb, clock, clogs, close, cloth, color, coral, crab, crap, cresc, crest, Dead, dead, dear, Dewar, ear, ears, eat, ever, far, fear, Fear, feat, flag, flat, flesh, floor, Friar, glare, Great, great, head, hear, heard, heart, heat, Her, her, idea, ideal, ideas, jar, law, lay, lead, leaf, leap, least, leave, led, lees, left, leg, legs, lent, leper, less, lest, let, mean, meat, near, oar, Ocean, Opera, over, peak, pearl, per, plat, pleas, read, Read, real, rear, sea, Sea, seat, sheer, slab, sleep, solar, speak, star, steam, sugar, swear, swears, sweat, tean, tears, their, vulgar, war, year, years, zeal

fania

acid, aid, aim, air, an, ance, and, animae, animal, Anna, ant, anti, ants, anvil, any, axis, Baba, bank, banks, basin, cabin, can, canal, Cane, canvas, dance, Danzig, data, Denis, fa, face, faced, faces, facet, facing, fact, facts, fading, falt, faith, fake, fall, falls, false, family, fan, fans, far, fat, fate, fauns, favor, final, find, finds, fine, finer, fins, flint, fluid, foil, frances, fruit, gain, habit, hair, hand, hands, india, Jane, Janus, Kaka, Kantian, laid, lance, land, lanes, Latin, lava, mail, main, Man, man, many, nadir, nail, nib, nil, pair, pan, Pan, Papio, papio, Paris, rang, range, rapid, said, sail, Saint, saliva, San, sand, sang, sonic, tail, Tait, Tanit, tunic, unit, vain, valid, van, vanish, vanity, vans, vina, Yan

moss

abyss, Across, across, acts, adds, Alas, almost, also, among, amor, amore, amour, ants, apes, arms, arose, as, As, ash, ask, ass, axis, bars, base, bases, beds, best, bis, blows, Boat, boat, boats, body, bolus, bone, bones, book, books, boot, boots, bores, born, Bosse, both, bout, bow, bowl, bows, box, boy, Boys, brass, brows, bust, case, cases, cash, cast, chose, clogs, close, co, coast, coats, Code, coins, cold, come, comes, cool, copy, cords, cost, Cost, costs, cows, crass, cross, cuIs, cups, days, demons, Deus, disk, disks, Do, do, does, dogs, dome, domos, done, door, doors, douds, down, Down, dress, drops, dust, ears, ease, easy, eats, eggs, ells, else, ends, Eros, ess, est, eyes, fans, fess, fins, fish, fist, fists, foam, fog, foil, folds, foot, For, for, fore, fork, Form, form, forms, fotms, foul, four, fox, foxes, Ghost, ghosts, glass, glows, go, God, gods, goes, Gog, Gogh, gold, Gold, gong, good, goods, gown, gowns, grass, hams, has, hast, His, his, ho, Ho, holds, holes, Holy, home, Homo, hoof, hooks, hope, horn, horns, Horse, horse, horses, host, hot, hour, Hour, hours, house, houses, how, How,

humors, hums, ikons, iris, irs, is, Is, Its, its, jaws, Jesus, jibs, job, John, jowls, joy, Just, just, kiosks, kiss, knows, last, laws, Lays, lees, legs, less, lest, lies, lions, lips, Lo, lobe, loins, Long, long, looks, Lord, lord, lords, lore, lose, loss, lost, Loti, lots, loud, louse, Love, love, loves, low, Loye, m, made, mail, main, make, makes, male, man, many, map, maps, mask, mass, masses, mast, masts, may, me, mean, means, meat, meet, men, mere, mesh, meshes, met, milk, mimes, mist, mite, mites, mob, moist, moles, month, months, moon, mor, more, Moses, most, motor, mount, Mour, mouth, mouths, moved, mower, Mrs, much, music, must, Must, my, nest, news, nisi, no, No, noise, non, none, noon, Nor, nor, nos, nose, Not, not, note, now, Now, nuts, o, oak, oar, oars, oc, odd, of, off, ofQ, oil, old, on, one, ones, or, orb, orms, our, out, own, pass, past, pigs, piss, Plus, Poe, poets, pole, poles, ponds, Poor, poor, pope, port, Pour, prose, Prose, rats, rays, rest, rise, rises, road, robe, robes, rock, rocks, rod, Roi, role, roll, rolls, rome, roof, room, rooms, root, rope, ropes, rose, rosy, row, rows, s, says, sc, sets, shops, smock, smoke, So, so, soft, sole, Some, some, son, songs, sons, soon, Soon, sorb, soul, souls, sows, sums, suns, tats, This, this, those, Thus, thus, tjis, to, To, toad, toads, tock, toes, told, tome, tone, toO, too, took, top, tops, tore, torn, tossed, Town, town, Tres, tres, ups, us, use, vans, vast, Was, was, wash, wasps, webs, whose, wigs, Woan, won, wont, wood, word, words, wore, Work, work, Works, works, worm, worn, wove, Yes, yolk, York, you, You, your, Your

2.3 WORDNET

2.3.1 ANTINOMY

```

synsets:
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                                ('clear.s.08'), Synset('

```

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synset item:open.n.01
synset item:unclutter.v.01
antonym out:clutter
antonym in:clutter
synset item:clear.v.02
synset item:clear_up.v.04
antonym out:overcast
antonym in:overcast
synset item:authorize.v.01
synset item:clear.v.05
synset item:pass.v.09
synset item:clear.v.07
antonym out:bounce
antonym in:bounce
synset item:clear.v.08
synset item:clear.v.09
synset item:clear.v.10
synset item:clear.v.11
synset item:clear.v.12
synset item:net.v.02
synset item:net.v.01
synset item:gain.v.08
synset item:clear.v.16
synset item:clear.v.17
synset item:acquit.v.01
antonym out:convict
antonym in:convict
synset item:clear.v.19
synset item:clear.v.20
synset item:clear.v.21
synset item:clear.v.22
synset item:clear.v.23
synset item:clear.v.24
synset item:clear.a.01
antonym out:unclear
antonym in:unclear
synset item:clear.s.02
synset item:clear.s.03
synset item:clear.a.04
antonym out:opaque
antonym in:opaque
synset item:clear.s.05
synset item:clear.s.06
synset item:clean.s.03
synset item:clear.s.08
synset item:clear.s.09
synset item:well-defined.a.02
antonym out:ill-defined
antonym in:ill-defined
synset item:clear.a.11
antonym out:cloudy
antonym in:cloudy
synset item:clean.s.02
synset item:clear.s.13
synset item:clear.s.14
synset item:clear.s.15
synset item:absolved.s.01
synset item:clear.s.17
synset item:clear.r.01
synset item:clearly.r.04

2.3.2 SYZYGY

set('clear.v.23'), Synset('clear.v.24'), Synset('clear.a.01'), Synset('clear.s.02'), Synset('clear.s.03'), Synset('clear.a.04'), Synset('clear.s.05'), Synset('clear.s.06'), Synset('clean.s.03'), Synset('clear.s.08'), Synset('clear.s.09'), Synset('well-defined.a.02'), [REDACTED]
 Synset('clear.a.11'), Synset('clean.s.02'), Synset('clear.s.13'), Synset('clear.s.14'),
 Synset('clear.s.15'), Synset('absolved.s.01'), Synset('clear.s.17'), Synset('clear.r.01'), [REDACTED]
 Synset('clearly.r.04')]

Step (2) then retrieves related terms. First it gets hypernyms.

synset: clear.n.01

hyponyms: —

hypernyms: innocence

holonyms: —

synset: open.n.01

hyponyms: —

hypernyms: area, country

holonyms: —

synset: unclutter.v.01

hyponyms: —

hypernyms: change, alter, modify

holonyms: —

synset: clear.v.02

hyponyms: —

hypernyms: make, create

holonyms: —

synset: clear_up.v.04

hyponyms: —

hypernyms: —

holonyms: —

synset: authorize.v.01

hyponyms: approbate, approve, O.K., okay, sanction, certificate, commission, declare, license, certify, validate, formalise

hypernyms: permit, allow, let, countenance

holonyms: —

synset: clear.v.05

hyponyms: clear-cut, deforest, disafforest, denude, bare, denudate, strip, stump

hypernyms: remove, take, take_away, withdraw

holonyms: —

synset: pass.v.09

hyponyms: clear

hypernyms: succeed, win, come_through, bring_home_the_bacon, [REDACTED] deliver_the_goods

holonyms: —

synset: clear.v.07

hyponyms: —

hypernyms: —

holonyms: —

synset: clear.v.08

hyponyms: —

hypernyms: vanish, disappear, go_away

holonyms: —

synset: clear.v.09

hyponyms: hop

hypernyms: pass, overtake, overhaul

holonyms: —

synset: clear.v.10

hyponyms: —

hypernyms: clarify, clear_up, elucid-

ate	hyponyms: purge, vindicate, whitewash, pronounce, label, judge
holonyms: —	holonyms: —
synset: clear.v.11	synset: clear.v.19
hyponyms: —	hyponyms: —
hypernyms: free, discharge	hypernyms: settle, square_off, square_up, determine
holonyms: —	holonyms: —
synset: clear.v.12	synset item:clear.v.20
hyponyms: —	hyponyms: —
hypernyms: rid, free, disembarass	hypernyms: change, alter, modify
holonyms: —	holonyms: —
synset: net.v.02	synset item:clear.v.21
hyponyms: —	hyponyms: —
hypernyms: yield, pay, bear	hypernyms: empty
holonyms: —	holonyms: —
synset: net.v.01	synset item:clear.v.22
hyponyms: —	hyponyms: —
hypernyms: profit, gain, benefit	hypernym out:take_out, move_out, remove
holonyms: —	holonyms: —
synset: gain.v.08	synset item:clear.v.23
hyponyms: eke_out, squeeze_out, gross, profit, turn_a_profit, rake_in, shovel_in, rake_off, take_home, bring_home, yield, pay, bear	hyponyms: —
hypernyms: get, acquire	hypernym out:empty
holonyms: —	holonyms: —
synset: clear.v.16	synset item:clear.v.24
hyponyms: —	hyponyms: —
hypernyms: sell	hypernym out:remove, take, take_away, withdraw
holonyms: —	holonyms: —
synset: clear.v.17	synset item:clear.a.01
hyponyms: —	hyponyms: —
hypernyms: pass, clear	hypernyms: —
holonyms: —	holonyms: —
synset: acquit.v.01	synset item:clear.s.02
hyponyms: —	

hyponyms: —	synset item:clear.a.11
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.s.03	holonyms: —
hyponyms: —	synset item:clean.s.02
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.a.04	holonyms: —
hyponyms: —	synset item:clear.s.13
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.s.05	holonyms: —
hyponyms: —	synset item:clear.s.14
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.s.06	holonyms: —
hyponyms: —	synset item:clear.s.15
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clean.s.03	holonyms: —
hyponyms: —	synset item:absolved.s.01
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.s.08	holonyms: —
hyponyms: —	synset item:clear.s.17
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:clear.s.09	holonyms: —
hyponyms: —	synset item:clear.r.01
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
synset item:well-defined.a.02	holonyms: —
hyponyms: —	synset item:clearly.r.04
hypernyms: —	hyponyms: —
holonyms: —	hypernyms: —
	holonyms: —

indent these paragraphs

synset: clear.n.01

hypernyms: innocence

synset: open.n.01

hypernyms: area, country

synset: unclutter.v.01

hypernyms: change, alter, modify

synset: clear.v.02

hypernyms: make, create

synset: authorize.v.01

hyponyms: approbate, approve, O.K., okay, sanction, certificate, commission, declare, license, certify, validate, formalise

hypernyms: permit, allow, let, countenance

synset: clear.v.05

hyponyms: clear-cut, deforest, disafforest, denude, bare, denudate, strip, stump

hypernyms: remove, take, take_away, withdraw

synset: pass.v.09

hyponyms: clear

hypernyms: succeed, win, come_through, bring_home_the_bacon, deliver_the

synset: clear.v.08

hypernyms: vanish, disappear, go_away

synset: clear.v.09

hyponyms: hop

hypernyms: pass, overtake, overhaul

synset: clear.v.10

hypernyms: clarify, clear_up, elucidate

synset: clear.v.11

hypernyms: free, discharge

synset: clear.v.12

hypernyms: rid, free, disembarass

synset: net.v.02

```

hypernyms: yield, pay, bear

synset: net.v.01
hypernyms: profit, gain, benefit

synset: gain.v.08
hyponyms: eke_out, squeeze_out, gross, profit, turn_a_profit, rake_in, [REDACTED]
shovel_in, rake_off, take_home, bring_home, yield, pay, bear
hypernyms: get, acquire

synset: clear.v.16
hypernyms: sell

synset: clear.v.17
hypernyms: pass, clear

synset: acquit.v.01
hyponyms: purge, vindicate, whitewash, pronounce, label, judge

synset: clear.v.19
hypernyms: settle, square_off, square_up, determine

synset: clear.v.20
hypernyms: change, alter, modify

synset: clear.v.21
hypernyms: empty

synset: clear.v.22
hypernyms: take_out, move_out, remove

synset: clear.v.23
hypernyms: empty

synset: clear.v.24
hypernyms: remove, take, take_away, withdraw

synsets:
[Synset('clear.n.01'), Synset('
open.n.01'), Synset('
unclutter.v.01'), Synset('
clear.v.02'), Synset('
clear_up.v.04'), Synset('
authorize.v.01'), Synset('
clear.v.05'), Synset('pass.v
.09'), Synset('clear.v.07'),
Synset('clear.v.08'),
Synset('clear.v.09'), Synset(
'clear.v.10'), Synset('
clear.v.11'), Synset('clear.
v.12'), Synset('net.v.02'),
Synset('net.v.01'), Synset('
gain.v.08'), Synset('clear.v
.16'), Synset('clear.v.17'),
Synset('acquit.v.01'),

```

```

Synset('clear.v.19'), Synset(
    ('clear.v.20'), Synset('
        clear.v.21'), Synset('clear.
        v.22'), Synset('clear.v.23')
        , Synset('clear.v.24'),
        Synset('clear.a.01'), Synset(
            'clear.s.02'), Synset('
                clear.s.03'), Synset('clear.
                a.04'), Synset('clear.s.05')
                , Synset('clear.s.06'),
                Synset('clean.s.03'), Synset(
                    'clear.s.08'), Synset('
                        clear.s.09'), Synset('well-
                        defined.a.02'), Synset('
                            clear.a.11'), Synset('clean.
                            s.02'), Synset('clear.s.13')
                            , Synset('clear.s.14'),
                            Synset('clear.s.15'), Synset(
                                'absolved.s.01'), Synset('
                                    clear.s.17'), Synset('clear.
                                    r.01'), Synset('clearly.r
                                    .04'))]

synset item:clear.n.01
hypernym out:innocence
[]
synset item:open.n.01
hypernym out:area
hypernym out:country
hypernym in:country
[]
synset item:unclutter.v.01
hypernym out:change
hypernym in:change
hypernym out:alter
hypernym out:modify
[]
synset item:clear.v.02
hypernym out:make
hypernym in:make
hypernym out:create
[]
synset item:clear_up.v.04
[]
synset item:authorize.v.01
hyponym out:approbate
hyponym out:approve
hyponym out:O.K.
hyponym out:okay
hyponym out:sanction
hyponym out:certificate
hyponym in:certificate
hyponym out:commission
hyponym out:declare
hyponym in:declare
hyponym out:license
hyponym out:licence
hyponym out:certify
hyponym out:validate
hyponym out:formalize
hyponym out:formalise
hypernym out:permit
hypernym in:permit
hypernym out:allow
hypernym in:allow
hypernym out:let
hypernym in:let
hypernym out:countenance
hypernym in:countenance
[]
synset item:clear.v.05
hypernym out:clear-cut
hypernym out:deforest
hypernym out:disforest
hypernym out:disafforest
hypernym out:denude
hypernym out:bare
hypernym in:bare
hypernym out:denudate
hypernym out:strip
hypernym out:stump
hypernym out:remove
hypernym out:take
hypernym in:take
hypernym out:take_away
hypernym out:withdraw
[]
synset item:pass.v.09
hypernym out:clear
hypernym in:clear
hypernym out:succeed
hypernym in:succeed
hypernym out:win

```

```

hypernym out:come_through
hypernym out:
    bring_home_the_bacon
hypernym out:deliver_the_goods
[]
synset item:clear.v.07
[]
synset item:clear.v.08
hypernym out:vanish
hypernym in:vanish
hypernym out:disappear
hypernym out:go_away
[]
synset item:clear.v.09
hyponym out:hop
hypernym out:pass
hypernym in:pass
hypernym out:overtake
hypernym out:overhaul
[]
synset item:clear.v.10
hypernym out:clarify
hypernym out:clear_up
hypernym out:elucidate
[]
synset item:clear.v.11
hypernym out:free
hypernym in:free
hypernym out:discharge
[]
synset item:clear.v.12
hypernym out:rid
hypernym out:free
hypernym in:free
hypernym out:disembarrass
[]
synset item:net.v.02
hypernym out:yield
hypernym out:pay
hypernym in:pay
hypernym out:bear
[]
synset item:net.v.01
hypernym out:profit
hypernym out:gain
hypernym in:gain
hypernym out:benefit
hypernym in:benefit
[]
synset item:gain.v.08
hyponym out:eke_out
hyponym out:squeeze_out
hyponym out:gross
hyponym out:profit
hyponym out:turn_a_profit
hyponym out:rake_in
hyponym out:shovel_in
hyponym out:rake_off
hyponym out:take_home
hyponym out:bring_home
hyponym out:yield
hyponym out:pay
hyponym in:pay
hyponym out:bear
hypernym out:get
hypernym out:acquire
[]
synset item:clear.v.16
hypernym out:sell
[]
synset item:clear.v.17
hypernym out:pass
hypernym in:pass
hypernym out:clear
hypernym in:clear
[]
synset item:acquit.v.01
hyponym out:purge
hyponym out:vindicate
hyponym out:whitewash
hypernym out:pronounce
hypernym in:pronounce
hypernym out:label
hypernym out:judge
hypernym in:judge
[]
synset item:clear.v.19
hypernym out:settle
hypernym out:square_off
hypernym out:square_up
hypernym out:determine
hypernym in:determine

```

```

[]                                synset item:clear.a.04
synset item:clear.v.20          []
hypernym out:change             synset item:clear.s.05
hypernym in:change              []
hypernym out:alter              synset item:clear.s.06
hypernym out:modify              []
[]                                synset item:clean.s.03
synset item:clear.v.21          []
hypernym out:empty              synset item:clear.s.08
hypernym in:empty              []
[]                                synset item:clear.s.09
synset item:clear.v.22          []
hypernym out:take_out           synset item:well-defined.a.02
hypernym out:move_out           []
hypernym out:remove              synset item:clear.a.11
[]                                []
synset item:clear.v.23          []
hypernym out:empty              synset item:clean.s.02
hypernym in:empty              []
[]                                synset item:clear.s.13
synset item:clear.v.24          []
hypernym out:remove              synset item:clear.s.14
hypernym out:take                []
hypernym in:take                synset item:clear.s.15
hypernym out:take_away           []
hypernym out:withdraw            synset item:absolved.s.01
[]                                []
synset item:clear.a.01          []
synset item:clear.s.02          []
[]                                synset item:clear.r.01
synset item:clear.s.03          []
[]                                synset item:clearly.r.04
[]                                []

```

2.4 BING API

Formatted:

```

"d": { "results": [
{ "__metadata": {
    "uri": "https://api.datamarket.azure.com/Data.ashx/Bing"
      ↳ /Search/Image
      ↳ ?Query=\u0027kittens\u0027&$skip=0&$top=1",
    "type": "ImageResult"
}, // __metadata
"ID": "e09072a2-faf3-47ac-b77d-46a8df8941aa",

```

```
"Title": "Cute Kittens - Pictures - The Wondrous Pics",
"MediaUrl": "http://wondrouspics.com/wp-content/uploads/2011/12/ ↳ /Cute-Kitten2.jpg",
"SourceUrl": "http://wondrouspics.com/cute-kittens-pictures/",
"DisplayUrl": "wondrouspics.com/cute-kittens-pictures",
"Width": "1440",
"Height": "900",
"FileSize": "238015",
"ContentType": "image/jpeg",
"Thumbnail":
{ "__metadata":
  { "type": "Bing.Thumbnail"
  },
  "MediaUrl": "http://ts2.mm.bing.net/th/ ↳ ?id=OIP.M5692e5d79242507e30600fd54639316cH0&pid=15.1" ↳ ,
  "ContentType": "image/jpg",
  "Width": "480",
  "Height": "300",
  "FileSize": "13856"
} // Thumbnail
}, ...
], // results
"__next": "https://api.datamarket.azure.com/Data.ashx/Bing/Search/ ↳ /Image?Query=%u0027kittens%u0027&$skip=50"
} // d
```

Real:

```

{"d": {"results": [{"__metadata": {"uri": "https://
    → //api.datamarket.azure.com/Data.ashx/Bing/Search/Image
    → ?Query=\u0027kittens\u0027&$skip=0&$top=1"
    → , "type": "ImageResult"}]
    → , "ID": "e09072a2-faf3-47ac-b77d-46a8df8941aa", "Title": "Cute
    → Kittens - Pictures - The Wondrous Pics", "MediaUrl": "http://
    → //wondrouspics.com/wp-content/uploads/2011/12/
    → /Cute-Kitten2.jpg", "SourceUrl": "http://wondrouspics.com/
    → /cute-kittens-pictures/", "DisplayUrl": "wondrouspics.com/
    → /cute-kittens-pictures", "Width": "1440", "Height": "900"
    → , "FileSize": "238015", "ContentType": "image/jpeg"
    → , "Thumbnail": {"__metadata": {"type": "Bing.Thumbnail"}}
    → , "MediaUrl": "http://ts2.mm.bing.net/th_
    → ?id=OIP.M5692e5d79242507e30600fd54639316cH0&pid=15.1"
    → , "ContentType": "image/jpg", "Width": "480", "Height": "300"
    → , "FileSize": "13856"}, {"__metadata": {"uri": "https://
    → //api.datamarket.azure.com/Data.ashx/Bing/Search/Image
    → ?Query=\u0027kittens\u0027&$skip=1&$top=1"
    → , "type": "ImageResult"}]
    → , "ID": "16f74e1b-9a64-4e5b-99b1-bc0b7bfe3121"
    → , "Title": "Silver and red kitten, evo jedne slike s
    → macama", "MediaUrl": "http://stuffpoint.com/cats/image/
    → /192286-cats-silver-and-red-kitten.jpg"
    → , "SourceUrl": "http://stuffpoint.com/cats/image/192286/
    → /silver-and-red-kitten-picture/"
    → , "DisplayUrl": "stuffpoint.com/cats/image/192286/
    → /silver-and-red-kitten-picture", "Width": "1332"
    → , "Height": "984", "FileSize": "133078", "ContentType": "image/
    → /jpeg", "Thumbnail": {"__
    → __metadata": {"type": "Bing.Thumbnail"}, "MediaUrl": "http://
    → //ts3.mm.bing.net/th_
    → ?id=OIP.Mf0ea1fd0a1675ba6c46daffd82bfd666H0&pid=15.1"
    → , "ContentType": "image/jpg", "Width": "300", "Height": "221"
    → , "FileSize": "6509"}, ...], "__next": "https://
    → //api.datamarket.azure.com/Data.ashx/Bing/Search/Image
    → ?Query=\u0027kittens\u0027&$skip=50"}}

```

2.5 RANDOM QUOTES

```

1 def getrandquote():
2     # RANDOM QUOTES
3     root_path = os.path.dirname(os.path.abspath(__file__))
4     root_path = root_path[:-4]
5     corpus_root = root_path + '/app/static/corpus'
6     path_b = corpus_root + '/quotes.txt'
7     quotes_text = codecs.open(path_b, "r", encoding='utf-8')
8     quotestext = quotes_text.readlines()
9     quotes_text.close()

```

```

10     # print random.choice(quotestext)
11     return random.choice(quotestext)

```

2.6 STOPWORDS

2.6.1 ENGLISH

Total: 127

i, me, my, myself, we, our, ours, ourselves, yo, your, yours, yourself, yourselves, he, him, his, himself, she, her, hers, herself, it, its, itself, they, them, their, theirs, themselves, what, which, who, whom, this, that, these, those, am, is, are, was, were, be, been, being, have, has, had, having, do, does, did, doing, a, an, the, and, but, if, or, because, as, until, while, of, at, by, for, with, about, against, between, into, through, during, before, after, above, below, to, from, up, down, in, out, on, off, over, under, again, further, then, once, here, there, when, where, why, how, all, any, both, each, few, more, most, other, some, such, no, nor, not, only, own, same, so, than, too, very, s, t, can, will, just, don, should, now

2.6.2 FRENCH

Total: 155

a, aux, avec, ce, ces, dans, de, des, d, elle, en, et, eux, il, je, la, le, leur, lui, ma, mais, me, même, mes, moi, mon, ne, nos, notre, nous, on, o, par, pas, pour, q, que, qui, sa, se, ses, son, sur, ta, te, tes, toi, ton, t, un, une, vos, votre, vous, été, étée, étées, étés, étant, étante, étants, étantes, suis, es, est, sommes, êtes, sont, serai, seras, sera, serons,erez, seront, serais, serait, serions, seriez, seraient, étais, était, étions, étiez, étaient, fus, fut, fûmes, fûtes, furent, sois, soit, soyons, soyez, soient, fusse, fusses, fût, fussions, fussiez, fussent, ayant, ayante, ayantes, ayants, e, eue, eues, eus, ai, as, avons, avez, ont, aurai, auras, aura, aurons, aurez, auront, aurais, aurait, aurions, auriez, auraient, avais, avait, avions, aviez, avaient, eut, eûmes, eûtes, eurent, aie, aies, ait, ayons, ayez, aient, eusse, eusses, eût, eussions, eussiez, eussent

2.6.3 GERMAN

Total: 231

aber, alle, allem, allen, aller, alles, als, also, am, an, ander, andere, anderem, anderen, anderer, anderes, anderm, andern, anderr, anders, auch, auf, aus, bei, bin, bis, bist, da, damit, dann, der, den, des, dem, die, das, daß, derselbe,

derselben, denselben, desselben, demselben, dieselbe, dieselben, dasselbe, daz, dein, deine, deinem, deinen, deiner, deines, denn, derer, dessen, dich, dir, d, dies, diese, diesem, diesen, dieser, dieses, doch, dort, durch, ein, eine, einem, einen, einer, eines, einig, einige, einigem, einigen, einiger, einiges, einmal, er, ihn, ihm, es, etwas, euer, eure, eurem, euren, eurer, eures, für, gegen, gewesen, hab, habe, haben, hat, hatte, hatten, hier, hin, hinter, ich, mich, mir, ihr, ihre, ihrem, ihren, ihrer, ihres, euch, im, in, indem, ins, ist, jede, jedem, jeden, jeder, jedes, jene, jenem, jenen, jener, jenes, jetzt, kann, kein, keine, keinem, keinen, keiner, keines, können, könnte, machen, man, manche, manchem, manchen, mancher, manches, mein, meine, meinem, meinen, meiner, meines, mit, muss, musste, nach, nicht, nichts, noch, nun, nur, ob, oder, ohne, sehr, sein, seine, seinem, seinen, seiner, seines, selbst, sich, sie, ihnen, sind, so, solche, solchem, solchen, solcher, solches, soll, sollte, sondern, sonst, über, um, und, uns, unse, unsem, unsen, unser, unses, unter, viel, vom, von, vor, während, war, waren, warst, was, weg, weil, weiter, welche, welchem, welchen, welcher, welches, wenn, werde, werden, wie, wieder, will, wir, wird, wirst, wo, wollen, wollte, würde, würden, z, zum, zur, zwar, zwischen

2.7 IMAGE SPIRAL

```

1  function createSpiral(imglist) {
2      if (imglist.length === 10) {
3          var spiral_code = ' \
4              <div class="spouter"> \
5                  <div class="spleft"> \
6                      <div class="spltop"> \
7                          <div class="splleft"> \
8                              <a id="a3" class="spimg" href="'+imglist[3][2]+'" ></a> \
9                                  </div> \
10                                 <div class="splright"> \
11                                     <div class="splrtop"> \
12                                         <a id="a8" class="spimg" href="'+imglist[8][2]+'" ></a> \
13                                     </div> \
14                                     <div class="splrbottom"> \
15                                         <div class="splrbleft"> \
16                                             <div class="splrbltop"> \
17                                                 <div class="splrbltleft"> \
18                                                     <a id="a0" class="spimg" href="'+imglist[0][2]+'" \
→     ></a> \
19                                                     </div> \
20                                                     <div class="splrblrightright"> \
21                                                         <div class="splrbltrtop"> \
22                                                             <a id="a1" class="spimg" href="'+imglist[1][2]+'" \
→     ></a> \
23                                                             </div> \
24                                                             <div class="splrbltrbottom"> \
25                                                 <div class="splrbltrbleft"> \
26                                                     <a id="a5" class="spimg" \
→     href="'+imglist[5][2]+'" ></a> \
27                                                     </div> \
28                                                     <div class="splrbltrbright"> \
29                                                         <a id="a6" class="spimg" \
→     href="'+imglist[6][2]+'" ></a> \
30                                                         </div> \
31                                                     </div> \
32                                                 </div> \
33                                             </div> \
34                                             <div class="splrblbottom"> \
35                                                 <a id="a7" class="spimg" href="'+imglist[7][2]+'" \
→     ></a> \
36                                                 </div> \
37                                             </div> \
38                                             <div class="splrbright"> \
39                                                 <a id="a2" class="spimg" href="'+imglist[2][2]+'" ></a> \
40                                                 </div> \
41                                             </div> \
42                                             </div> \
43                                         </div> \
44                                     </div> \
45                                 </div> \
46                             </div> \
47                         </div> \
48                     </div> \
49                 </div> \
50             </div> \
51         </div> \
52     </div> \
53 
```

WORDNET

The sections below show an example result returned by WordNet for the query ‘clear’. It is split into four parts, nouns (n), verbs (v), adjectives (adj) and adverbs (adv). Each entry is preceded by an S for synset.

3.1 NOUN

- S: (n)** **clear** (the state of being free of suspicion) “investigation showed that he was in the clear”
- S: (n)** open, **clear** (a clear or unobstructed space or expanse of land or water) “finally broke out of the forest into the open”

3.2 VERB

- S: (v)** unclutter, **clear** (rid of obstructions) “Clear your desk”
- S: (v)** **clear** (make a way or path by removing objects) “Clear a path through the dense forest”
- S: (v)** clear up, **clear**, light up, brighten (become clear) “The sky cleared after the storm”
- S: (v)** authorize, authorise, pass, **clear** (grant authorization or clearance for) “Clear the manuscript for publication”; “The rock star never authorized this slanderous biography”
- S: (v)** **clear** (remove) “clear the leaves from the lawn”; “Clear snow from the road”
- S: (v)** pass, **clear** (go unchallenged; be approved) “The bill cleared the House”
- S: (v)** **clear** (be debited and credited to the proper bank accounts) “The check will clear within 2 business days”
- S: (v)** **clear** (go away or disappear) “The fog cleared in the afternoon”

- S: (v)** **clear**, top (pass by, over, or under without making contact) “the balloon cleared the tree tops”
- S: (v)** **clear**, clear up, shed light on, crystallize, crystallise, crystalize, crystalise, straighten out, sort out, enlighten, illuminate, elucidate (make free from confusion or ambiguity; make clear) “Could you clarify these remarks?”; “Clear up the question of who is at fault”
- S: (v)** **clear** (free from payment of customs duties, as of a shipment) “Clear the ship and let it dock”
- S: (v)** **clear** (clear from impurities, blemishes, pollution, etc.) “clear the water before it can be drunk”
- S: (v)** net, **clear** (yield as a net profit) “This sale netted me \$1 million”
- S: (v)** net, sack, sack up, clear (make as a net profit) “The company cleared \$1 million”
- S: (v)** gain, take in, **clear**, make, earn, realize, realise, pull in, bring in (earn on some commercial or business transaction; earn as salary or wages) “How much do you make a month in your new job?”; “She earns a lot in her new job”; “this merger brought in lots of money”; “He clears \$5,000 each month”
- S: (v)** **clear** (sell) “We cleared a lot of the old model cars”
- S: (v)** **clear** (pass an inspection or receive authorization) “clear customs”
- S: (v)** acquit, assuage, **clear**, discharge, exonerate, exculpate (pronounce not guilty of criminal charges) “The suspect was cleared of the murder charges” [REDACTED]
- S: (v)** **clear**, solve (settle, as of a debt) “clear a debt”; “solve an old debt”
- S: (v)** **clear** (make clear, bright, light, or translucent) “The water had to be cleared through filtering”
- S: (v)** **clear** (rid of instructions or data) “clear a memory buffer”
- S: (v)** **clear** (remove (people) from a building) “clear the patrons from the theater after the bomb threat”
- S: (v)** **clear** (remove the occupants of) “Clear the building”
- S: (v)** **clear**, clear up (free (the throat) by making a rasping sound) “Clear the throat”

3.3 ADJECTIVE

S: (adj)

clear (readily apparent to the mind) “a clear and present danger”; “a clear explanation”; “a clear case of murder”; “a clear indication that she was angry”; “gave us a clear idea of human nature”

S: (adj)

clear (free from confusion or doubt) “a complex problem requiring a

clear head”; “not clear about what is expected of us”

S: (adj)

clear, open (affording free passage or view) “a clear view”; “a clear path to victory”; “open waters”; “the open countryside”

S: (adj)

clear (allowing light to pass through) “clear water”; “clear plastic bags”; “clear glass”; “the air is clear and clean”

S: (adj)

clear (free from contact or proximity or connection) “we were clear of the danger”; “the ship was clear of the reef”

S: (adj)

clear (characterized by freedom from troubling thoughts (especially guilt)) “a clear conscience”; “regarded her questioner with clear untroubled eyes”

S: (adj)

clean, **clear**, light, unclouded ((of sound or color) free from anything that dulls or dims) “efforts to obtain a clean bass in orchestral recordings”; “clear laughter like a waterfall”; “clear reds and blues”; “a light lilting voice like a silver bell”

S: (adj)

clear, unmortgaged ((especially of a title) free from any encumbrance or limitation that presents a question of fact or law) “I have clear title to this property”

S: (adj)

clear, clean-cut, clear-cut (clear and distinct to the senses; easily perceptible) “as clear as a whistle”; “clear footprints in the snow”; “the letter brought back a clear image of his grandfather”; “a spire clean-cut against the sky”; “a clear-cut pattern”

S: (adj)

well-defined, **clear** (accurately stated or described) “a set of well-defined values”

S: (adj)

clear (free from clouds or mist or haze) “on a clear day”

S: (adj)

clean, **clear** (free of restrictions or qualifications) “a clean bill of health”; “a clear winner”

S: (adj)

clear (free from flaw or blemish or impurity) “a clear perfect diamond”; “the clear complexion of a healthy young woman”

S: (adj)

clear (clear of charges or deductions) “a clear profit”

S: (adj)

clear, decipherable, readable (easily deciphered)

S: (adj)

absolved, **clear**, cleared, exculpated, exonerated, vindicated (freed from any question of guilt) “is absolved from all blame”; “was now clear of the charge of cowardice”; “his official honor is vindicated”

S: (adj)

clear, percipient (characterized by ease and quickness in perceiving) “clear mind”; “a percipient author”

3.4 ADVERB

S: (adv)

clear, all the way (completely) “read the book clear to the end”; “slept clear through the night”; “there were open fields clear to the horizon”

S: (adv)

clearly, **clear** (in an easily perceptible manner) “could be seen clearly under the microscope”; “She cried loud and clear”

JARRY'S TEXTS

A list of Jarry's works in chronological order with their original titles copied from the French Wikipedia entry on Jarry follows below.

4 WORKS

- Les Antliaclastes (1886–1888) poems, reprinted in Ontogénie
- La Seconde Vie ou Macaber (1888) reprinted in Les Minutes de sable mémorial
- Onénisme ou les Tribulations de Priou (1888) first version of Ubu cocu
- Les Alcoolisés (1890) reprinted in les Les Minutes de sable mémorial
- Visions actuelles et futures (1894)
- “Haldernablou” (1894) reprinted in les Les Minutes de sable mémorial
- “Acte unique” from César-Antéchrist (1894)
- Les Minutes de sable mémorial (1894) poems
- César Antéchrist (1895)
- Ubu roi (1896, version of 1888)
- L'Autre Alceste (1896)
- Paralipomènes d'Ubu (1896)
- Le Vieux de la montagne (1896)
- Les Jours et les Nuits (1897), novel
- Ubu cocu ou l'Archéoptéryx (1897)
- L'Amour en visites (1897, publié en 1898) poems
- Gestes et opinions du docteur Faustroll, pataphysicien (achevé en 1898, published in 1911) novel
- Petit Almanach (1898)
- L'Amour absolu (1899)
- Ubu enchaîné (1899, published in 1900)
- Messaline (1900)

- Almanach illustré du Père Ubu (1901)
- “Spéculations”, in La Revue Blanche (1901)
- Le Surmâle (1901, publié en 1902) novel
- “Gestes” in La Revue Blanche (1901) published in 1969 with “Spéculations” in La Chandelle verte.
- L'Objet aimé (1903)
- “Le 14 Juillet” in Le Figaro (1904)
- Pantagruel (1905 opéra-bouffe by Rabelais staged in 1911, music by Claude Terrasse)
- Ubu sur la Butte (1906)
- Par la taille (1906) opérette
- Le Moutardier du pape (1906, publié en 1907) opéra-bouffe
- Albert Samain (souvenirs) (1907)

PUBLICATIONS POST-MORTEM

- La Dragonne (1907, published in 1943)
- Spéculations (1911)
- Pieter de Delft (1974) opéra-comique
- Jef (1974) play
- Le Manoir enchanté (1974) opéra-bouffe staged in 1905
- L'Amour maladroit (1974) opérette
- Le Bon Roi Dagobert (1974) opéra-bouffe
- Léda (1981) opérette-bouffe
- Siloques. Superloques. Soliloques Et Interloques De Pataphysique (2001) texts
- Paralipomènes d'Ubu/Salle Ubu (2010) livre d'artiste
- Ubu marionnette (2010) livre d'artiste

TRANSLATIONS

- La ballade du vieux marin (1893, after The ancient mariner by Coleridge)
- Les silènes (1900, translation of German play by Christian Dietrich Grabbe)
- Olalla (1901, novel by Stevenson)
- La papesse Jeanne (1907, translation of Greek book by d'Emmanuel Rhoïdès) [REDACTED]

CONTRIBUTIONS

- Écho de Paris
- L'Art de Paris

- Essais d'art libre
- Le Mercure de France
- La Revue Blanche
- Le Livre d'art
- La Revue d'art
- L'Omnibus de Corinthe
- Renaissance latine
- Les Marges
- La Plume
- L'Œil
- Le Canard sauvage
- Le Festin d'Ésope
- Vers et prose
- Poésia
- Le Critique

[Go to TOC](#)

GIT HISTORY

5.1 WEBSITE REPOSITORY

```
* 0fbbfcfd | Sat 15 Oct 2016 (HEAD -> master, origin/master, origin/HEAD) |
  ↳ Deleted local log
* 504bcfa | Sat 15 Oct 2016 | Added meta description
* a7e4a5d | Sun 02 Oct 2016 | Updated about
* 64b0c9a | Sun 02 Oct 2016 | Work in progress
| \
| | * 76e1dbb | Fri 12 Aug 2016 (origin/live, live) | Merge pull request
|   ↳ #15 from Fania/master
| | \
| | /
| | /
| * | 5fd81f9 | Fri 12 Aug 2016 (tag: v.4.1) | Merge pull request #14
|   ↳ from Fania/thesis
| | \
| | | 331ddfe | Fri 12 Aug 2016 (origin/thesis) | Comment out prints
| | | 878cade | Fri 12 Aug 2016 | Log updates
| | | d894400 | Fri 12 Aug 2016 | Fixed results-reverbs-origins numbers
| | | 7a64760 | Fri 12 Aug 2016 | Fixed holonyms and meronyms
| | /
| * | 8efc58a | Fri 12 Aug 2016 | Merge pull request #13 from Fania/live
| | \
| | | c4b9eea | Thu 11 Aug 2016 | About section update
| | /
| * 0f6353a | Thu 11 Aug 2016 (tag: v.4.0) | Added new paper to about
|   ↳ section
| * 0fd2af4 | Thu 11 Aug 2016 | Cleaned files
| * 1bf06c8 | Thu 11 Aug 2016 | Merge branch 'live' of https://github.com
|   ↳ /Fania/pata.physics.wtf into live
| | \
| * | 0b66aaf | Thu 11 Aug 2016 | Enabled image and video in menu
| | * 15bdb1e | Thu 11 Aug 2016 | Merge pull request #12 from Fania/
|   ↳ master
```

```

| | | \
| | / /
| | /
| | /
| / |
* | 23ea5c6 | Thu 11 Aug 2016 | Merge commit
|\ \
| | /
* | 8f5708d | Thu 11 Aug 2016 | Changed date
* | 3b32674 | Thu 11 Aug 2016 | Merge pull request #11 from Fania/dev
|\ \
| * \ d480bfa | Thu 11 Aug 2016 (dev) | Merge pull request #9 from Fania/
    ↳ prints
| | \ \
| | * | 4adf2a2 | Thu 11 Aug 2016 (prints) | Added meronyms, got rid of
    ↳ prints again
| | * | b454247 | Thu 04 Aug 2016 | ppSENT
| | * | dbb33cd | Thu 04 Aug 2016 | ppSENT fix
| | * | ef33367 | Sat 23 Jul 2016 | stuff
| | * | 6edc4a3 | Tue 19 Jul 2016 | ppSENT prints
| | * | 3fa7ab6 | Tue 19 Jul 2016 | about to change ppSENT
| | / /
| * | 96a7f8f | Mon 18 Jul 2016 | log changes
| * | abdc8a1 | Wed 06 Jul 2016 | Revert "failed getty (3callspersec)"
| * | 975edb6 | Wed 06 Jul 2016 | failed getty (3callspersec)
| * | c9b6b82 | Wed 06 Jul 2016 | Prepping for rewriting Getty and Bing to
    ↳ run 10 times
| * | 62ad371 | Wed 06 Jul 2016 | Made Flickr Img List Vessel function
    ↳ standalone
| * | 8eaa132 | Wed 06 Jul 2016 | Fixed log printouts
| * | e6c1d5f | Tue 05 Jul 2016 | flickr working with 10 images
| * | 916faa4 | Tue 05 Jul 2016 | 10 images working
| * | 46b4209 | Tue 05 Jul 2016 | partially working imagelistvessel ith 10
    ↳ results
| * | efe1893 | Tue 05 Jul 2016 | still fucking in progress
| * | f549bab | Sun 03 Jul 2016 | work in progress
| * | f4fdbea | Sun 03 Jul 2016 | trap for empty data items in js
| * | 178b63a | Sun 03 Jul 2016 | half assed img search 10 results done
| * | b00fd7e | Sun 03 Jul 2016 | Video working
| * | c99e8eb | Sun 03 Jul 2016 | Getty works too.
| * | aeb081d | Sat 02 Jul 2016 | Getty API down, flickr and Bing work
| * | d228062 | Sat 02 Jul 2016 | Flickr and Bing work
| * | c53b060 | Sat 02 Jul 2016 | Query is now 1 random item from pata set
| * | ac86e07 | Sat 02 Jul 2016 | Image search works again somehow
| * | 0c7713b | Tue 07 Jun 2016 | work in progress
| * | 4fed23c | Tue 07 Jun 2016 | added log with date and time
| * | 52c4394 | Tue 07 Jun 2016 | datetime log
| / /
| * 2dfa9d3 | Mon 06 Jun 2016 (tag: v.3.5) | Ready to deploy
| * 0cc8be1 | Mon 06 Jun 2016 | Added log

```

```

| /
* 2c51dbc | Mon 06 Jun 2016 | dot creped into code
* e49efa5 | Mon 06 Jun 2016 | pre-merge commit
| \
* | 6c43cea | Mon 06 Jun 2016 | pre-merge commit again
* | af51ef4 | Mon 06 Jun 2016 | pre-merge commit
| \
* | \ 4859e65 | Mon 06 Jun 2016 | pre merge commit
| \
* | | | 26a1d9c | Mon 06 Jun 2016 | test commit
| | | * 3ef1630 | Mon 06 Jun 2016 | readme updates
| | | * 06b070a | Mon 16 May 2016 | git log stuff
| | | * 10f61f9 | Sun 08 May 2016 | Merge remote-tracking branch 'refs/
    ↳ remotes/origin/master' into api
| | | |
| | | \
| | | /
| | | |
| | | aa58f79 | Sat 09 Apr 2016 | screenshot
* | | | bea5474 | Sat 09 Apr 2016 | added screenshot
* | | | 7072f33 | Sat 09 Apr 2016 (tag: v2.0) | gitignore
| | | * 0e53ee6 | Sat 09 Apr 2016 | Working on new server stuff
| | | * a082595 | Tue 05 Apr 2016 | Update to Todo file
| | | * 6fbbd49 | Sun 20 Mar 2016 | pataphysicalisation work in progress
| | | * 80412e1 | Sun 20 Mar 2016 | Flickr, Getty and Bing working!
| | | * 00fd2c5 | Sun 20 Mar 2016 | radio buttons update properly
| | | * 7e03f4b | Wed 16 Mar 2016 | Flickr OK Getty OK
| | | * df847d9 | Wed 16 Mar 2016 | Revert "Test revert commit"
| | | * 630bf1a | Wed 16 Mar 2016 | Test revert commit
| | | * 62dfc0b | Wed 16 Mar 2016 | Getty OK, Flickr NO
| | | * 17cff52 | Wed 16 Mar 2016 | Getty working
| | | * fde271f | Wed 16 Mar 2016 | FUCK THIS SHIT
| | | * 9095fa1 | Mon 14 Mar 2016 | Flickr API working (spiral + list)
| | | * adb55cf | Sat 12 Mar 2016 | img spiral works
| | | * e64e995 | Sat 12 Mar 2016 | work in progress
| | | /
| | * fa0e818 | Fri 11 Mar 2016 | Pre branch img vid
| | * 83032fd | Fri 11 Mar 2016 | Fixedtextfield search default text
    ↳ problem
| | * e6609fe | Thu 10 Mar 2016 | Emails fixed
| | * 9fec8e | Thu 10 Mar 2016 | Fixed javascript error problem
| | * 1ce1893 | Wed 09 Mar 2016 | Work in progress
| | * 2999784 | Tue 08 Mar 2016 | Radio button styles
| | * 844817d | Tue 08 Mar 2016 | Shakespeare working
| | * f6f4e38 | Tue 08 Mar 2016 | Changed setupcorpus function (unfinished)
| | * 3cfb7e2 | Tue 08 Mar 2016 | Started shakespeare stuff
| | * 5e93e11 | Fri 19 Feb 2016 | Added a few cheats
| | * 5daf3b7 | Wed 17 Feb 2016 | surface updates
| | * e1f7c12 | Tue 22 Dec 2015 | added quotes and shakespeare
| | * 44e6211 | Sat 31 Oct 2015 | Stuff for thesis
| | * 9blec61 | Wed 19 Aug 2015 | Getty works sort of

```

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| | * 71437f6 | Tue 18 Aug 2015 | Flickr and Bing work, radio buttons work
| | * 6c552aa | Wed 12 Aug 2015 | Fixed image problem but not video.
| * | 1cbb63d | Tue 11 Aug 2015 | Update textsurfer.py
| |
| * 0ebff0d | Tue 11 Aug 2015 | Analytics enabled again
| * 703f977 | Tue 11 Aug 2015 | Problems solved.
| * 74a1fae | Tue 11 Aug 2015 | About to change l_dict to dict of dict
| * 0935b23 | Mon 10 Aug 2015 | BUG FUCKER
| * 4f7d91e | Mon 10 Aug 2015 | Turn debug off
| * 58f0c2b | Mon 10 Aug 2015 | Button styling done
| * 59add58 | Mon 10 Aug 2015 | Email problem solved
| * f1b2d40 | Sun 09 Aug 2015 | Merge branch 'Deploy' into thesis
| |
| * 435cb2d | Sun 09 Aug 2015 | Deployment works, added analytics
| * 8a63dc7 | Sat 08 Aug 2015 | gunicorn runs locally fine.
| * 2861407 | Sat 08 Aug 2015 | Revert 5f2c957..4026965
| * 4026965 | Sat 08 Aug 2015 | Tests
| * | 8f2eeab | Sat 08 Aug 2015 | Merge branch 'w3' into thesis
| | \
| | |
| | * 5f2c957 | Sat 08 Aug 2015 | Stuff
| | * 873153c | Fri 07 Aug 2015 | Tiny cleanup
| | * 05d5760 | Thu 06 Aug 2015 | Random Poems and Emailing works
| | * 657126c | Wed 05 Aug 2015 | Random poems work - without links though
| | * 3d31ea9 | Wed 05 Aug 2015 | Randomise still only works once, count ok
| | * 5f1d45b | Wed 05 Aug 2015 | Randomise poem works ONCE
| | * c583341 | Wed 05 Aug 2015 | Poem subtabs, email poems done
| | * f1b3878 | Wed 05 Aug 2015 | Hiding divs
| | * a6939c4 | Tue 04 Aug 2015 | huh?
| | * e6b411d | Tue 04 Aug 2015 | Poem emails WORK Fuck YEAH!
| | * 4b6b170 | Tue 04 Aug 2015 | Test email
| | * 24e356c | Tue 04 Aug 2015 | Better load icon
| | * e6ae736 | Tue 04 Aug 2015 | loading icon version 1
| | * 51b43e2 | Tue 04 Aug 2015 | Added 4th pictures
| | * f2d8a83 | Mon 03 Aug 2015 | Minor fixes
| * | 1ddb03d | Mon 03 Aug 2015 | Merge branch 'w3' into thesis
| | \
| | |
| | * ca4eab3 | Mon 03 Aug 2015 | Pretty good state.
| | * 9370334 | Mon 03 Aug 2015 | working on list display of images
| | * e1f1ead | Mon 03 Aug 2015 | Stylesheets sorted and cleaned files
| * | 9732d5b | Mon 03 Aug 2015 | Merge branch 'w3' into thesis
| | \
| | |
| | * f0a4c40 | Sun 02 Aug 2015 | Minor errors left
| | * 4c94b11 | Sun 02 Aug 2015 | Styles ok. still some errors in vids?
| | * 5ab4bb3 | Sun 02 Aug 2015 | Videoreresults work
| | * d575762 | Sun 02 Aug 2015 | Videos works and styled
| | * 906be06 | Sun 02 Aug 2015 | Starting videos

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| | * 0d29479 | Sun 02 Aug 2015 | Images working with occasional error (
| |   ↵ unicode? )
| | * 8e9f7bf | Sun 02 Aug 2015 | Http response 200
| | * 09706d8 | Sat 01 Aug 2015 | Stuff
| | * 57ff730 | Sat 01 Aug 2015 | Bing or Flickr not working yet
| | * c85b61d | Sat 01 Aug 2015 | Prep for image results done
| | * 052b55d | Sat 01 Aug 2015 | Starting image results
| | * 4f08696 | Sat 01 Aug 2015 | So far so good.
| | * 1ff8370 | Sat 01 Aug 2015 | good version
| | * 50f8f00 | Sat 01 Aug 2015 | About to play with poem width
| | * ea3de12 | Fri 31 Jul 2015 | Styling in progress
| | * f69e4c9 | Fri 31 Jul 2015 | Work in progresss
| | * 3c8ae12 | Fri 31 Jul 2015 | Work in progress
| | * 616a1b3 | Fri 31 Jul 2015 | style start
| |
| * fafd254 | Thu 30 Jul 2015 | Todos
| * 0fc8807 | Wed 29 Jul 2015 | Merge branch 'text' into thesis
| |
| | *
| | * 95c2071 | Wed 29 Jul 2015 | Minor spacing
| | * 3a9fd4b | Wed 29 Jul 2015 | Rewritten syzygy function
| | * 12afae9 | Wed 29 Jul 2015 | todo update
| | * f52186f | Wed 29 Jul 2015 | pp_sent changed based on punctuation
| |   ↵ marks
| * | 5d69975 | Wed 29 Jul 2015 | Merge branch 'text' into thesis
| |
| | \
| | |
| | *
| | * a01f935 | Wed 29 Jul 2015 | Todo
| | * 489ccf5 | Wed 29 Jul 2015 | Up arrows
| | * 6b2736f | Wed 29 Jul 2015 | Title fixes, links etc
| | * f3b874b | Wed 29 Jul 2015 | poems display for less than 14 works
| * | a58abe2 | Wed 29 Jul 2015 | Merge branch 'poetry' into thesis
| |
| | \
| | |
| | *
| | * 1654fa5 | Tue 28 Jul 2015 | split poem into stanzas from correct
| |   ↵ files
| | * 0562be7 | Tue 28 Jul 2015 | Fixed counts and search clicking
| | * 15940da | Tue 28 Jul 2015 | centre poems work
| | * f9338f1 | Mon 27 Jul 2015 | Style fixes
| | * ed81657 | Mon 27 Jul 2015 | Tabs done. Need style.
| | * 28939a6 | Mon 27 Jul 2015 | 3 Forms working with titles
| | * fe57ba8 | Mon 27 Jul 2015 | Change in data structure all_sens
| | * 653c6e6 | Mon 27 Jul 2015 | Temp commit
| | * 8fb6423 | Sun 26 Jul 2015 | Poem design ok
| | * 6c4f4fc | Sun 26 Jul 2015 | triplet poem working
| | * 0ad1e63 | Sun 26 Jul 2015 | 3 scroll results working omg
| | * 262c60a | Sun 26 Jul 2015 | sentence scroll clin_sens working
| | * d900391 | Sun 26 Jul 2015 | scroll text works on single list
| | * 19b8570 | Sun 26 Jul 2015 | working scroll img demo
| | * 74cc973 | Sat 25 Jul 2015 | Work in progress
| | * 624bbc2 | Sat 25 Jul 2015 | Added more files, hover title works

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| * | 8e9257f | Sat 25 Jul 2015 | Merge branch 'poetry' into thesis
| |\ \
| | | /
| | * f1a627b | Sat 25 Jul 2015 | Counts done
| | /
| * 811f38a | Sat 25 Jul 2015 | Fixed origins error
| * 112ab28 | Sat 25 Jul 2015 | Got rid of empty results
| * 95f1bc7 | Sat 25 Jul 2015 | All three algorithms work
| * eae3139 | Sat 25 Jul 2015 | antinomy working
| * 9de06b4 | Sat 25 Jul 2015 | Dave and sex works again
| * ce63862 | Sat 25 Jul 2015 | Restructure of clinamen
| * a4c3bd8 | Fri 24 Jul 2015 | Cleaned up files.
| * 4067361 | Fri 24 Jul 2015 | Working mostly
| * 9778834 | Fri 24 Jul 2015 | impression works but not clear?
| * d19a52a | Fri 24 Jul 2015 | pp_sent works but not website
| * 1c5d945 | Fri 24 Jul 2015 | complete corpus working but slow
| * 7ac8697 | Wed 22 Jul 2015 | Count works properly.
| * 9b318e1 | Wed 22 Jul 2015 | Works.
| * 22d5e9d | Wed 22 Jul 2015 | Added to library
| * ae77a28 | Mon 20 Jul 2015 | templates loop not quite right
| * b8ba9b7 | Mon 20 Jul 2015 | Almost working. template needs fix
| * 47b2766 | Mon 20 Jul 2015 | Cleaned corpus files
| * 71e7153 | Fri 17 Jul 2015 | Library added and simple search works
| * 95aed8a | Thu 16 Jul 2015 | Library setup Schwob
| * a260bec | Tue 14 Jul 2015 | Do some stuff to library
| * 9ead88b | Tue 14 Jul 2015 | Print first 10 words of each book
| * 47a5ae3 | Tue 14 Jul 2015 | Start for library
| * c99b5ff | Wed 24 Jun 2015 | Added more printouts
| * daf6a5d | Wed 24 Jun 2015 | Added printouts
| /
* fa3ffc7 | Fri 22 May 2015 (tag: v3.0) | Updated Readme for IOCT server
* 2d51804 | Sat 21 Mar 2015 | added algorithms summary
* 81c1b12 | Thu 31 Jul 2014 | pata.fania.eu
* 7545e3e | Mon 28 Jul 2014 | Slight style change
* b5191a7 | Sun 27 Jul 2014 | Readme
* 2b3be93 | Sun 27 Jul 2014 | readme change
* 97847d9 | Sun 27 Jul 2014 | Minimally responsive now.
* 8e1b77a | Sun 27 Jul 2014 | Updated nltk to 3.0.0b1
* ce9b9b6 | Sun 27 Jul 2014 | Added macreqs
* 34c883a | Sun 27 Jul 2014 | About edit and WINREQS
* 7a9432b | Sat 26 Jul 2014 | Submenu for About
* 76ba522 | Sat 26 Jul 2014 | Added autofocus for search boxes
* c1c0f83 | Sat 26 Jul 2014 | Fixed mac word net error
* 6efe43c | Wed 16 Jul 2014 | stuff
* 554b354 | Wed 16 Jul 2014 | Changed error bug link style
* 6aab7b | Wed 16 Jul 2014 | Fixed typos in quotes, changed errors
* e7f40f3 | Wed 16 Jul 2014 | Added more quotes
* 84561d7 | Tue 15 Jul 2014 | Favicon, errors
* 593b0c0 | Mon 14 Jul 2014 | Quotes
* 2915771 | Sun 13 Jul 2014 | Added Icons. Style changes.

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* 7eb40d0 | Sun 13 Jul 2014 | Inline links now working.
* 9077ed2 | Sun 13 Jul 2014 | So far so good. Working nicely.
* 13112b7 | Sat 12 Jul 2014 | Style for p02 and p03. Golden spiral test.
* c911264 | Sat 12 Jul 2014 | Fixed unicode problem, changes file structure
    ↵ .
* 8df543b | Sat 12 Jul 2014 | Updated TODO
* eeb9f59 | Sat 12 Jul 2014 | Updated TODO
* b1c6d68 | Sat 12 Jul 2014 | Added quotes, scramble logo, jquery
* 20bac1c | Sat 12 Jul 2014 | Removed pip build folder
* f36a498 | Sat 12 Jul 2014 | Random quotes working but word net seems
    ↵ bugged
* 54d09e2 | Sat 12 Jul 2014 | More style, content and structure
* 462010b | Sat 12 Jul 2014 | p01 changes to style
* 646c38d | Fri 11 Jul 2014 | Style
* bf5f8bf | Fri 11 Jul 2014 | Rotating spiral :)
* 08eff76 | Thu 10 Jul 2014 | More style
* bb3f1e5 | Thu 10 Jul 2014 | Changed style and venv
* 4190994 | Wed 09 Jul 2014 | P01 working. Added style.
* d427ff1 | Wed 09 Jul 2014 | Deleted files
* 6251eae | Wed 09 Jul 2014 | Merge branch 'master' of https://github.com
    ↵ /Fania/newpata
| \
* | c9eb78b | Wed 09 Jul 2014 | Reinstalled venv
| * fb54978 | Wed 09 Jul 2014 | proto01 sort of working
| * 6547cc5 | Wed 09 Jul 2014 | get and post working ok
| /
* 81a3eec | Tue 08 Jul 2014 | Merge branch 'master' of https://github.com
    ↵ /Fania/newpata
| \
* | 5801f70 | Tue 08 Jul 2014 | Few updates
| * bf40b91 | Tue 08 Jul 2014 | pip installed nltk, some fixes
| * 3ced858 | Tue 08 Jul 2014 | Changed files around. Multiple pages now
    ↵ working.
| * 34da770 | Tue 08 Jul 2014 | Added wenv for windows
| /
* 809ac8c | Mon 07 Jul 2014 | Cleanup and readme changes
* 3f06260 | Mon 07 Jul 2014 | Edited readme again
* c721b33 | Mon 07 Jul 2014 | Edited readme
* ffbdb4b | Mon 07 Jul 2014 | Edited readme
* 8870b3d | Mon 07 Jul 2014 | Added gitignore file
* ba1a9c2 | Mon 07 Jul 2014 | Second commit
* 244c4b3 | Mon 07 Jul 2014 | First commit
* 4789ead | Sun 06 Jul 2014 | Before merge with 2.0
* c4d8ef2 | Wed 15 Aug 2012 | Removed old files, added new stuff
* 8cdd5ae | Wed 15 Aug 2012 | Before pata 2
* cb2afbb | Wed 15 Aug 2012 | (origin/master, origin/HEAD) | small changes
* d78b916 | Fri 15 Jun 2012 | gitignore
* 6ff5630 | Tue 14 Aug 2012 | readme updates
* c364398 | Tue 14 Aug 2012 | (tag: 1.5) | version 1.5 stuff
* a541df9 | Thu 28 Jun 2012 | fixed conflict

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| \
| * 4cece9a | Thu 28 Jun 2012 | (version15branch) | moved files again
| * df252a4 | Mon 16 May 2016 | (Version_1.5/master) | Bing not working yet
| * 6e5b8ac | Mon 13 Aug 2012 | Linked to prototype01's syzygy function.
| * 8188da6 | Mon 13 Aug 2012 | Fixed sizes in spiral for images.
| * de742c0 | Mon 13 Aug 2012 | Spirals for vid and img working.
| * 1095af7 | Mon 13 Aug 2012 | Bing images now display as 150x150 properly
| * fcbf1a2 | Thu 09 Aug 2012 | Minor changes to prototype 02
| * 803a364 | Thu 09 Aug 2012 | git ignore fix
| * 32ff91f | Thu 09 Aug 2012 | git ignore fix
| * aa1959e | Tue 07 Aug 2012 | git ignore added
| * 6176e9a | Tue 07 Aug 2012 | none
| * f39323a | Tue 07 Aug 2012 | gitattributes change
| * 35dac54 | Mon 06 Aug 2012 | Revert "?"
| * 386df83 | Mon 06 Aug 2012 | ?
| * d3adb11 | Fri 03 Aug 2012 | Added Bing image search to the flickr
    ↳ search
| * 2258b53 | Fri 27 Jul 2012 | Small fixes to how everything works.
| * 87738e1 | Fri 27 Jul 2012 | Added Translator functionality.
| * aff96b1 | Thu 26 Jul 2012 | Added Youtube search functionality
| * fd68ace | Thu 26 Jul 2012 | Added prototype02 flickr search
    ↳ functionality
| * 4d827c9 | Thu 05 Jul 2012 | Added structure to switch between
    ↳ prototypes
* | 637d9f8 | Thu 28 Jun 2012 | edited readme
* | 01b7bfa | Thu 28 Jun 2012 | (tag: 1.0) | version 1 stuff
* | 7b2cf7f | Wed 27 Jun 2012 | fix conflicts
| \
| \
| * | 53bb1e5 | Mon 16 May 2016 | (Version_1/master, version1branch) |
    ↳ Version 1 working again
| * | 47b00d9 | Sun 15 May 2016 | Upgrade 2016
| /
| *
| * 527e7e1 | Wed 27 Jun 2012 | Normalize line endings
| * ee01b37 | Wed 27 Jun 2012 | Mini changes to readme files.
| * 3c242a0 | Wed 27 Jun 2012 | Removed some spaces.
| * 041f8ad | Thu 10 May 2012 | Fixed plural s
| * 5a58ee7 | Thu 10 May 2012 | Changes to links and button, all works on
    ↳ single words.
| * 97d5e25 | Thu 10 May 2012 | Added icon
| * 84c59c2 | Thu 10 May 2012 | Minor changes to button and wordings
| * 9177388 | Wed 09 May 2012 | Making results keywords links
| * 3dc5019 | Wed 09 May 2012 | Changed stopwords handling
| * 81b5183 | Wed 09 May 2012 | Test
| * 63588d1 | Wed 09 May 2012 | First commit of working prototype v0.1
| * c52f846 | Wed 09 May 2012 | test
| * 4a04baa | Wed 09 May 2012 | Initial commit of Django skeleton.
* 65bade4 | Sun 06 May 2012 | readme update
* 8365be0 | Sun 06 May 2012 | (tag: 0.5) | New files for patatype
* e987fb6 | Sat 05 May 2012 | Added reqs
* 775e0dc | Sat 05 May 2012 | Fixing venv

```

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*   4854a02 | Mon 16 May 2016 | Gitignore
| \
| * d45d5b5 | Sun 15 May 2016 | Initial commit
* 83991a6 | Sat 05 May 2012 (tag: 0.2) | Added surfer 2
* c55bb54 | Sat 05 May 2012 (tag: 0.1) | test message
* 40716ba | Sat 05 May 2012 | First few files
* 701d5ba | Sat 05 May 2012 | Initial commit
```

5.2 THESIS REPOSITORY

```
* 25a4ecf | Sat 05 Nov 2016 (HEAD -> master, origin/master, origin/HEAD) |
    ↪ Analysis done
* 723aaf3 | Sat 05 Nov 2016 | Analysis wip
* 7516ac9 | Thu 03 Nov 2016 | that difficult analysis section wip
* ad117f8 | Thu 03 Nov 2016 | Application chapter done
* 43d1356 | Wed 02 Nov 2016 | Spelling, Application stuff
* d09f664 | Wed 02 Nov 2016 | Implementation done!
* 08af130 | Tue 01 Nov 2016 | Impl img and vid and design done
* f3230d4 | Mon 31 Oct 2016 | Impl Img Vid wip
* a78b091 | Mon 31 Oct 2016 | Implementation clinamen section
* e87b804 | Sun 30 Oct 2016 | Implementation up to Text section done
* 2ea5ade | Sat 29 Oct 2016 | Implementation stuff wip
* 5e67379 | Thu 27 Oct 2016 | Implementation formatting
* 36a561b | Thu 27 Oct 2016 | Sort of finished interpretation chapter
* 4f859b5 | Wed 26 Oct 2016 | Interpretation first half
* 3a5eaef | Wed 26 Oct 2016 | Foundations done
* a1a4856 | Wed 26 Oct 2016 | Foundations restructure
* 8125d14 | Tue 25 Oct 2016 | Eval stuff almost done
* 3635502 | Tue 25 Oct 2016 | Evaluation first pass done
* 750f67b | Tue 25 Oct 2016 | Fixed mmce tikz
* e2a8bcf | Mon 24 Oct 2016 | MMCE tikz fuck yeah
* 577f4f3 | Sun 23 Oct 2016 | Finished Technology
* a312c62 | Sun 23 Oct 2016 | wip
* b57c5b2 | Thu 20 Oct 2016 | tech and eval wip
* 20c07bc | Wed 19 Oct 2016 | tech nlp stuff
* b7d8f89 | Tue 18 Oct 2016 | NLP restructure and regex section
* 3183c78 | Tue 18 Oct 2016 | started NLP
* 0ca80ab | Tue 18 Oct 2016 | IR section 99% done
* 92de3d5 | Mon 17 Oct 2016 | tech vector model wip
* dd09b7a | Sun 16 Oct 2016 | Tech TF-IDF table and stuff
* bb1500c | Sun 16 Oct 2016 | Merge branch 'master' of github.com:Fania/
    ↪ Thesis
| \
* | 7a87ae6 | Sun 16 Oct 2016 | Merge problem?
| * 6e788be | Sun 16 Oct 2016 | Technoprocess
| /
* bf59bd8 | Sat 15 Oct 2016 | Added all refs for corpus
* ff100b9 | Sat 15 Oct 2016 | Merge branch 'master' of github.com:Fania/
    ↪ Thesis
| \
```

```

* \ cc80c3f | Sat 15 Oct 2016 | Merge commit
| \
| | * 93a3b5d | Fri 14 Oct 2016 | removed test
| |
| * df04179 | Fri 14 Oct 2016 | Test commit with ssh
| * e2f0700 | Fri 14 Oct 2016 | Work in progress
| * 71c4e27 | Thu 13 Oct 2016 | Added email from museepata
| * 100badf | Wed 12 Oct 2016 | Tikz diagrams, creativity and technology
| * 25989c5 | Tue 11 Oct 2016 | creativity almost done
| * dbdebe1 | Tue 11 Oct 2016 | added here
| * d4cb222 | Tue 11 Oct 2016 | Creativity chapter progress
| * 7ccb304 | Mon 10 Oct 2016 | fixed refs in four c
| * 91cda6b | Mon 10 Oct 2016 | Creativity up to four c's plus figure
| * 81c989c | Mon 10 Oct 2016 | Fixed sourceatright font and size
| * 43e43b3 | Sun 09 Oct 2016 | Pataphysics chapter complete
| * 606f640 | Sun 09 Oct 2016 | Oulipo table
| * e844bcf | Thu 06 Oct 2016 | pataphysics edit
| * 6311124 | Thu 06 Oct 2016 | Pataphysics polish
* | a47a79a | Sun 02 Oct 2016 | mini change
|/
* 30cb89f | Tue 13 Sep 2016 | Mini changes
* 002a993 | Thu 25 Aug 2016 | ai chapter
* 672f4dd | Thu 25 Aug 2016 | stuff
* d83d382 | Tue 23 Aug 2016 | turing notes
* ebd6051 | Sat 20 Aug 2016 | Added refs
* b898d08 | Wed 17 Aug 2016 | creat int arguments
* 0c2e560 | Tue 16 Aug 2016 | Moved AI section to test temporarily
* e600de0 | Mon 15 Aug 2016 | searle
* 0cbcac15 | Mon 15 Aug 2016 | analysis ai stuff
* cb917a9 | Mon 15 Aug 2016 | Moved formalisation to implementation
* 9568a23 | Sun 14 Aug 2016 | Formalisation stuff, clinamen
* f936370 | Fri 12 Aug 2016 | Stuff
* 29a274d | Fri 12 Aug 2016 | Changed nums
* b03c24b | Fri 12 Aug 2016 | Moved all table captions
* 8b533f6 | Fri 12 Aug 2016 | Merge branch 'master' of https://github.com
    ↳ /Fania/Thesis
|\
* | f055732 | Fri 12 Aug 2016 | Full compile
| * 568ff22 | Fri 12 Aug 2016 | Added meronym prints
|/
* 4c0db9d | Thu 11 Aug 2016 | mini changes
* df9bd05 | Sun 07 Aug 2016 | work on api stuff
* 5cdb101 | Sat 06 Aug 2016 | Acronyms french fixed
* 959288f | Fri 05 Aug 2016 | link to toc works
* e105d81 | Fri 05 Aug 2016 | floats fixed to [!htbp]
* f7b3466 | Fri 05 Aug 2016 | style fixes
* b28f27e | Thu 04 Aug 2016 | analysis stuff end of day
* f9c6732 | Tue 02 Aug 2016 | Sentences work
* 445e164 | Sun 31 Jul 2016 | analysis stuff
* 7adbd90 | Sun 31 Jul 2016 | merge commit

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| \
* | 94d3560 | Sun 31 Jul 2016 | laptop commit
| * 4f3de4c | Sun 31 Jul 2016 | commit from PC
| /
* 6068b75 | Fri 29 Jul 2016 | merge commits
| \
* | bdb45fa | Fri 29 Jul 2016 | throwaway
| * 1c794e7 | Fri 29 Jul 2016 | update
| * 546c28e | Thu 28 Jul 2016 | added Andrews feedback
| * a642999 | Wed 27 Jul 2016 | full compile
| * fbccdf7 | Tue 26 Jul 2016 | end of day commit - numbers
| * 363a483 | Tue 26 Jul 2016 | fixes
| | \
| | /
| /
| * f6ee5eb | Tue 26 Jul 2016 | Fixed partial TOCs spacing problem
* | 7c2073e | Tue 26 Jul 2016 | test
| /
* 3acf223 | Tue 26 Jul 2016 | analysis work
* 4f04c38 | Mon 25 Jul 2016 | small fix
* baaa22b | Mon 25 Jul 2016 | introduction and inspiration first draft
* 593d887 | Mon 25 Jul 2016 | progress
* e571c15 | Mon 25 Jul 2016 | Poetry formatting
* 236b88a | Sun 24 Jul 2016 | forest stuff
* 484fae7 | Sat 23 Jul 2016 | table anayslis stuff
* 624d77d | Fri 22 Jul 2016 | tabu width sorted
* 4917a5c | Tue 19 Jul 2016 | Restructure of analysis
* 6435ea3 | Tue 19 Jul 2016 | work in progress
* 44effab | Sun 10 Jul 2016 | end of day 3
* 62f6a02 | Sun 10 Jul 2016 | 10000 day 3
* 5d2deae | Sun 10 Jul 2016 | interim commit day 3
* f0cc780 | Sat 09 Jul 2016 | end of day 2
* cca6bfe | Fri 08 Jul 2016 | end of day one
* d7869b7 | Fri 08 Jul 2016 | full compile
* accfe9d | Fri 08 Jul 2016 | Ready for Boot Camp
* 0dd4448 | Sat 02 Jul 2016 | stuff
* 3c11939 | Thu 30 Jun 2016 | Progress in methodology
* cd6809a | Wed 29 Jun 2016 | Start on Methodology chapter
* 41811c3 | Tue 21 Jun 2016 | Planning
* 9488f72 | Tue 07 Jun 2016 | Added interludes and toc design
* fca28e9 | Mon 23 May 2016 | typos, corpus
* edba811 | Sat 21 May 2016 | Impl folder structure
* 134f154 | Fri 20 May 2016 | started restructure of implementation chapter
* e12cd57 | Tue 17 May 2016 | Added gource image
* 93f2726 | Thu 05 May 2016 | Minor fixes
* 5ef8cc7 | Thu 05 May 2016 | emph change
* edfc6f9 | Wed 04 May 2016 | Acronyms sorted
* 293a05f | Wed 04 May 2016 | Merge branch 'master' of https://github.com
    ↵ /Fania/Thesis
| \

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* | 8fe7a6b | Wed 04 May 2016 | Typos
| * c92d9ec | Wed 04 May 2016 | small update
| * be93e01 | Wed 04 May 2016 | Added Latex Error Link
|/
* 192e239 | Wed 04 May 2016 | Typos
* b2383b5 | Tue 03 May 2016 | quotations are now british
* 33d7866 | Mon 02 May 2016 | gitignore update
* 8123ebc | Sun 01 May 2016 | VSCode stuff
* 2b65561 | Sun 01 May 2016 | VS Code test
* bacdc47 | Wed 27 Apr 2016 | Programming Culture stuff
* d72fdcd | Tue 26 Apr 2016 | Structure of final chapters
* cd35a52 | Mon 25 Apr 2016 | Fixed toc numwidth problem
* 8219928 | Mon 25 Apr 2016 | fixed part design
* 249091f | Thu 21 Apr 2016 | Interpretation edits
* 8a070bd | Fri 08 Apr 2016 | Interpretation stuff
* b171625 | Thu 07 Apr 2016 | More work on Interpretation
* 29b318a | Mon 04 Apr 2016 | Structured Interpretation chapter
* c57b825 | Sun 03 Apr 2016 | Add zombies to chapter
* 6231f8a | Sun 03 Apr 2016 | Added publications
* b15063d | Tue 16 Feb 2016 | Test compilation for Surface
* 9947594 | Wed 03 Feb 2016 | Added new publication
* 0963f28 | Sat 09 Jan 2016 | Draft 01 for Sophy
* 41481f9 | Wed 06 Jan 2016 | Work in Progress
* 57c367b | Tue 05 Jan 2016 | Todo fixing progress
* f6f974f | Mon 04 Jan 2016 | Restructuring
* db7ca77 | Sat 02 Jan 2016 | More interpretation changes
* daa7560 | Sat 02 Jan 2016 | Interpretation progress
* 6562882 | Wed 30 Dec 2015 | evaluation draft
* 214e654 | Tue 29 Dec 2015 | Stuff, marginnote, TOC, Foundations
* 366f15d | Mon 28 Dec 2015 | Foundations progress
* d792b19 | Tue 22 Dec 2015 | Foundations progress
* 407e1b5 | Tue 22 Dec 2015 | Draft methodology chapter
* 6b38154 | Fri 11 Dec 2015 | spirals and poems added
* 8a01e8f | Thu 10 Dec 2015 | intro, insp design
* f5bc906 | Thu 10 Dec 2015 | Intro and Inspir almost done.
* e57d672 | Tue 08 Dec 2015 | Added inspirations chapter.
* ecad3b9 | Tue 01 Dec 2015 | Spiral file seperate
* d71c213 | Thu 26 Nov 2015 | Wordcount works
* e0d9975 | Wed 25 Nov 2015 | backup
* a7ae537 | Tue 17 Nov 2015 | Added screenshots in responsive design
* 47f724a | Tue 10 Nov 2015 | stuff
* afce56f | Fri 06 Nov 2015 | methodology stuff
* e462c69 | Tue 03 Nov 2015 | work in progress
* e16085b | Sun 01 Nov 2015 | Updated publications appendix
* 5ca0ee5 | Mon 05 Oct 2015 | work in progress
* 2887469 | Wed 30 Sep 2015 | Partial ToC subsections
* da0f3f9 | Wed 30 Sep 2015 | Fucking vertical space in ptoc works!
* 0eeb9ca | Tue 29 Sep 2015 | Chapter contents ok
* c274fd0 | Tue 29 Sep 2015 | ToC per chapter
* 3c23f12 | Thu 24 Sep 2015 | fixed stuff, written stuff

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* 2b2e57c | Wed 23 Sep 2015 | fixed some issues and added content
* 176392f | Tue 22 Sep 2015 | todonotes are back
* 2fafb08 | Sun 20 Sep 2015 | Migrated to memoir
* 3566974 | Sun 13 Sep 2015 | Work in progress
* 37e02cb | Sat 12 Sep 2015 | Described code, minted fix
* 86d0ffc | Fri 11 Sep 2015 | Work in progress
* f3999f4 | Mon 07 Sep 2015 | Changed over to minted
* 6004ebd | Sat 05 Sep 2015 | Fixed syntax highlight + wrote a lot
* bf74cca | Thu 03 Sep 2015 | Fixed another error
* 8e03c17 | Thu 03 Sep 2015 | Fixed some errors
* 282be4b | Thu 03 Sep 2015 | Work in progress
* 78920e7 | Thu 27 Aug 2015 | Work in progress
* aeaeaff | Wed 26 Aug 2015 | Small fixes
* 571d396 | Wed 26 Aug 2015 | Chktex linter pass
* 5c1c21e | Fri 31 Jul 2015 | Todo
* d9f1482 | Tue 14 Jul 2015 | Tech, TDM example
* 2778fed | Sat 11 Jul 2015 | Few things, I did.
* ba2187a | Thu 09 Jul 2015 | IR TF IDF stuff
* c1ed5af | Wed 08 Jul 2015 | Things
* b64eb1f | Tue 07 Jul 2015 | Added images
* 778aa4a | Fri 26 Jun 2015 | Stuff
* 25b4e09 | Thu 25 Jun 2015 | Integrating printouts into text
* ef86a5b | Wed 24 Jun 2015 | Printouts
* 8f17c8e | Wed 24 Jun 2015 | Added to read
* d9dc6b9 | Sun 21 Jun 2015 | Tech, Description
* e791530 | Fri 19 Jun 2015 | Tech stuff figures
* f373561 | Wed 17 Jun 2015 | Technology, exploratory search
* eb3b368 | Wed 17 Jun 2015 | Inkscape graphics
* aee67b1 | Mon 15 Jun 2015 | Tech restructure
* led41ee | Mon 15 Jun 2015 | Changed import to include
* 5ab2351 | Sun 14 Jun 2015 | Testing word count
* 09b8e9d | Sun 14 Jun 2015 | Aaaaand more structure and bib
* a7a7ff2 | Fri 12 Jun 2015 | Even More Structure
* e89688b | Wed 10 Jun 2015 | Re-Structure
* 7d73b68 | Wed 10 Jun 2015 | Restructuring
* 2b1b713 | Wed 10 Jun 2015 | Work on creativity
* adfb005 | Mon 08 Jun 2015 | Working on creativity chapter
* d7f1cf7 | Sun 07 Jun 2015 | Readme
* fc1e228 | Sat 06 Jun 2015 | Creativity chapter
* ac3ff1c | Sat 06 Jun 2015 | more changes
* b5af173 | Wed 03 Jun 2015 | Fonts test
* c8a7d76 | Tue 26 May 2015 | More edits, writing, styling.
* 077d8e1 | Mon 25 May 2015 | Writing stuff START
* 4152a3e | Sat 23 May 2015 | conflict sorted?
* 50cbb3a | Fri 22 May 2015 | Update
* 0e8a0f7 | Wed 13 May 2015 | Toc changes
* bb3c091 | Mon 20 Apr 2015 | show wireframe
* 1e082fa | Sat 18 Apr 2015 | Update readme.md
* f5b7c8e | Sat 18 Apr 2015 | Update readme.md
* 3129135 | Sat 18 Apr 2015 | Added todo, updated error section in readme

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```
* b15d2ae | Sat 18 Apr 2015 | Added todos
* 0d8235f | Sat 18 Apr 2015 | Style and error fixes
* 73bece1 | Fri 17 Apr 2015 | Update readme.md testing task lists
* ceaba92 | Fri 17 Apr 2015 | Update readme.md
* b8451fc | Fri 17 Apr 2015 | Added todo
* 188747f | Fri 17 Apr 2015 | Spacing, Equations, Margins
* 60216ba | Wed 15 Apr 2015 | marginpar
* d4640b4 | Wed 15 Apr 2015 | image
* dfc9b45 | Wed 15 Apr 2015 | image sizes and names
* 5c2f753 | Wed 15 Apr 2015 | readme changes
* a1a1e31 | Tue 14 Apr 2015 | Added read
* 0dc0f77 | Mon 13 Apr 2015 | Initial commit
```

PUBLICATIONS

This chapter includes copies of the following publications and talks:

finish list here

Funding was provided to attend ISCC 2016 in Oxford by Jon Bennett, Clinton Ingrams and a Graduate School Travel Award.

A travel fund has been awarded by the DMU Faculty of Technology for travel to Australia, Sydney for the Creativity and Cognition conference in July 2013.

De Montfort University has granted me a full 3 year bursary covering living costs and tuition fees.



update

IOCT Student Showcase 07 June 2016

Conference talk on “Creative Zombie Apocalypse” (by Fania Raczinski and Dave Everitt) at ISCC in Oxford, UK, 29 March 2016.

Phoenix CAS talk on “Pata-computed Poetry” in Leicester, UK, 14 Oct 2015.

De Montfort University Leicester Media School Launch Showcase, 05 November 2014.

De Montfort University Institute of Creative Technologies PhD showcase at the Phoenix Cube Gallery, Leicester, 15–18 August 2014.

Conference talk on “” at Creativity and Cognition in Sydney, Australia, 20 June 2013.

TDC talk on “The Pataphysics of the Future” (by Andrew Hugill, Hongji Yang and Fania Raczinski) in Leicester, UK, 13 Feb 2013.

1. Talk given at IEEEISCC’16 in Oxford, UK (March/April 2016).
2. Conference paper ‘Creative Zombie Apocalypse: A Critique of Computer Creativity Evaluation’. Proceedings of 2nd IEEE International Symposium of Creative Computing (2016).
3. Presentation slides for a **CAS! (CAS!) IOCT! (IOCT!)** talk at the Phoenix in Leicester, UK (14 Oct 2015).¹
4. **IOCT! LMS! (LMS!)** Showcase, **DMU! (DMU!)**, Leicester, UK (5 Nov 2014).
5. **IOCT!** PhD Research Showcase, Phoenix Cube, Leicester, UK (15-18 Aug 2014).²
6. Journal article ‘The pataphysics of creativity: developing a tool for creative search’. Routledge: Digital Creativity, Volume 24, Issue 3 (2013).
7. Talk given at Creativity and Cognition conference in Sydney, Australia (20 June 2013).³
8. Conference paper ‘Creative Search Using Pataphysics’. Proceedings of the 9th ACM conference on Creativity and Cognition (2013).
9. **TDC! (TDC!)** **DMU!** Talk, Leicester, UK (13 Feb 2013).⁴
10. Conference paper ‘A Framework for Creativity in Search Results’. Proceedings of the 3rd International Conference on Creative Content Technologies (2011). ’.

¹<http://interactlabs.co.uk/news/2015/10/ioct-talks---videos-now-available>,
<https://vimeo.com/142947457>

²Sean’s Gallery <https://www.flickr.com/photos/seancuttlefish/sets/72157646116801940/>, Interact Blog <http://interactlabs.co.uk/diary/2014/08/dmu-phd-showcase>

³<http://cc13.creativityandcognition.com/>

⁴<https://www.youtube.com/watch?v=UxYUZMyPE0o>

Pata-computed Poetry

Fania Raczinski

pata.physics.wtf



Raymond Queneau



Oulipo



Pataphysics



Technologies

- Python
- Javascript, HTML & CSS
- Flask, Jinja,
- NLTK & WordNet

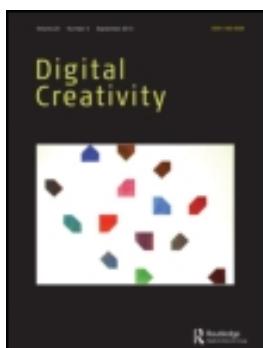
creative computing vs. computational creativity

<h2>Faustroll's Corpus</h2> <p>Alfred Jarry, Edgar Allan Poe, Cyrano de Bergerac, Saint Luke, Lean Bloy, Samual Taylor Coleridge, Georges Darien, Marceline Desbordes-Valmore, Max Elskamp, Jean-Pierre Claris de Florian, V.A., Christian Dietrich, Gustave Kahn, Le Compte de Lautreamont, Maurice Maeterlinck, Stephane Mallarme, Mendes, Homer, Josephin Peladan, Francois Rabelais, Jean de Chirra, Henri de Regnier, Arthur Rimbaud, Marcel Schwob, Paul Verlaine, Emile Verhaeren and Jules Verne</p>	<h2>Concepts</h2> <p>[Clinamen] “smallest possible aberration that can make the greatest possible difference” Boek</p> <p>[Syzygy] alignment of three celestial bodies, pun</p> <p>[Antinomy] mutually incompatible, paradox</p>
<h2>Patalgorithms</h2> <p>[Clinamen] Introduction of spelling errors</p> <p>[Syzygy] Moving within the semantic hierarchy</p> <p>[Antinomy] Opposite</p>	<h2>Love Poem</h2>  <pre> < kissing me like a little girl <u>home</u> from school > < like the <u>pope</u>'s mule > < after a <u>long</u> period > < we prepared to draw <u>lots</u> > < I have been a <u>long</u> time on this earth > < agape they heard me call > < il sera <u>pair</u> d' Angleterre avant peu ... Ah > < so many acres to be <u>lost</u> > < Chewing with teeth that grind and <u>crush</u> > < And each in jovial mood his <u>mate</u> address'd > < what though from <u>pole</u> to pole resounds her name > < elate and <u>loud</u> > < if it was a <u>note</u> for the Reckoning > < -- the bottom of a <u>pair</u> of breeches for a vessel full of fart > </pre>
<h2>Love Poem</h2> <p>Maeterlinck, Rabelais, Verne, Poe Mendes, Coleridge, Darien, Rabelais Verhaeren, Homer, Homer Homer, Bergerac, Rabelais</p> <p>CCCC CSSC SSC CCS</p>	<h2>Future</h2> <ul style="list-style-type: none"> • rhyming pattern • sentence structure • corpus or web • multi-keyword • Digital Opera • PhD

- IOCT LMS Showcase. 5 Nov 2014. <!-- ![Tweets](Citations/tweets.png) -->

Phoenix Exhibit. Phoenix Cube Showcase. 15-18 Aug 2014. [Sean's Gallery](<https://www.flickr.com/photos/seancuttlefish/sets/72157646116801940/>), [Interact Blog](<http://interactlabs.co.uk/diary/2014/08/dmu-phd-showcase>)

This article was downloaded by: [De Montfort University]
On: 13 November 2013, At: 06:34
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office:
Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Digital Creativity

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/ndcr20>

The pataphysics of creativity: developing a tool for creative search

Andrew Hugill^a, Hongji Yang^a, Fania Raczinski^a & James Sawle^a

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The pataphysics of creativity: developing a tool for creative search

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Abstract

We introduce the idea of a new kind of web search tool that uses the literary and philosophical idea of pataphysics as a conceptual framework in order to return creative results. Pataphysics, the science of exceptions and imaginary solutions, can be directly linked to creativity and is therefore very suitable to guide the transformation from relevant into creative search results. To enable pataphysical algorithms within our system we propose the need for a new type of system architecture. We discuss a component-based software architecture that would allow the flexible integration of the new algorithms at any stage or location and the need for an index suitable to handle patadata, data which have been transformed pataphysically. This tool aims to generate surprising, novel and provocative search results rather than relevant ones, in order to inspire a more creative interaction that has applications in both creative work and learning contexts.

Keywords: pataphysics, creativity, information retrieval, creative computing, component-based software engineering

1 Introduction

In this article we propose a new type of web search engine, reminiscent of the experience of ‘surfing the Web’. This is in contrast to current search engines which value relevant results over creative ones. ‘Surfing’ used to be a creative interaction between a user and the web of information on the Internet, but the regular use of modern search engines has changed our expectations of this sort of knowledge acquisition. It has drifted away from a *learning process* by exploring the Web to a straightforward process of information retrieval similar to looking up a word in a dictionary.

Jorge Luis Borges has provided us with a very useful example to illustrate our idea. His ‘Chinese Encyclopaedia’ (Borges 2000, 231) lists the following results under the category of ‘animal’:

- (1) those that belong to the emperor;
- (2) embalmed ones;
- (3) those that are trained;
- (4) suckling pigs;
- (5) mermaids;
- (6) fabulous ones;
- (7) stray dogs;
- (8) those that are included in this classification;
- (9) those that tremble as if they were mad;
- (10) innumerable ones;
- (11) those drawn with a very fine camel’s hair brush;
- (12) etcetera;
- (13) those that have just broken the flower vase;
- (14) those that at a distance resemble flies.

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Although these are all perfectly valid results, it is clear that they form a more creative, even poetic, view of what an animal might be than the Oxford English Dictionary's prosaic: 'a living organism which feeds on organic matter' (Oxford Dictionaries n.d.).

To achieve this sort of creativity in search results we propose the use of pataphysical methods. Pataphysics is highly subjective and particular, and as such is very suitable for this kind of transformation from relevant to creative. We hope that the tool will prove useful as a source for information and inspiration and at the same time challenge the way we think about information retrieval on the Web. The Web is not a place limited to one discipline, and in fact creating a transdisciplinary field of 'web science' was suggested by Hendl et al. in 2008. Our project will therefore span several disciplines as well.

Given the breadth of the Web and its inherently multi-user (social) nature, its science is necessarily interdisciplinary, involving at least mathematics, [computer science], artificial intelligence, sociology, psychology, biology, and economics

(Hendl et al. 2008).

Over the rest of the article, we will examine how pataphysics and creativity map onto one another, give an outline of the field of information retrieval, and discuss how this new type of search could be implemented in future systems. We conclude with a short discussion and summary of the article.

2 Creativity and pataphysics

[Pataphysics] can only be defined in a new undiscovered language because too obvious: tautology

(Baudrillard 2007).

The creative process normally involves a move from the known to the unknown, and sometimes from the named to the unnamed. In bringing something new into existence, the human qualities of openness and tolerance of ambiguity are generally regarded as highly desirable. We may define crea-

tivity as *the ability to use original ideas to create something new and surprising of value*. We generally speak of creative 'ideas' rather than 'products', which merely provide evidence of a creative process that has already taken place. Both the originality and the value of an idea are evaluated using subjective criteria. Pataphysics, which represents an extreme form of subjectivity, is therefore a highly appropriate framework within which to encourage and enable creative thinking and operations.

2.1 Pataphysics

Pataphysics¹ was invented by a group of French schoolboys at the Lycée de Rennes in the 1880s. One of their number was the author and playwright Alfred Jarry (1873–1907), who later developed the concept both in his celebrated *Ubu* plays and in his novels and speculative writings. He defined it as follows:

Pataphysics . . . is the science of that which is superimposed upon metaphysics, whether within or beyond the latter's limitations, extending as far beyond metaphysics as the latter extends beyond physics. Ex: an epiphenomenon being often accidental, Pataphysics will be, above all, the science of the particular, despite the common opinion that the only science is that of the general. Pataphysics will examine the laws which govern exceptions, and will explain the universe supplementary to this one; or, less ambitiously, will describe a universe which can be—and perhaps should be—envisioned in the place of the traditional one, since the laws which are supposed to have been discovered in the traditional universe are also correlations of exceptions, albeit more frequent ones, but in any case accidental data which, reduced to the status of unexceptional exceptions, possess no longer even the virtue of originality.

DEFINITION. Pataphysics is the science of imaginary solutions, which symbolically attributes the properties of objects, described by their virtuality, to their lineaments

(Jarry 1996, 21).

This may be summarised in following way: pataphysics:

- is the science of imaginary solutions;
 - is the science of the particular;
 - is the science of the laws governing exceptions and contradictions;
 - is to metaphysics as metaphysics is to physics.
- The conceptual space of pataphysics is a ‘universe supplementary to this one’ (Jarry 1996, 21). We argue that pataphysics can facilitate creative computing. *Constraints* are the rules that we set in our space, the grammar that we want to use. A pataphysical grammar would consist of exceptions, syzygies, anomalies, clinamen, antinomies, contradictions, equivalents and imaginaries. Such constraints can transform the ways in which we may navigate the new space. Pataphysical concepts will cause surprise and therefore could be considered unconventional.

Since pataphysics is concerned with the laws governing *exceptions*, its application in creative computing will focus on the ludic aspects of unique occurrences, rather than predictable recurrence of expected outcomes (Bök 2002). It is axiomatic that no single viewpoint may predominate, an understanding that was codified by Jarry and subsequent theorists as the ‘doctrine’ of Equivalence. Abstraction and generalisation in creative computing may therefore be founded upon a parallel we would draw between meta-metaphysics (pataphysics) and meta-metadata (patadata), which will be discussed in more detail below. Since pataphysics is the science of imaginary solutions, *imagination* (specifically a poetic imagination) provides the guiding principle for our work. Domain-specific knowledge and skill is described by the final line of Jarry’s *Exploits and Opinions of Doctor Faustroll, Pataphysician*: ‘Pataphysics is the science’ (Jarry 1996, 114).

2.2 Creativity

It is instructive to overlay these ideas on existing theories of creativity. Margaret Boden (2003), for example, has defined *P-creativity* (short for psychological creativity) as the personal kind of creativity that is novel in respect to the individual mind, and *H-creativity* (short for historical

creativity) as fundamentally novel in respect to the whole of human history. This allows for subjective evaluation of any idea. A child that builds a corbelled arch out of woodblocks, without any knowledge of physics or architecture, could be called creative. The child created something new and valuable within its own constraints and could therefore be called P-creative, but since the technique was already known historically it cannot be considered H-creative.

Using Boden’s definition we can call an idea ‘new’ if it is new to the individual who came up with it, making the idea P-creative. We can say that a creative idea can be seen from two perspectives: the subjective (P-creative) and the objective (H-creative) view. She argues that constraints support creativity, and are even essential for it to happen. ‘Constraints map out a territory of structural possibilities which can then be explored, and perhaps transformed to give another one’ (Boden 2003, 82).

This echoes the ideas of groups such as the *Oulipo* (which began as a Sub-Commission of the Collège de ’Pataphysique), who investigate ‘potential literature’ by creating constraints that frequently have a ludic element. Various other groups, the Ou-x-Pos, perform similar operations in fields as diverse as cinema, politics, music and cooking (Motte 1998).

Boden’s conceptual space is the ‘territory of structural possibilities’. So, the conceptual space of a teacup might be that it is meant to carry a certain amount of tea without breaking or burning fingers. It wouldn’t be wise to create a teacup made out of paper. But whether we make a cup out of glass or porcelain or how we shape the cup or the handle is pretty much up to the individual’s creativity. Being able to move around in this conceptual space, experiment (in thought or in reality) and play with different ideas while still following a given set of constraints is a good starting point for creativity to happen. Boden defines three sub-types of creativity:

- combinational creativity: making unfamiliar combinations of familiar ideas;
- exploratory creativity: exploration of conceptual spaces;

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- transformative creativity: transformation of space.

The Oulipo similarly classifies its conceptual space under two broad headings: the synthetic and the analytic:

In the research which the Oulipo proposes to undertake, one may distinguish two principal tendencies, oriented respectively towards Analysis and Synthesis. The analytic tendency investigates works from the past in order to find possibilities that often exceed those their authors had anticipated. . . . The synthetic tendency is more ambitious: it constitutes the essential vocation of the Oulipo. It's a question of developing new possibilities unknown to our predecessors. This is the case, for example, of [Raymond Queneau's] 100,000,000,000 Poems or the Boolean haikus

(Motte 1998, 27).

Later writings develop these ideas in more detail. *La Littérature Potentielle* (Oulipo 1973), is divided into several sections, dealing with clusters of methods, that include: *anoulipisms* (analytical oulipisms, such as combinatorial literature); *use of pre-existing structures* such as lipograms (omitting a letter or letters), palindromes and snowballs (in which each successive word adds or subtracts a letter), homophonic translation, tautogram, and definitional literature; *lexical, syntactic, or prosodic manipulations* (such as the celebrated S + 7, in which each substantive is replaced by the seventh word after it in a standard dictionary); *lexicographical or prosodic synthoulipisms* (early algorithmic methods); and *perimathematical synthoulipisms* (such as the Boolean poetry and combinatorial works already mentioned).

Boden links her three aspects of creativity to three sorts of surprise. She says that creative ideas are surprising because they go against our *expectations*. ‘The more expectations are disappointed, the more difficult it is to see the link between old and new’ (Boden 2003, 84). This suggests that fewer expectations (an open mind) allow creativity to happen more easily. Empirical experiences form expectations, which hinder our ability to accept creative ideas when they

happen. In order to be able to recognise creative ideas, we need to be able to see what they all have in common and in what way they differ, and not reject unusual, unexpected ones.

Unless someone realizes the structure which old and new spaces have in common, the new idea cannot be seen as the solution to the old problem. Without some appreciation of shared constraints, it cannot even be seen as the solution to a new problem intelligibly connected with the previous one

(Boden 2003, 84).

It is clear that the Oulipo has a similar approach in its theorising of potential literature. Releasing creativity through constraint is its essential *raison d'être*.

This is not to say that experience and knowledge are necessarily bad for creativity. To appreciate creativity we need to be knowledgeable in the relevant domain to be able to recognise old and new connections and transformations. But we also need a certain level of openness and tolerance for ambiguity to overcome our expectations. Perhaps it is for this reason that ‘creative people’ are often assumed to have particular personality traits. Sternberg (1988, 1999), for example, proposes that these comprise: independence of judgement, self-confidence, attraction to complexity, aesthetic orientation, tolerance for ambiguity, openness to experience, psychoticism, risk-taking, androgyny, perfectionism, persistence, resilience, and self-efficacy. More empirically, Heilman, Nadeau, and Beversdorf (2003) have investigated the possible brain mechanisms involved in creative innovation. While a certain level of domain-specific knowledge and special skills are necessary components of creativity, they point out that ‘co-activation and communication between regions of the brain that ordinarily are not strongly connected’ (Heilman, Nadeau, and Beversdorf 2003, 269) might be equally important.

Newell, Shaw, and Simon (1963) add to the above with their report on the creative thinking process. They identify three main conditions for creativity: the use of imagery in problem

solving; the relation of unconventionality to creativity; and the role of hindsight in the discovery of new heuristics. Other issues they point out are abstraction and generalisation. So, for example, poets transform the grammar of their conceptual space (in this case, language) to create new sentence structures in a poetic form. By doing so, they go against the expectations, the possibilities of the language and cause surprise. Some people might not understand the transformations and therefore the jokes or beauty of a poem simply because they are either not able to recognise connections between the old and newly transformed elements (maybe due to a lack of knowledge in the poems topic or in that particular language) or because they do not want to accept unconventional methods.

2.3 Creative computing

But how may we apply the insights into creativity described above in computing? One approach is described by Simon Colton (2008), who suggests we should adopt human skill, appreciation and imagination:

Without skill, [computers] would never produce anything. Without appreciation, they would produce things which looked awful. Without imagination, everything they produced would look the same.

(Colton 2008, 6)

He thinks that evaluating the worth of an idea or product is the biggest challenge facing *computational creativity*. Whereas in conventional problem-solving success is defined as finding a solution, in a creative context more aesthetic considerations have to be taken into account. He suggests three ways for computer programs to generate creative artefacts:

- (1) mimicking human skill
- (2) mimicking human appreciation
- (3) mimicking human imagination.

Since our solutions will be imaginary, our aim is not so much to have the computer generate creative artefacts as to engage in a creative dialogue with the user. Therefore, we do not intend to move as close to artificial intelligence as

Colton's framework seems to suggest. In the pataphysical universe, ideas such as 'human skill', 'human imagination' and 'human appreciation' are too generalised to be useful. One may very well ask: *which human?* And *when, where* and even *why*? Rather, our project will aim to produce an exceptional computational entity that consistently generates surprising and novel provocations to the users, who in turn may navigate and modify these by deploying their own skills, appreciation and imagination. The relationship between the two will develop quite rapidly into one of mutual subversion since, however apparent the 'rules of the game' may become, the outcomes will always be particular or exceptional.

2.4 Pataphysical computing

We are not the first people to attempt to apply pataphysical ideas in computer science. Johanna Drucker focused specifically on the cleft between formal logic and subjective judgement. She introduced the discipline of 'speculative computing' as a solution to that problem (Drucker and Nowviskie 2007). The concept can be understood as a criticism of mechanistic, logical approaches that distinguish between subject and object.

Speculative computing takes seriously the destabilization of all categories of entity, identity, object, subject, interactivity, process, or instrument. In short, it rejects mechanistic, instrumental, and formally logical approaches, replacing them with concepts of autopoiesis (contingent interdependency), quantum poetics and emergent systems, heteroglossia, indeterminacy and potentiality, intersubjectivity, and deformance. Digital humanities is focused on texts, images, meanings, and means. Speculative computing engages with interpretation and aesthetic provocation

(Drucker 2009, 29).

For Drucker, *aesthesia* (ambiguous and subjective knowledge) is fundamentally opposed to *mathesis* (formal objective logic) and subjectivity is always in opposition to objectivity. Knowledge is a matter of interpretation of information, which can be represented digitally as data and metadata. She

introduces what she calls a '*patacritical*' method of including exceptions as rules, even if repeatability and reliability are compromised. Bugs and glitches are privileged over functionality, and are 'valuable to speculation in a substantive, not trivial, sense' (Drucker 2009, 26). As she says: 'Pataphysics inverts the scientific method, proceeding from and sustaining exceptions and unique cases' (Drucker and Nowviskie 2007, 434).

In order to break out of the formal logic and defined parameters of computer science, she asserts, we need speculative capabilities and pataphysics. 'The goal of pataphysical and speculative computing is to keep digital humanities from falling into mere technical application of standard practices' (Drucker and Nowviskie 2007, 441). She links interface design with other speculative computing principles, referring to Kant's idea of art as 'purposiveness without purpose' and saying that the appreciation of design as a thing in itself (regardless of utility) is a goal of speculative aesthetics (Drucker and Nowviskie 2007, 437).

Table 1.

Creativity	Pataphysics
Combinational	Antinomy
Juxtaposition of dissimilar, Bisociation, Deconceptualisation	Symmetry, duality, mutually incompatible, contradicting, simultaneous existence of mutually exclusive opposites
Exploratory	Syzygy
Noticing new things in old places	Alignment of three celestial bodies in a straight line, pun, conjunction of things, something unexpected and surprising
Transformative	Anomaly
Making new thoughts possible by transforming old conceptual space, altering its own rules	Exceptions, equality
	Clinamen
	Unpredictable swerve, the smallest possible aberration that can make the greatest possible difference

2.5 Creativity and pataphysics compared

To conclude this discussion, consider Table 1, which compares some of the key ideas of creativity (Boden 2003; Bök 2002; Indurkha 1997; Koestler 1964) with the main pataphysical operations. It will be seen that pataphysics succeeds in bringing into sharp relief the more generalised scientific ideas. The pataphysical terms are taken from the natural sciences or philosophy, but always with an ironic twist, betraying their underlying humour. They connect quite strongly with the primary descriptors of creativity, while adding a certain layer of *jouissance*. *Pataphysics is self-avowedly useless, but its principles may prove surprisingly useful within this context.*

3 Information retrieval systems

Information retrieval is one of the common processes that a person carries out day-to-day, usually without even thinking about it. The amount of information that a human comes in contact with on a daily basis is overwhelming, and as such we have developed very sophisticated methods of finding the *relevant information* instantaneously. However, it is also possible to see how this relates to a large number of commonly used computer systems.

Information retrieval (IR) is finding material (usually documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually on local computer servers or on the Internet)

(Manning, Raghavan, and Schütze 2008, 1).

It is important to note that whilst a large proportion of information retrieval (IR) is focused on web search engines, this is not the only application. The reason that such a large focus is on this area is due to the unique challenges it holds: huge quantities of *unstructured data* which change over time and can be in a number of formats. The true aim of any research into search engines is that it can be applied back to the general field of IR and enhance a much larger ecosystem of systems.

However, research in all of IR focuses on arbitrary values of success, called precision and recall, the fraction of retrieved instances that are relevant and the fraction of relevant instances that are retrieved respectively. Whilst these measures are logical, they are arbitrary due to the subjectiveness of relevance. And due to the clinical nature of the measures, returning results that are partially related to the request would be detrimental to the perceived quality of the system, irrelevant of the insightful knowledge they may provide.

Whilst IR systems can take many different forms, Baeza-Yates and Ribeirio-Neto (2011) defined a standard model, which allows all systems to be broken down into similar components:

An IR model is a quadruple $[D, Q, \mathcal{F}, R(q_i, d_j)]$ where

- *D is the set composed of logical views (or representations) for the documents in the collection;*
 - *Q is the set composed of logical views (or representations) for the user information needs. Such representations are called queries;*
 - *\mathcal{F} is a framework for modelling document representations, queries, and their relationships...;*
 - *$R(q_i, d_j)$ is a ranking function which associates a real number with a query representation $q_i \in Q$ and a document representation $d_j \in D$. Such ranking defines an ordering among the documents with regard to the query q_i .*
- (Baeza-Yates and Ribeirio-Neto 2011, 58)

It is possible, under this definition, that there is no ranking function; such is the case for the Boolean model. Whilst this may not appear logical when considering search engines, there are a number of cases where returning all possible results which match our ‘need’ without bias can be useful. It is not possible, however, for an IR system to exist without any of the other components.

3.1 Classical IR models

The classification of classical IR models typically includes the Boolean, vector space and probabilistic models (Dominich 2000). Each of the models is built on pure mathematical underpinnings, which has also lead to research into a unified model for them.

The Boolean retrieval model is based on set theory and Boolean algebra. The model views documents as a collection of words or, more precisely, a collection of indexed terms present in those documents. A user request (query) is usually a Boolean expression written as a series of terms connected by Boolean operators such as AND, OR and NOT.

In the vector space model, documents are represented as vectors (Wong and Raghavan 1984). The success or failure of this method is based on term weighting. Terms are words, phrases, or any other indexing units used to identify the contents of a text. As such, term weighting is assigning a value to each term in order to define its importance in relation to the rest of the terms within that context (Salton and Buckley 1987). Polettini (2004) points out that term weighting schemes play an important role for the similarity measure, which plays a key role in the retrieval performance of IR systems.

Due to the fact that vector space models only link documents through related terms, we have no in-built technique to handle relevance. The aim of probabilistic methods is to rank a collection of documents in decreasing probability of their relevance to a query. This is often referred to as the probabilistic ranking principle (Cooper 1968). The idea of using probability was suggested as no system can predict with certainty the documents that a requester might find useful (Maron and Kuhns 1960).

3.2 Latent semantic indexing

Latent semantic indexing (LSI) is an indexing and retrieval model that attempts to identify patterns in the relationships between the terms and concepts contained in an unstructured collection of text. A key feature of LSI is its ability to extract the conceptual content of a body of text by establishing

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associations between those terms that occur in similar contexts (Deerwester et al. 1990). The model is based upon a mathematical method called single value decomposition as well as correspondence analysis (Benzécri 1973). LSI overcomes two of the most problematic constraints of Boolean keyword queries: synonymy and polysemy. Synonymy and polysemy are often the cause of mismatches in the vocabulary used by the authors of documents and the users of information retrieval systems (Furnas et al. 1987). There has been some promising research into using LSI instead of the vector space model (Chen and Tai 2009).

3.3 Artificial intelligence models

Numerous artificial intelligence-inspired models have been proposed, from neural networking, genetic algorithms, knowledge bases and natural language processing. Each of these different systems manages to solve a different problem within the field of IR; however, trying to generalise these models has not proved as fruitful as they were in their specialised fields.

4 Beyond the realm of traditional IR systems

Most modern web search engines, excluding semantic search engines, have a similar architecture, irrespective of the IR model on which they are based (see Figure 1). The main reason for this is due to the generic data store at the heart of them, the inverted index, which is a very efficient method of storing and searching over the contents of documents.

In an inverted index, the contents of a document are broken into various different combinations or terms by the indexer, and a link to the original document is stored with each of these terms. This means that when searching for a *keyword*, instead of having to look at every document and its contents, the system just looks for all terms that match the request and returns the various links that match. The inverted index is quick at retrieval; however, building the index is slower.

Even with these characteristics, the inverted index is not suitable with respect to any of the above definitions of creativity. We are only able to search over the contents of the document as they are, with *no understanding of their meaning*. As such, being able to implement pataphysical themes like clinamen or syzygy would be very challenging.

It is possible to apply these concepts to a traditional search engine architecture by modifying the user's search request. Hendlér and Hugill (2011) suggest that by using 'panalogies' we can model patadata and as such apply pataphysical constructs to requests. In the proposal that is outlined, the system would be applied to work on the open Web, using results from commercial search engines, as well as domain specific systems such as the British Library.

However, there is a limitation to such a system. Whilst we can modify the initial request to something with a more creative twist, the system cannot make decisions based on the underlying content of the results. As such, the quality of the results is limited by the quality of the indexer and not the search algorithm. Whilst this could be argued to be true in any search architecture, the index is built up of data that we wish to access directly, i.e. searching over the content to find a document that matches based on certain rules. With respect to creative search, it makes more sense that we look at how different parts of the document relate to each other, and other documents based upon underlying meaning, and not pure text. Even with this in mind, such a system would be adventurous from a creative standpoint over current search engines, and would provide an interesting insight into how people would respond to such a system and how important the user interface would be in such a system.

4.1 Semantic search engines

Semantic search engines would therefore seem to be a more logical fit to a pataphysics-inspired creative search engine as they will allow the creation of links between different documents based on more than the exact words used.

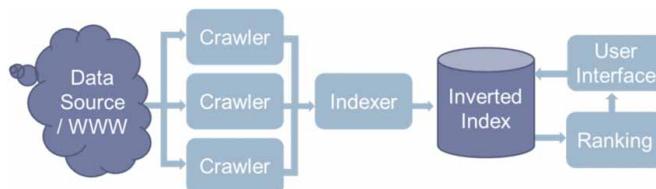


Figure 1. A traditional architecture for a web search engine. © Fania Raczinski and James Sawle. Reproduced with permission.

The key difference between the architectures of traditional IR systems is the way that the data is stored, and hence the indexing process. The majority of different semantic search systems use *Resource Description Framework (RDF) triples* as a way of storing data, based on semantic web ontologies. In RDF, each entry to the data store has the following attributes: <<object>> <<relation>> <<value>>. For example, a blue balloon would be <<balloon>> <<hasColour>> <<blue>>. This is not meant to represent the syntax of RDF; however, for this example the relation of ‘hasColour’ and the concept of blue being a colour would have to already have been defined. However, trying to represent the concept of ‘twelve blue balloons’ requires even more relations and concepts to be defined; therefore, if we end up with a large amount of loosely related data, the number of concepts and relations defined will explode. However, if the data are tightly related, the number of relations and concepts is much more concise and cogent.

With the data stored in this format, *inference logic* and/or *fuzzy set theory* can be used to carry out searches over the data set to return concepts that relate. These inference searches are slow and tend not to relate directly to documents, instead returning a list of different concepts which can then be linked back to the documents. This is usually done with an inverted index using traditional methods to return documents that match numerous combinations of the concepts.

With this method, the trickiest part of the system is *indexing*, as a document must be related back to concepts that exist within the system already. If they do not exist in the system

already, the concept must be found in an *ontology* that has already been defined, which then leads to the problem of ontology merging, or creating them from scratch.

Whilst this clearly allows more for the concepts that we have defined for results to be creative, there are a number of issues that arise. For example, once a document has been added to the system, the concepts are set in stone. Whilst the RDF store will evolve over time and hence change the concept results that emerge, the document’s classifications are set in stone. This is not just a problem for a creative search engine, but for all semantic search engines as well.

Also, within an ontology, different concepts tend to be linked with relations that are descriptive, such as <<isAn>>, <<hasColour>>, <<produces>>, etc. However, these types of relations are not analogous with the pataphysical concepts that have been defined, and as such it is not immediately apparent how one could implement a syzygetic transformation of a search request using an RDF data store.

As can be seen by looking at the two main search architectures, a new IR system architecture is needed; however, instead of defining it from the top-down, the algorithms need to be defined first to allow maximum flexibility in the system to allow the definition of creativity to evolve over time.

5 Pataphysical search algorithms

The conceptual space for our project is ‘pataphysical Web searching’. There are some very simple rules or constraints that form an initial definition of the project. For example, it is clear that we

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want to search the World Wide Web (rather than a library database), that we want to return a list of search results (and not a pile of books), and that we want the search process and its results to be creative/pataphysical (rather than relevant). In a more technical sense, we have the query term(s), the index (of all web pages that we have crawled) and some pataphysical rules in our conceptual space. How we structure our search system, how we format the index or how we go about finding our results is not in our conceptual space, however. We can explore the space to its limits, and we can transform it if we want to or feel like we need to. Our pataphysical rule set will include methods for transforming the space. By applying pataphysical rules to find results to our query we are *pataphysicalising* the query.

Definitions:

- To pataphysicalise (verb):* apply pataphysical transformations;
- Pataphysicalisation (noun):* the process of pataphysicalising;
- Patadata (noun):* any data which have been pataphysicalised.

The idea of patadata is derived from the idea below:

*Physics → Metaphysics → Pataphysics
Data → Metadata → Patadata*

But what exactly does the process of pataphysicalisation include? The kinds of transformations we are thinking of could be, for example, replacing or adding to the query term(s) with synonyms, antonyms, opposites, syzygies, clinamens, etc. This can be done with the help of thesauri or dictionaries and ontologies. Whether we pataphysicalise our query term(s), the index or the results does not matter at this point. They are all possible and will maybe be done all at the same time (see Figure 2). We can consider the possibility of a *patametric index* rather than a parametric index or a *patasaurus* (pataphysical thesaurus/ontology).

Arguably, few other textual forms will have greater impact on the way we read, receive,

search, access, use and engage with the primary materials of humanities studies than the metadata structures that organize and present that knowledge in digital form
(Drucker 2009, 9).

Patadata will allow us to engage with digital knowledge in a more creative way even. If metadata help us *organise information semantically*, then patadata are for *organising information pataphysically*. If metadata are objective, then patadata are subjective. Drucker also points out that 'many information structures have *graphical analogies* and can be understood as diagrams that organise the relations of elements within the whole' (Drucker 2009, 16, emphasis added). So, maybe patadata could allow us to represent these graphical analogies in some way? An alphabetical list is a typical model for representing text data sets, for example. Or an otherwise ranked list, a tree structure, a matrix, a one-to-many relationship, etc. But is a ranked list really the best way to represent search results? *Ranking* itself seems unpataphysical. It contradicts the philosophy of pataphysics, although we can argue that this contradiction makes it pataphysical again. Maybe this dilemma can be solved simply by adopting another type of graphical analogy to structure the results, such as a tree structure instead of a ranked list.

In a traditional web search, ranking signals contribute to the improvement of the ranking process. These can be content signals or structural signals. *Content signals* are referring to anything that is concerned with the text and content of a page. This could be simple word counts or the format of text such as headings and font weights. The *structural signals* are more concerned about the linked structure of pages. They look at incoming and outgoing links on pages. There are also *web usage signals* that can contribute to ranking algorithms such as the clickstream. This also includes ideas such as the Facebook 'like' button or the Google '+ 1' button, which could be seen as direct user-relevance feedback.

Ranking can be done at different stages of the search process. Depending on how the index is formatted and what information can be

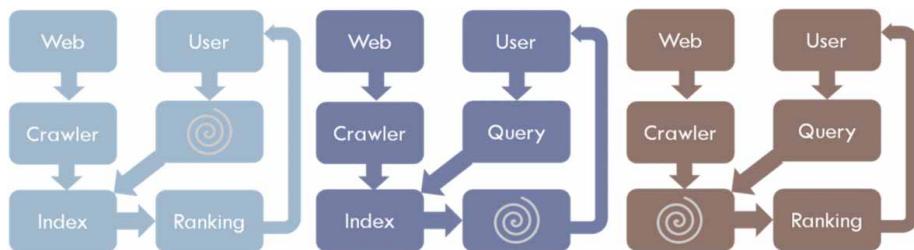


Figure 2. Three possibilities where pataphysicalisation can happen. © Fania Raczinski. Reproduced with permission.

pre-computed at that stage, the ranking algorithm evaluates every web page for *relevance* and returns them in order. There exist lots of different approaches on ranking, including PageRank (Brin and Page 1998) and HITS (Kleinberg 1999), which both analyse the link structure of the World Wide Web. They analyse the incoming and outgoing links on pages. PageRank, for example, assigns a numerical weight to each document, where each link counts as a vote of support in a sense. It is executed at *indexing time*, so the ranks are stored with each page directly in the index. HITS stands for ‘Hyperlink Induced Topic Search’, and its basic features are the use of so-called hubs and authority pages. It is executed at *query time*. Pages that have many incoming links are called authorities and pages with many outgoing links are called hubs.

Given a query term X, what is considered a relevant match, though? Do we simply return a list of web pages where X appears in the heading of each page? It is obviously not that easy. Several ranking signals are combined together; Google states that it uses over 200 signals including PageRank, and it personalises results using signals such as the web history and location (Google, n.d.).

What kinds of ranking signals do we need for our pataphysical web search tool? We could say that a page Y is relevant if it matches the patadata for query X. So, for example, Y would be a relevant result if it is a clinamen or syzygy to X. The more patadata matches there are, the higher the ranking, maybe. We don’t necessarily have to assign a numerical ranking value to each

page. Depending on how we structure our results page, that might not be necessary. Shuffling the results list or the results tree could be an option.

For example, let’s say our patadata are represented by a list of keywords that each stands for a pataphysicalisation of the original query term. This list is added to each item in the index:

Query = ‘Tree’

Patadata = [Tree(equivalent), Car(opposite), Paper(antinomy), Narwhal(anomaly), Book(syzygy), Venus Fly Trap(clinamen)]

Query = ‘Sun God Ra’

Patadata = [Sun God Ra(equivalent), Slave(opposite), Holiday(antinomy), Blue Balloon(antinomy), Pyramid(syzygy), Sphinx(clinamen)]

6 A new architecture for search

It is clear that any of these new algorithms, or ones that follow, will not be suitable for existing system architectures in IR research, and as such a new one will need to be defined. The question becomes whether or not the architecture itself can help enhance the chance of providing creative search results. If so, would it be possible to abstract this so that it can be used in other types of systems to help allow creative computing to flourish in areas where it may not have been possible before? This is a tall order, and one that is not likely to come soon; however, developing an architecture that is as generic as possible can only aid this task.

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The concept of pataphysicalisation, using pataphysical methods to transform an object/idea, on the search request does appear to be an interesting place to start the search for a new architecture. While it can certainly constrain the possible amount of creative outputs and the general characteristics of such a system, it will give valuable insight into areas that need to be addressed by both the algorithms and architecture.

A *component-based system architecture* is therefore proposed to allow for greater flexibility in search engine development, whilst reducing the coupling between different parts of the system. This coupling tends to mean that for a new concept to be tried, large proportions of the entire search engine need to be redeveloped. The use of standard interfaces, for different types of components, would therefore allow a *generic harness* to handle the communication between these different components and provide a seamless service to the end user. The wiring of these components could be handled by a configuration file, therefore allowing people to build systems without needing any explicit programming skills.

Whilst this architecture itself does not explicitly improve the chance of creative results being returned, it will allow for new components to be tested in a full-scale environment in an *agile* way, and as such should allow for quicker testing. The *harness* is currently being developed, including a number of administration and monitoring tools inbuilt to aid analysis. The aim is to test the new architecture using a standard search engine and the Syzygy Surfer proposed by Hendler and Hugill (2011).

It is interesting to note how such a system could also be used in an educational environment to teach students how search engines work. Students could attempt to build systems using

pre-built components and see how different arrangements of such components affect the outcome. This is very similar to the way that the Massachusetts Institute of Technology has proposed to teach children how to program using the Scratch development environment.² More advanced students could also develop their own components to test out theories and improve their understanding of the base concepts of not just search engines but the various fields that play a role in information retrieval systems.

It is clear that this system could have great advantages outside of being a testbed for new ideas, allowing for the easy development of search engines to suit the needs of all new types of problems, without the need for specific development of every component. Whilst this idea is still within its infancy, the potential is strong and will be explored over time.

7 Discussion

Whilst developing a system that returns creative results to the end user has numerous advantages, the assumptions that are made about and the decisions we take for the user must still be considered. For example, presume that the user inputs a search request ‘The Cat in the Hat’ after reading a Dr Seuss book to their child, and the system employs an anomalous method on the query and searched ‘sunglasses’. Whilst there is logic to the new search request, it is anomalous to the initial request; if the user receives these results without being told what method was used, the results will appear *random*, and therefore are likely to be detrimental to the user. Therefore, the level of *interaction* the user has with the system and the *feedback* the system gives to the user on decisions it is making will have a large

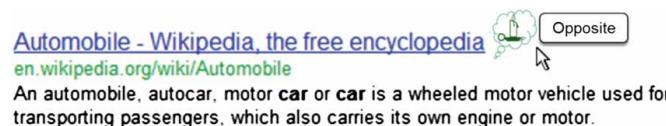


Figure 3. Example of an icon explaining the pataphysicalisation of a search result. © Fania Raczinski. Reproduced with permission.

influence on the overall effectiveness and appreciation of the search tool. A quick and simple solution to this problem would be to add an icon to the side of each search result which displays how the original query was pataphysicalised.

The image in Figure 3 shows an example of how this could be implemented. The little green candle (a reference to pataphysics in itself by the way) shows a pop-up note when hovered over with the mouse pointer. In this case, the original query could have been ‘tree’, and ‘car’ was returned as an opposite to that.

In the end, it comes to a point of being able to identify which of these factors will affect how the user perceives the results and which do not, and therefore give the system greater flexibility. This in itself is a huge undertaking, with which large quantities of empirical data will be required, and is therefore left for future work on the project.

8 Conclusion

Current information retrieval systems might be used for creative purposes. However, they do not directly provide creative results to their users; instead they focus on precise and relevant results only. Therefore, we argue that a new style of system is required. It is clear that the fundamental problem in this is that standard algorithms are not suited for these problems, with them considering a document to be groupings of words in traditional IR systems, and that an entire document falls under the same classifications in semantic IR systems.

The proposed concept for a pataphysical algorithm requires precise data structures to represent the transformations that have taken place during the pataphysicalisation, such as the patadata. The system’s index has to be adapted to accommodate this new type of data structure. It also needs to be flexible enough to allow algorithms to fit in at different stages or locations of the system; for example, the inverted index, ranking functions or query itself.

Whilst this new style of algorithm has been proposed, current architectures are not capable of supporting it. As such, a new, flexible

component-based software architecture has been proposed which will allow for a range of different style systems to be developed with little overhead, thereby improving the chance of creative outcomes occurring in a different way.

We have introduced the motivation and concept for a creative web search tool and discussed some of the major challenges a project like this faces. With web search being a major research and learning tool nowadays, it is imperative to think about *how* such a tool could be (ab)used. Ethical issues that arise through the provision of unexpected results, and the misunderstandings this could lead to, will be discussed in future work. Nevertheless, we believe that creative web search can facilitate inspirational learning through an exploratory search journey, and we hope our tool will provide just that.

Acknowledgements

We would like to thank Professor Jim Hendler at the Rensselaer Polytechnic Institute for his valuable thoughts on this work.

Notes

¹ Although note how the perplexing apostrophe that sometimes appears before the word ‘pataphysics undermines too literal an interpretation of this construction. Jarry only ever used the apostrophe on a single occasion, specifying that he did so ‘in order to avoid a simple pun’ (Jarry 1996, 21). What that pun might be has never been fully explained.

² See <http://scratch.mit.edu/>.

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Creative Search Using Pataphysics

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Pataphysics

- is the science of the **particular**
- examines the laws governing **exceptions**
- explains a universe supplementary to this one
- is the science of **imaginary** solutions
- is to metaphysics as metaphysics is to physics

“To understand ‘pataphysics is to fail to understand ‘pataphysics”
(Andrew Hugill’s Useless Guide to ‘Pataphysics)

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Pataphysics

- | | |
|--|--|
| <ul style="list-style-type: none">• the clinamen or the chance• particular over the general• exceptions over the ordinary• the paradox or antinomy• simultaneous existence of mutually exclusive opposites | <ul style="list-style-type: none">• subjective• symmetry, duality• absurd anomalies• transcended reality or the absolute• epiphenomenalism• unexpected alignment, syzygy |
|--|--|

Definition of “animal”

- those that belong to the Emperor,
• embalmed ones,
- those that are trained,
• suckling pigs,
• mermaids,
• fabulous ones,
• stray dogs,
• those included in the present
classification,
- those that tremble as if they were
mad,
• innumerable ones,
• those drawn with a very fine
camelhair brush,
• others,
• those that have just broken a
flower vase,
• those that from a long way off look
like flies.

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Creative Search Using Pataphysics

Aim: surprising, novel, inspiring, humorous search

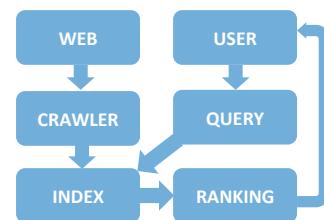
- Exploratory search, not information lookup
- Creative computing by using pataphysical algorithms
- Generate creative search results rather than relevant ones

Pataphysicalisation = applying pataphysical techniques to data

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Information Retrieval

1. Information need
2. Query formulation
3. Retrieval process
4. Ranking
5. Results evaluation



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Prototype

- Local search in book
- Text only, no images
- Tiny index
- No ranking
- Three algorithms



Exploits and Opinions of Dr Faustroll, Pataphysician (Jarry 1907)

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Algorithms

Clinamen clear - leaf

Deliberate spelling errors

Syzygy clear – disappear – vanish

Query → synonyms → hypo/hyper/holonyms

Antinomy clear – allow light to pass through – opaque

Antonyms of query & antonyms of synonyms

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Experimental Results

QUERY	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

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Conclusion

- Algorithms
- Larger Index
- Web
- Multimedia
- Evaluation
- Interpretation
- Apparent randomness
- Transparency

a pataphysical approach to making a creative exploratory search tool

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Creative Search Using Pataphysics

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ABSTRACT

This paper looks at defining, analysing and practicing how creativity can be applied to search tools. It defines creativity with respect to search and discusses how these concepts could be applied in software engineering using principles from the pseudo-philosophy of pataphysics. The aim of the proposed tool is to generate surprising, novel, humorous and provocative search results instead of purely relevant ones, in order to inspire a more creative interaction between a user, their information need and the application. A proof-of-concept prototype is described to justify the ideas presented before implications and future work are discussed.

Author Keywords

Creative computing; pataphysics; information retrieval; creative technologies.

ACM Classification Keywords

F.3.m. Logics and Meanings of Programs: Miscellaneous
H.3.3. Information Search and Retrieval: Search Process
J.5. Arts and Humanities: Literature

General Terms

Algorithms; Design, Experimentation.

INTRODUCTION

Imagine a web search engine that does not quite return the results you expect. For example, imagine you search for “animal” and the top three results are a list of animals in the Emperor’s possession, followed by instructions about embalming animals and information on a society for animal training. Google’s top search results for this query on the other hand return the webpage of an action sports lifestyle brand, the Wikipedia article and a BBC (British Broadcasting Corporation) page about animal videos. While there is certainly nothing wrong with Google’s results, they are simply not very inspiring. The first example of search

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results is adapted from Jorge Luis Borges’s *Chinese Encyclopaedia* [4] which lists several creative definitions of the term “animal”. Whilst they might not provide the kind of information we were initially seeking (if we even had a clear idea of the kind of answers we wanted), they are still perfectly valid results for the query and might even provoke a smirk upon their encounter. These are the kind of search results we are aiming for; strange, creative, surprising, inspiring and possibly funny (which some would call irrelevant) yet perfectly valid.

Pataphysics can provide some useful techniques that are very suitable for creative computing. Hendl and Hugill first suggested the use of three of its principles: clinamen, syzygy and anomaly, in their “Syzygy Surfer” [15].

“The ambiguity of experience is the hallmark of creativity, that is captured in the essence of pataphysics. Traversing the representations of this ambiguity using algorithms inspired by the syzygy, clinamen and anomaly of pataphysics, using a panalogical mechanism applied to metadata, should be able to humanize and even poeticize the experience of searching the Web.” [15]

In the rest of this paper we will introduce creativity and pataphysics and explain how they are used for our algorithms and the general philosophy during the development. We then discuss some of the implementation details for our proof-of-concept prototype and speculate on users and uses of the tool. We conclude the paper with a short discussion on further work.

CREATIVITY AND PATAPHYSICS

Creativity

We define creativity as “the ability to use original ideas to create something new and surprising of value”. Here, we generally speak of creative *ideas* rather than *products*, since we believe creative products merely provide evidence of a creative process that has already taken place. Creativity is often divided into two types, one is a personal everyday type of creativity (P-creativity [2] or mini-c/little-c creativity [21]) and the other is a more eminent historical type (H-creativity [2] or Pro-c/Big-C creativity [21]). Margaret Boden further divides creativity into three categories [2, with some additional descriptions from 17, 21, 22], the concepts of which are also described in Kaufman & Beghetto’s Four-C model [21].

- Combinational creativity: making unfamiliar combinations of familiar ideas; juxtaposition of

dissimilar; bisociation; deconceptualisation, interpretive process of constructing and understanding

- Exploratory creativity: exploration of conceptual spaces; noticing new things in old spaces, interpretive process of constructing and understanding
- Transformative creativity: transformation of space; making new thoughts possible by altering the rules of old conceptual space, transformative learning

Boden also argues that creative ideas are surprising because they go against expectations and she believes that constraints support creativity and are even essential for it to happen. She says that *constraints map out a territory of structural possibilities which can then be explored, and perhaps transformed to give another one* [2]. This view supports our use of pataphysical concepts or constraints to enable creativity in search tools.

In many cases (especially of P-creative or mini-c types), both the originality and the value of a creative idea are evaluated using subjective or intrapersonal criteria [21]. Pataphysics, which represents an extreme form of subjectivity, is therefore a highly appropriate framework within which to encourage and enable creative thinking and operations.

Pataphysics

"To understand pataphysics is to fail to understand pataphysics." [16]

Pataphysics was invented by a group of French schoolboys in France in the 1880s. One of their number was the author and playwright Alfred Jarry (1873-1907) [20], who later developed the concept both in his celebrated *Ubu* plays and in his novels and speculative writings. In short (there are over 100 equally correct definitions [6]) it can be defined as follows:

- Pataphysics is the science of imaginary solutions,
- Pataphysics is the science of the particular,
- Pataphysics is the science of the laws governing exceptions and contradictions,
- Pataphysics is to metaphysics as metaphysics is to physics, and
- Pataphysics describes a universe supplementary to this one.

We argue that pataphysics can facilitate creative computing. A pataphysical grammar can consist of exceptions, syzygies, anomalies, clinamen, antinomies, contradictions, equivalents and imaginaries. Such concepts or constraints can influence the ways in which we may navigate and transform our conceptual space. Pataphysical concepts are likely to cause surprise and could therefore be considered unconventional and provocative.

The concept of the clinamen can be understood as an unpredictable swerve which Bök called *the smallest possible aberration that can make the greatest possible difference* [3]. One of the most famous examples of a clinamen is Jarry's *merdre* (the first word in his *Ubu* plays). He squeezed an extra 'r' into the French word *merde* (meaning *shit*) and translates into something like *pshit*.

A syzygy both surprises and confuses. The concept originally comes from the field of astronomy where it denotes the alignment of three celestial bodies. In a pataphysical context it usually describes a conjunction of things, something unexpected and surprising. Unlike serendipity, a simple chance encounter, the syzygy has a more scientific purpose. A typical instance is the pun, which Jarry called the *syzygy of words* [20]. Next to being intentionally funny, puns demonstrate a clever use (or abuse) of grammar, syntax, pronunciation and/or semantics, often taken to a quite scientific level, such that without understanding of what is said and what the intended meaning is, the humour of the pun might be lost.

The antinomy, in a pataphysical sense, is the mutually incompatible or paradox. Mutually contradictory opposites can and do co-exist in the pataphysical universe.

CREATIVE COMPUTING AND SEARCH

Creative Computing

The concept of creative computing has existed for some time but has not yet managed to evolve into a recognised discipline within computer science. Computational creativity, on the other hand, has emerged as a field within artificial intelligence research [18] and overlaps with creative computing ideas to some extent.

It is important to differentiate between the ideas of *creative computing* and *computational creativity*. Intuitively the former is about doing computations in a creative way, while the latter is about achieving creativity through computation. You can think of the latter falling into the artificial intelligence category (using formal computational methods to mimic creativity as a human trait, see also [18]) and the former being a more poetic endeavour of how the computing itself is done, no matter what the actual purpose of the program is.

As a good example of creative computing, consider the *International Obfuscated C Code Contest* [19]. The competition revolves around writing compilable/runnable code, while visually appearing as obfuscated as possible. They value unusuality, obscurity and creativity but expect contestants to follow the strict rules and constraints of the C programming language.

Examples of computational creativity are Simon Colton's *Painting Fool* [9] or Harold Cohen's *AARON* [8]; both are computer programs that paint pictures. Kurzweil's *Cybernetic Poet* [23] is a classic example of a program that produces poetry.

Our search tool can be seen from both perspectives and therefore somewhat lies in-between. We want to use creative techniques to come up with refreshing results to provide a counter-inspiration for the relevant results provided by Google or other mainstream Web search engines. We (are trying to) use creative techniques to build something that (hopefully) also has a creative purpose and value.

Search

In simple terms, a typical search process can be described as follows. A user is looking for some information so she or he types a search term or a question into the text box of a search engine. The system analyses this query and retrieves any matches from the index, which is kept up to date by a web crawler. A ranking algorithm then decides in what order to return the matching results and displays them for the user. In reality of course this process involves many more steps and levels of detail, but it provides a sufficient enough overview.

From the users' point of view the search process can be broken down into four activities [31] reminiscent of classic problem solving techniques [29]:

1. Problem identification = information need (IN),
2. Need articulation = IN in natural language terms,
3. Query formulation = translate IN into query terms, and
4. Results evaluation = compare against IN.

Searching can be thought of in two ways, information lookup (searching) and exploratory search (browsing) [11, 24]. A situation where an information need cannot easily be articulated or in fact is not existent (the user is not looking for anything specific) can be considered a typical case of exploratory search and describes the kind of search that is most suited to our proposed tool.

Most big search engines like Google, Baidu or Bing focus on usefulness and relevance of their results. [13, 1, 26] Google uses over 200 signals [14] that influence the ranking of web pages including their original PageRank algorithm [5]. We can only speculate whether these signals also take into account any creative factors due to their secrecy. Other search engines like YossarianLives (currently in alpha release) [32] concentrate on purely abstract concepts like metaphors for their search algorithms.

Any information retrieval process is constrained by factors like subject, context, time, cost, system and user knowledge [25]. Such constraints should be taken into consideration in the development of any search tool. A web crawler needs resources to crawl around the Web, language barriers may exist, the body of knowledge might not be suitable for all queries, the system might not be able to cater for all types of queries (e.g. multi-word queries), or the user might not be able to understand the user interface, and many more. It is therefore imperative to eliminate certain constraining

factors (for example by targeting a very specific audience or filtering the amount of information gathered by a crawler from web pages).

PROPOSED SYSTEM

The general concept of the project described in this paper is *pataphysical web searching* and the following three points summarize its main aims:

- search the Web for suitable answers to a given query,
- return results as a list or a mixture of data structures, and
- present pataphysical results (rather than relevant ones).

Principles

The essence of the proposed search tool lies in its algorithms which make the difference to traditional search engines. The philosophical ideology behind the tool is fundamentally different. Our system will still consist of the main components typically found in Web search engines (crawler, index and ranking) but they will have slightly different inner workings and target a different audience of users.

To link back to some of the creative, pataphysical concepts we have discussed earlier, let us put some of the ideas for our tool into perspective. The constraints for our conceptual space are the pataphysical rules that we want to apply to our data. We use those rules to explore, combine and transform our space; giving us the flexibility and freedom we need to find interesting results.

We developed the idea of *pataphysicalising* data as the process of applying such pataphysical rules in order to produce creative search results. This pataphysicalisation process forms a central component of our system (see Figure 1) and influences all areas of the search tool.

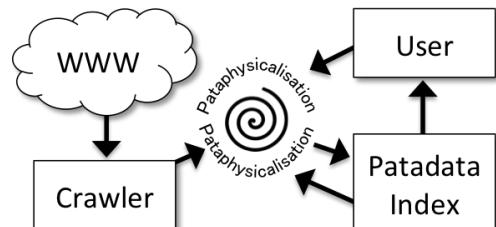


Figure 1. Pataphysicalisation as a central component

Our index will contain what Hender and Hugill have called *patadata* [15]. Patadata is to metadata as metadata is to data - inspired by one of the definitions of pataphysics: *that which is above that which is after physics* [20]. This suggests that patadata provides another layer of information above information. If metadata helps us organise information semantically then patadata is for organising information pataphysically. If metadata is objective then patadata is subjective and that is precisely what pataphysics is for.

Prototype

The prototype described here (see Figure 2) was developed as a proof-of-concept tool to demonstrate some example search results using pataphysical algorithms. In this case the results are limited to the text of Alfred Jarry's *Exploits and Opinions of Dr. Faustroll, Pataphysician* [20] and only the main algorithmic functionality of this prototype is discussed here.

Clinamen - 19 pataphysicalised reverberations found for: "clear"

...s webbed feet . Pitiful **pleas** swim up against the stream...
...was impossible to enter the **cellar** due to the flooding thereof...
...the length of a cabbage **leaf** , paying no attention to...
...with Mendacious in the **lead** . Since the episcopal nature...
...gigantic , black , mass **altar** . At the blunt point...
...blue diadem . He was **clad** , too , in sky...
...TO ARTICLE 819 In this **year** Eighteen Hundred and Ninety - ...
...route ; but such a **leap** is not within everyone '...
...any need for Faustroll to **fear** that his scalp hair...
...which followed us and those **near** us which crossed our path...
..., maple , oak , **cedar** , sorb wood and poplar...
...yellow skin , his face **clean** - shaven , apart from...
...exclaims : Never , I **swear** , shall I forget the...
...the pale forehead , the **dear** face , this terrible little...
...LAURENT TAILHADE We could already **hear** bells - as loud as...
...content to be black . **Fear** , turning away its head...
...- Nage 's right **ear** and four of his teeth...
...doctor informed me , discern **clearly** through these mirrors those ultraviolet...
...WITCH Her hump to the **rear** , belly to the fore...

Syzygy - 22 pataphysicalised reverberations found for: "clear"

...French language , he could **pronounce** fairly correctly a few words...
...as his tonsure , laying **bare** the optic nerve and the...
...few quarter - centuries will **determine** their periods . Soon ,...
...allows air and steam to **pass** through but is impermeable to...
...zero , if these dimensions **vanish** on both sides of our...
...the Mayor , who did **certificate** the original thereto ; within...
...- four hours , to **pay** to the claimant into my...
...choice of the two asphyxiating **make** - ups called white hanged...
...hereunder . The sale will **take** place on whatever day shall...
...web , leaves the holes **empty** - the number of which...
...guide had given him absolutely **free** ; one represented realistically ,...
...'s day ... serene **countenance** ... supreme image , so...
...usual example of water , let us reflect , in this...
...our dead drunk credits and **gain** , without wasting our talent...
...as far as I could **judge** , understood these prodigies very...
...examine any disturbances which this **change** in size might involve in...
...except perhaps in the **country** , he will rarely see...
...the Snout , to the **clear** anxiety of those present....
...found by experiment that the **benefit** extends only to those whose...
...meshes are wide enough to **allow** the passage of a large...
...the globe by attraction , **permit** me , I pray
.... And I ' ll **declare** He ' s mooning up...

Antinomy - 1 pataphysicalised reverberations found for: "clear"

...colors were locked in an **opaque** box ; until he was...

Figure 2. Screenshot of search results for the query "clear"

In short, the prototype's workflow can be described as follows:

- 1) tokenise text and remove stopwords to build index,
- 2) query triggers the three pataphysical functions,
- 3) each function finds matches for query as described above,

- 4) retrieve some words before/after match for context, and
- 5) return list of resulting sentences.

The three functions inspired by pataphysics (clinamen, syzygy and antinomy) are described in more detail in the next section. Figure 2 shows a screenshot of the resulting list of results for the query *clear*. The specific results for each of the three methods are simply a few words surrounding the pataphysicalised query term from within the book, which does not necessarily represent complete sentences but simply provides some context for the result.

The same principles and algorithms can be applied to different types of media, for example images or video and even sound. The complete tool would include a mixture of different types of media in its results with various styles of displaying them.

Algorithms

The clinamen function uses the Damerau-Levenshtein algorithm [10], which measures the distance between two strings (with 0 indicating equality), to find words that are similar but not quite the same. The distance is calculated using insertion, deletion, substitution of a single character, or transposition of two adjacent characters. We are basically asking the program to return matches (v) that are of distance two or one to query term t , meaning they have two or one spelling errors in them (see Equation 1). While we only return matches that actually appear in the book (i.e. they exist in the index), and by doing so eliminate the introduction of new words like Jarry's *merdre*, the swerve or aberration is still evident.

$$\text{clinamen}(t) = \{ v : 0 < \text{dameraulevenshtein}(t, v) \leq 2 \}, \text{ for } v \in V \quad (1)$$

For the syzygy function, we made use of the WordNet lexical database [30] using the NLTK python library [27] to find suitable results. Specifically, as shown in Equation 2, the algorithm fetches the set of synonyms (synsets) for query term t first and then finds any hyponyms, hypernyms or holonyms for each of those (each of which denotes a sort of relationship or membership with its parent synonym). We then return a list of all of those related terms if they appear in the original vocabulary of the text (index V). This approach mimics the syzygy alignment of three words in a line mentioned earlier (query \rightarrow synonym \rightarrow hypo/hyper/holonym).

$$\begin{aligned} \text{syzygy}(t) &= \{ h : h \in \text{union}(t) \wedge \exists h \in V \} \\ \text{union}(t) &= \text{hypo}(t) \cup \text{hyper}(t) \cup \text{holo}(t) \\ \text{hypo}(t) &= \{ h : h \in \text{hyponyms}(s) \} \\ \text{hyper}(t) &= \{ h : h \in \text{hypernyms}(s) \} \\ \text{holo}(t) &= \{ h : h \in \text{holonyms}(s) \} \\ \text{syno}(t) &= \{ s : s \in \text{synonyms}(t) \} \\ \text{for } s \in \text{syno}(t) \end{aligned} \quad (2)$$

For the antinomy function we simply made use of WordNet's antonyms (opposites) (see Equation 3). We first get all synonyms for query term t , find any antonyms for

those and return any that also appear in the index V . Naturally, not all words have an opposite, especially given WordNet's limited vocabulary of around 150,000 words, but a pataphysical antinomy should still be able to find a match. This is a big shortcoming of our prototype at this point. A better thesaurus or a larger index (e.g. based on more than one book – or, of course, the Web) could improve this function drastically.

$$\begin{aligned} \text{antinomy}(t) &= \{ h : h \in \text{anto}(t) \text{ and } \exists h \in V \} \\ \text{anto}(t) &= \{ h : h \in \text{antonyms}(s) \} \\ \text{syno}(t) &= \{ s : s \in \text{synonyms}(t) \} \end{aligned} \quad (3)$$

for $s \in \text{syno}(t)$

Table 1 shows some example matches produced by the three algorithms described above. While the syzygy and antinomy methods both work in a semantic manner, the clinamen function is purely syntactical, which becomes very obvious when seeing the different results side by side as in the table. Relying on WordNet's limited vocabulary means less matches can be found mostly because the text of *Faustroll* uses a very specific language and not always matches that found in the thesaurus. On the other hand, it illustrates the breadth of vocabulary used by Jarry in his writing nicely, as only those results are returned that actually appear in the book.

	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 1. Example search results. Queries are shown in column one, algorithms used in row one.

POSSIBLE APPLICATIONS

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 they are not discouraged by what might appear to be *nonsensical* results. Potential users could include artists, writers or poets

and anybody who is looking for out-of-the-box inspirations or a refreshingly different search engine to the norm.

Uses

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, 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 source 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 also produce a much larger index which would then possibly find many more matches through WordNet and end in a more varied list of results.

From a computer science perspective this pataphysical approach could be added to 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.

Our 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 Group¹, 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.

Evaluation

Evaluating creative software is not an easy task and there are no standard approaches. Pease and Colton [28] divide it into two notions:

¹ www.theoperagroup.co.uk

- whether an idea or artefact is valuable or not, and
- whether a system is acting creatively or not.

Following this approach, we would need to investigate each individual search result in terms of its value and creativity. This could be done by user ratings or satisfaction questionnaires. Rather than measuring the success of individual results though, we could also look at evaluating them as one set instead, similar to the blind side-by-side comparisons by the Bing search engine or the selective omission of a certain number of results by search engine MillionShort².

The way we display and label results produced by the tool can influence how the user perceives them. Our current prototype for example separates the results into its three components but we could have equally just mixed them all together. It is not always clear how each result connects to the initial query, even if we identify through which algorithm a result has been obtained. These keywords (syzygy, clinamen and antinomy) might not be helpful to users unfamiliar with the concept of pataphysics anyway and might therefore appear rather nonsensical. Whilst there is a clear logic to each search result, they might appear anomalous to the user's expectations if he received these results without knowing the philosophy of the search tool. The results could possibly appear random then, and could therefore likely be detrimental to the user. The level of interaction between the user and the system and the feedback the tool gives to the user on its internal processes will have a large influence on the overall effectiveness, perception and appreciation of the tool.

The less obvious the processes in the background are for the user, the more difficult it might be to appreciate the search results. On the other hand, too much transparency could spoil much of the experience. After all, explaining a joke kills it. The issue therefore becomes a question of finding just the right level of transparency to satisfy curious users while at the same time not spoiling the seemingly serendipitous experience of others.

FURTHER WORK AND CONCLUSION

We are just beginning to understand the potential of such a creative search tool and its implications. There is much research left to be done, specifically in developing more and different kinds of search algorithms and evaluating the results we obtain. We could try to implement different algorithms or different pataphysical concepts within our existing prototype or built a different system altogether. We could also try to implement a fully functioning Web search engine using the algorithms described in this paper and then compare the two different types of results. It could be interesting to investigate how users perceive and use search

² www.bington.com and www.millionshortiton.com

results produced in either the book based search or an open Web based search.

Before we go into further development and programming though, it might be worth studying, evaluating and interpreting the results produced by the prototype presented in this paper. An evaluation framework for pataphysical search results is under development. A study of user's reactions to the prototype could be very interesting as well and will be part of future work in this project.

Finally, to summarise, in this paper we have introduced a new approach for a creative search tool that uses pataphysics as an underlying philosophy. We have explained how pataphysics can be applied to search algorithms in order to produce interesting results with a humorous twist. Our initial experiments within a limited domain have shown that the generated results could indeed be interpreted as being novel, surprising and useful. We have also briefly discussed ideas for applications of the tool and issues that may trigger possible further research in the field of creative computing. We have also presented some thoughts on evaluation of our tool and future work.

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TDC Talk Andrew Hugill

A Framework for Creativity in Search Results

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Abstract—Although trying to define creativity has been a hot area of research in many fields, the field of information retrieval has remained under developed. Over the report we attempt to define a structural definition of creativity which could be applied to search results in order to aid users in their creative endeavours. After defining creativity for search, we have then devised a simple metric based upon it, to show that there is a need for this research. The results, whilst positive, could be interpreted as a poor definition of creativity, and as such this is a sounding paper for future work.

Index Terms—information retrieval; computational creativity

I. INTRODUCTION

Over the past decade search has been focused on returning the smallest number of results which correlate to the user's information need. This has been a logical trend to pursue, as 92% of people use the internet as their first port of call when looking for everyday information [1].

However, this has meant that the creativity inspired by 'surfing the web' has over time slowly diminished. This research is not advocating the end of document based search; however, we propose that a new search engine architecture, which aims to inspire the creativity of its users, can only be beneficial to the landscape of the world wide web.

Over the course of the paper, we define what we mean by the creativity of a search result, with respect to a single result as well an entire set. The concepts presented in this paper, are inspired by 'Pataphysics, a pseudo-philosophy defined as "the science of imaginary solutions, which symbolically attributes the properties of objects, described by their virtuality, to their lineaments" [2].

The rest of the paper is organised as followed. Section 2 explores definitions of creativity from both computer science and psychology. In Section 3, we outline a general definition of creativity in search, which can be used to create a metric. Section 4 will see a simplistic metric to be used for the purpose of evaluating the concept as well as some experimental data.

II. DEFINITION OF CREATIVE SEARCH

A. A Framework to Base Creativity Upon

Creativity is a subjective topic, with different people defining the creative worth of a piece of information differently; however, Newell, Shaw and Simon [3] devised a definition based upon four criteria to categorise the creativity of a given solution or answer.

- 1) The answer is novel and useful (either for the individual or for society)
- 2) The answer demand that we reject ideas we had previously accepted
- 3) The answer results from intense motivation and persistence
- 4) The answer comes from clarifying a problem that was originally vague

Each of these criterion for creativity approach a definition from a different perspective. Whilst trying to relate this to information retrieval, it should be simple to see that criterion 1 relates to the goal of the search, whilst criterion 4 relates to the information need, or starting point. What may be less obvious however, is that criterion 3 relates to the scale of the search and hence the number of dead ends that may be encountered and that criterion 2 suggests which search paths should be avoided whilst looking for creative results.

Whilst this framework gives us a very high level definition of creativity, it is hard to apply it in its current form. Through applying some of the more prevalent techniques used in the field of computational creativity, we can attempt to reduce this down into a more precise definition.

B. P-Creativity and H-Creativity

Boden [4] defines that there are two forms of creativity, P-creativity and H-creativity. P-creativity or 'psychological' creativity, is an idea or solution that is new to the person who came up with it. An idea that represents 'historical' creativity, H-creativity, on the other hand, is one which has not been thought of by anybody before and can therefore be deemed a historical-sociological category [5]. H-creativity is subsequently a special case of P-creativity which many people consider to be the more important of the two, as this is what drives forward human knowledge.

When we relate these concepts to search results we end up with some interesting outcomes.

1) *Single Search Result*: A single search result is most likely to be P-creative or neither. This is because, for it to be H-creative, there must be some logic in the document that nobody else has noticed, or drawn the same conclusions from different information. For the single result to be neither P-creative or H-creative, the user must have a thorough understanding of the topic, and the result must add no new information.

2) *Set of search results*: A set of search results is most likely to be P-creative. It is highly unlikely that a user would

have explored every possible creative avenue over a set of results, unless the set is not of a trivial size. But by the same logic, if a large range of ideas are contained, it is unlikely that the set will be H-creative, as somebody is likely to have linked them together.

The question becomes, is there a link between maximising the chance of something being P-creative and H-creative or is the link more subtle. Or is it enough for a search engine to try and improve the chances of P-creativity for a user.

C. Exploratory and Transformational Creativity

Boden [4] goes on to define the concepts of exploratory and transformational creativity. She defines exploratory creativity to be the exploration of a space of partial and complete possibilities. This therefore suggests that there are rules that confine this space. If we were therefore to alter the rules that define the space, and subsequently alter the space that we are exploring, this is defined as transformational creativity [6].

Whilst this does give us a nice slant to look at creativity, comparing the trade-off of traditional problem spaces compared to augmented ones, this is very difficult to model, combined with the fact that the solutions found by tweaking the rules that confine the space can easily rule out the solution in the traditional space [7].

D. Bisociation

Bisociation makes a distinction between the routine skills of thinking on a single ‘plane’, and the creative act, which operates on more than one plane [8]. This means, with Koestler’s definition, that we must define creativity as a set of results such that they are simultaneously associated with two habitually incomparable contexts.

It is clear to see how this model extends from that of Boden’s theory of exploratory and transformational creativity. The fact that more than one ‘plane’ must be considered will force a transformational process to occur. However, unlike transformational creativity, both processes must be considered, the exploratory and transformational. Subsequently, we should not end up with a solution that can’t exist within the rules defined by the original problem, even if we transcend into transformational creativity, as long as we finish the process in the plane that we started in.

E. Conceptual Blending

The idea of combining different thought processes, whilst more elegant than transformational creativity, does not give us a nice definition that applies to search results as well as tying in with our underlying philosophy. Conceptual blending is a step closer. This general theory of cognition, formally called Conceptual Integration Networks [9], allows us to look at a number of different dataspaces, and attempt to ‘blend’/merge them in such a way that the new dataspace tries to simulate how we use large amounts of information and bring it together to form new ideas.

F. Combinatorial Creativity

Both of the above concepts fall into the general category of combinatorial creativity. This is a logical assumption of modelling creativity, as people tend to come up with solutions by first looking at new combinations of currently existing ideas. This therefore allows us to consider the idea of creativity as a search process through the space of all possible combinations, therefore this fits into the idea of search engines.

Whilst conceptual blending explores the idea of combining different thought processes and bisociation, looking at different planes of creative thought; let us consider the idea of placing the data itself into different concepts, enabling us to get the following areas of combinatorial creativity to explore with respect to creative search based upon philosophical.

- Placing a familiar object in an unfamiliar setting or placing an unfamiliar object into a familiar setting.
- Blending two superficially different objects or concepts
- Comparing a familiar object to a superficially unrelated and semantically distant concept
- Searching through a number of different concepts that are related to each other but could be considered as swerving away from the original concept. This is based upon Epicurus’s theory of clinamen from his doctrine of atomism [10].

III. DEFINITION

The above definitions, allow us to define creativity in search results with pre-existing concepts agreed by the academic community.

It is clear, that in the case of search results, we still have the issue of a group of results providing greater creative inspiration to one user than another. This tends to be a problem with most metrics, the problem of objectiveness vs subjectiveness. With subjectiveness being a quality that is important, it means that we have a problem getting repeatable results. We therefore need to build a definition that is as objective as possible, whilst not overlooking some of the dynamic properties that it may be possible to model.

At this stage it is important to stress that this is not an attempt to model the creative process, but to give a model for how useful a set of results might be in inspiring creativity.

A. A Single Result

It is intuitive for us to start with a single result. Whilst maximising the possibility for a single result being H-creative, it is very unlikely that this will be the case with a full set of results. The issue becomes, measuring how P-creative an individual result is to a search result.

It seems sensible to assume, that if a result has no relevance to the search request, then the result will have no chance of inspiring P-creativity. The more information about the search request a single result has, increases the chance of a result inspiring P-creativity, therefore using relevance metrics.

B. Set of Results

To improve the chances of inspiring creativity, a group of related results which discuss a number of different areas of the topic would logically improve the quality of the results. As stated, if we maximise the breadth of information of a single result it would improve creativity, we should therefore attempt to do the same across the entire set.

The issue however, is that the majority of users do not look past the top 10 search results [11]. Whilst this is unlikely to be the case for people using a search engine targeted at inspiring creativity, it does make sense to try to reduce the overall amount of data provided. We must therefore penalise repetition in the results provided, forcing a more diverse set of results.

This can be taken a step further by only considering a certain number of results and ignoring the ordering, because there is no simple way to define how ordering affects the creative process. With a lack of defined ordering, it means that having endless results would be tedious and counter-productive. Whilst we have no strong view on the exact number of results that should be considered, we believe that it should not be substantially greater than 10, for the reason discussed above.

The way that each result is provided to the user will affect how the user perceives the results. A diversity of different document types, e.g., text, images, sound, we believe would improve the quality of creativity inspiration.

C. Results as a Set of Sets

We could extend this concept to the next logical step of returning results as a set containing multiple related sets of results. In this analogy, each of the inner sets could relate to an individual concept related to the information need, and a clearer relationship between concepts, how they relate to each other and how the results represent the concept they are contained within would exist.

The question becomes how we measure the creative quality of this type of result. Due to the structure of the results, we can attempt to model the creativity in different levels allowing us to try and abstract the problem as much as possible.

Due to the fact that this is not a method that is currently used to return search results, we shall not explore it further at this point in time. However, we believe that this would be a logical way to return results in the future.

IV. EXAMPLE METRIC

As the above definition is meant as a guideline for defining creativity, this section attempts to give a real world example. The metric defined below is a contrived example to show how it could be applied with current search results.

A. Algebraic Definition

Taking the definition defined in Section III-B, we have derived the following abstract metric.

Let us define a query as q , a set of results as r and an individual result as d . As such $r = \{d_1, d_2, d_3, \dots, d_i\}$ where i is the number of results examined.

For the quality of a single result, we shall define $P(q, d)$ as a measure between 0 and 1, where 1 is the optimal value.

To reduce the amount of data duplication in the returned results, we shall define $D(r)$ which has to return a value between 0 and 1, where 0 means that no data is duplicated.

Let us define $T(r)$ as a way to weigh the final outcome of the metric to ensure that a diverse set of document types are returned. This metric will return 1 if a satisfactory balance is returned, and 0 if only a single document type is returned.

We can therefore compile these measures into a single metric, the Search Creativity Metric or SCM:

$$SCM = T(r) \cdot \frac{1}{i} \sum_{j=1}^i P(q, d_j) \cdot (1 - D(r))$$

As such, this metric will always return a value between 0 and 1, with 1 being the optimal value.

B. Fleshying Out the Metric

To enable us to apply any experimental data to the metric, we must first give definitive definitions to each of the functions provided above, $P(q, d)$, $D(r)$ and $T(r)$.

1) $D(r)$: As this measures the number of duplicate results in a return set, we can easily define it as the number of results that have a majority of information that is contained within another article. This allows the following definition

$$D(r) = \frac{\text{Number of results with data in previous results}}{\text{Number of results}}$$

As we relate each result to the previous results in the list, the results must always be $0 < D(r) \leq 1$. This makes sense, as even if all of the results are identical, there may still be some creative inspiration contained in the first result. This also allows us to penalise results heavily for leaning too much on one area of information.

2) $T(r)$: As with $D(r)$, we need to define this measure so that we penalise for a lack of diversity, but do not eradicate all results, as this would not reflect the possible creative quality of the information returned.

For this definition, we will need to leverage on the definitions provided earlier. Let i is the number of results within the result set r . We can therefore define n to be the number of different result types that are returned, and σ to be the standard deviation of the number of results for each media type. It is interesting to note that $0 \leq \sigma < \frac{i}{2}$, such that $\sigma = \frac{i}{2}$ means that the results are biased to only one result.

$$T(r) = \begin{cases} 1 - \frac{2 \cdot \sigma}{i} & : n > 2 \\ 0.1 & : n \leq 2 \end{cases}$$

For the case of this sample measure, we have defined that for a result set to be considered to be broad enough, that it must contain at least 3 different media types. This measure has no empirical backing.

TABLE I: Example Results

URL	$P(q, d)$	Reason
www.unicorn-darts.com	0.3	Company called Unicorn due to the single point on a dart
en.wikipedia.org/wiki/Unicorn	1.0	Contains mythology as well as related animals
www.unicorn-grocery.co.uk	0.0	No relation to unicorns
www.unicorn-theatre.com	0.25	Uses the mythology of unicorns to draw children into theatre
http://katemckinnon.files.wordpress.com/2008/07	0.7	Image of a unicorn but purely as a distraction from the rest of the article
http://www.unicorn-centre.co.uk/	0.9	Unicorn mythology about the soul applied to a spiritual ideal including image
http://31st-and-chi.blogspot.com/2010/07/bunch-of-pictures-of-unicorns.html	0.9	Large array of unicorn pictures. One is identical to result 5.
http://disgrasian.com/2010/09/unicorns-really-do-exist-and-theyre-asian/	0.9	Picture of unicorn and asian 2 horn unicorn.
http://www.youtube.com/watch?v=QSim0Ssyus	0.4	Comedy cartoon video about unicorns.
http://www.youtube.com/watch?v=v25MaXwopNI	0.8	Music for a cartoon character.

3) $P(q, d)$: With respect to the relevance of an individual result compared to the information need, there are a number of different methods that could be used. For example, keyword analysis in text documents and image recognition in images, it is clear that a separate method would be needed for each media type that is returned.

With this in mind, for the example below, the individual relevance of a given result will be manually determined and a brief explanation given. The focus will be more on the relevance of the result to the information need, with some weighting given if there is a creative link.

C. Experimental Data

To show this metric in practice we will need to get real world data about a topic. We have used Google to search for results on the following creative need - unicorns from Greek mythology.

The search term input into Google on Thursday 12th May was 'unicorn'. Below is a table of a url to each result, their assigned P rating and a brief description of the reason why. We have taken the top 10 results including the first 4 images and videos.

Due to the repeated result in result 4 and 6, $D(r) = 0.1$ and $T(r) = 1 - \frac{2 \cdot 0.94}{10} = 0.812$. If we then feed these results into the SCM metric we get.

$$SCM = 0.812 \cdot \frac{1}{10} \cdot 6.15 \cdot (1 - 0.1) = 0.449$$

A 0.449 result for us represents a set of results that contain some creative merit, but which also could be improved. This

result could be enhanced, based on this metric, if four of the results were to have been replaced with more relevant results.

We still need to understand whether the low result is due to the fact that the results are not inspiring creativity as we presume, or that the definition that we have provided is not complete and that we need to extend it further. It is planned, that we take this research further to answer the question using in-depth empirical analysis.

V. CONCLUSION AND FUTURE WORK

Over the course of the report, we have attempted to define what we mean by creativity with respect to search engine results using the concepts from computational creativity. The definition is focused more on the structure and relationship between the results returned than the content of the results themselves. This will allow us to define this separately after carrying out further experiments.

This is evident from the metric that we generated to show how the definition could be used. We believe that the low result shows that the return set does not have a high creative merit; however, more testing will be needed to check whether this is the case, or whether the definition needs to be redefined.

We believe, that whilst this paper has little empirical backing, it has highlighted a short fall in the information retrieval domain, namely that of creative search. Even from the simple test that was conducted, it is apparent, that even when we reach a metric for measuring the creative quality of results, a new form of search engine will be required to achieve top quality results consistently.

The next stage of the research will focus on applying what we have learnt and combine quantitative and qualitative analysis to try and develop a new metric with a strong empirical backing. This means that our definition of creativity will likely need to be adapted over time; however, this could allow us to develop a metric that evolves over time to adapt to what the users consider to be creative search.

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