Theme Ontology
A community-based, open access knowledgebase
of literary themes and thematically annotated stories.

Ontologies for Narrative and Fiction Workshop

# Toward Creating a Collection of Literary Themes for use in Supervised Learning Applications

Paul Sheridan
Assistant Professor, University of Prince Edward Island
Monday, 3 July 2023

2010-16

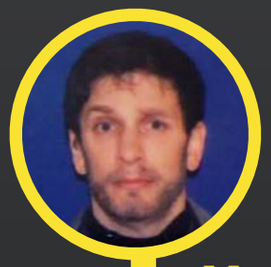
2017

2018

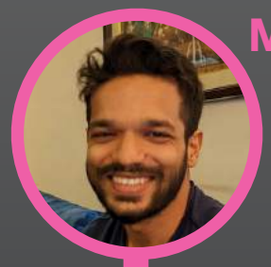
2019

2020-22

2023



Me



Oshan Modi

GitHub

Janna Hastings

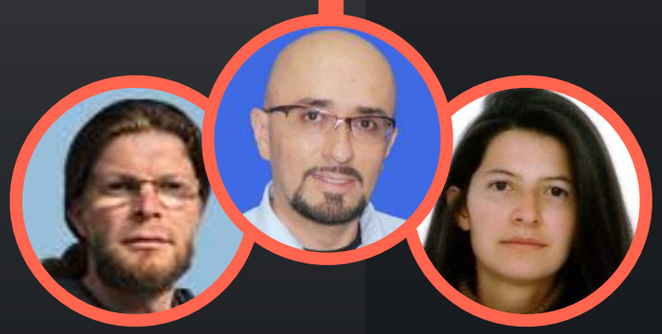
WODHSA

DSCN

MT&A

JOSS (in prep)

Mikael Onsjö



Sergio Jiminez Team

Future Internet

LTO + GOLEM Lab

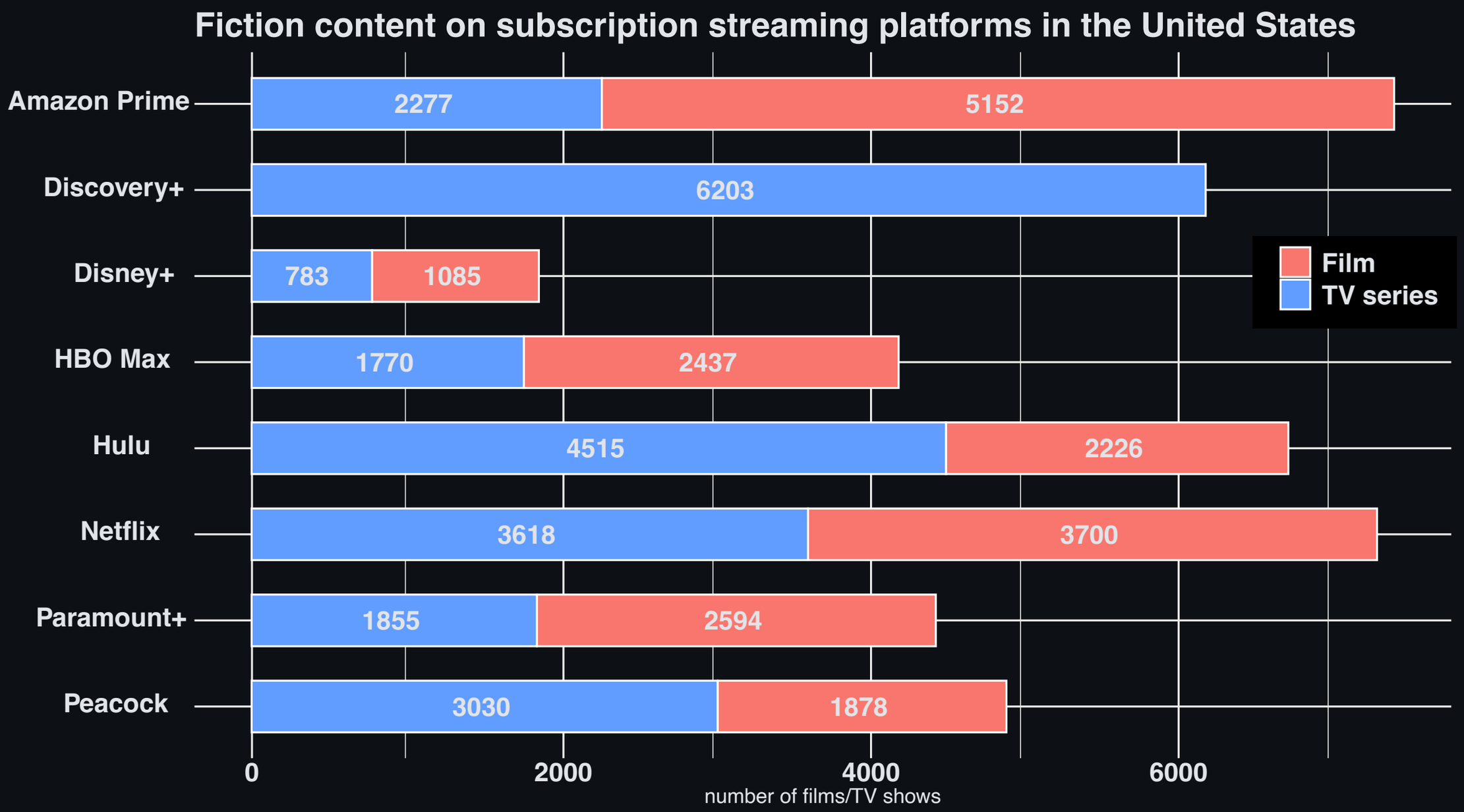
Part I: The Vision

Part II: LTO in a Nutshell

Part III: LTO Today

Part IV: LTO Tomorrow

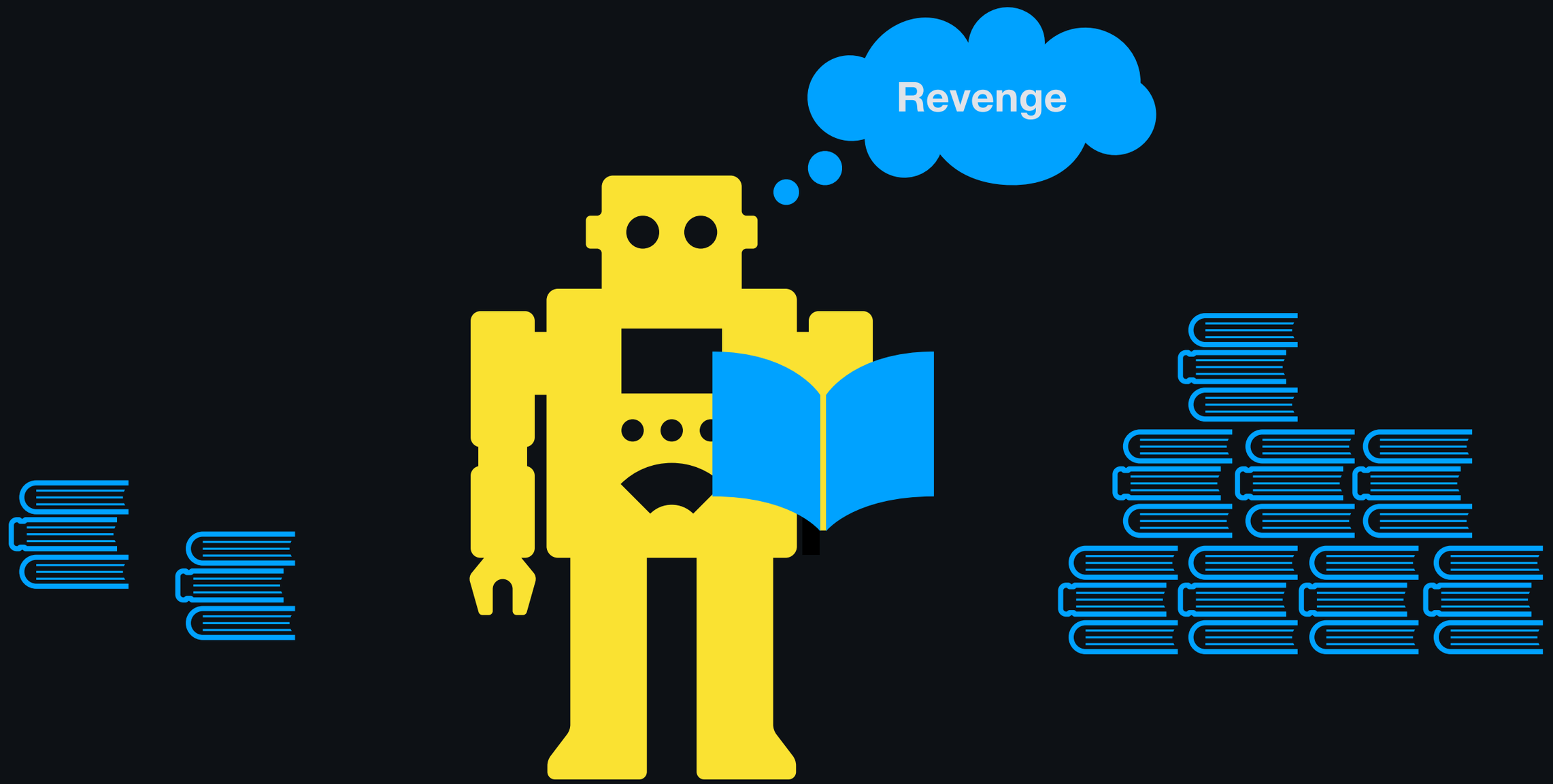
# The Problem




USA, January 2023

Source: Statista

# The Goal

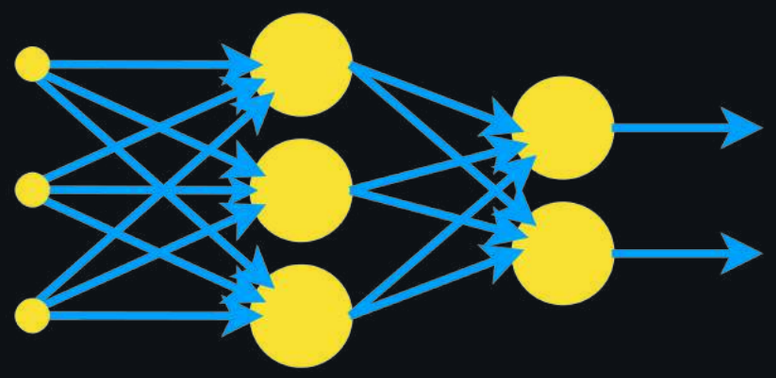


# The Approach

1. Build an open-source knowledgebase of common literary themes.

2. Create gold/silver-standard corpora of thematically annotated narrative texts.

3. Train machine learning models on the themes and annotated corpora to annotate narrative text with themes.



Part I: The Vision

Part II: LTO in a Nutshell

Part III: LTO Today

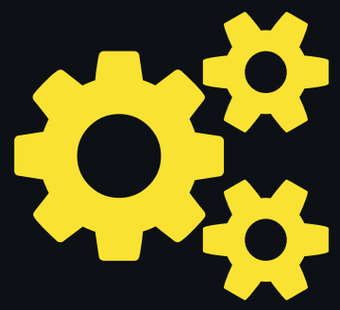
Part IV: LTO Tomorrow

# What is the LTO?

A knowledgeable of literary themes

An online collaborative fiction document thematic annotation platform

An open access database of thematically annotated stories



An ecosystem of statistical analysis applications

# Where is the LTO?

theme ontology github

theme ontology homepage

Search or jump to... Pulls Issues Codespaces Marketplace Explore

theme-ontology / theming Public

Edit Pins Unwatch 5 Fork 5 Starred 11

Code Issues Pull requests Discussions Actions Projects Wiki Security Insights

master Go to file Add file Code

paul-sheridan deleted notes fields ... last week 8,573

| | | |
|---|---|---|
| .github | typo fix | 2 years ago |
| notes | deleted notes fields | last week |
| CONTRIBUTING.md | initial import | 2 years ago |
| LICENSE.md | Added md extension to file name | 2 years ago |
| README.md | Update README.md | 4 months ago |

README.md

**Theme Ontology**

A community-based, open access knowledgebase of literary themes and thematically annotated stories.
Explore the themes » || Explore the stories »

Request a theme · Revise a theme

## Welcome to the Theme Ontology Community

Visit the Theme Ontology website: https://www.themeontology.org/

About

The core repository for the Literary Theme Ontology Project.

www.themeontology.org/

Readme
MIT license
Activity
11 stars
5 watching
5 forks
Report repository

Releases 10

LTO 2023.06 release Latest
last week

+ 9 releases

Packages

No packages published
Publish your first package

Contributors 3

paul-sheridan Paul Sheridan
odinlake Mikael Onsjö
brent-hagen

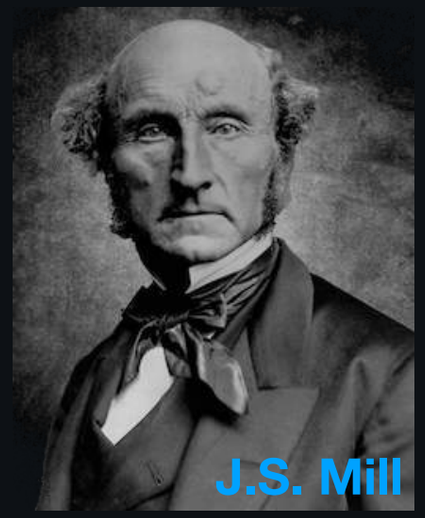
stories themes data github»

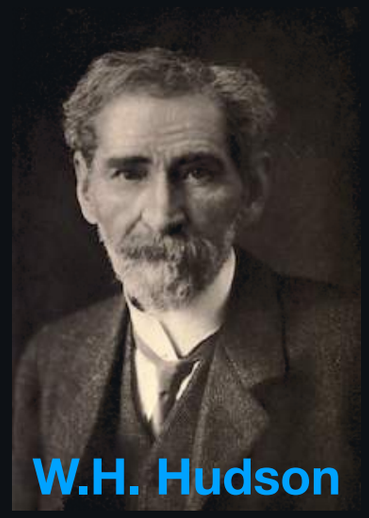
## Theme Ontology

Contains 2943 well defined literary themes arranged in a hierarchy. The hierarchy is a tree-like graph, a *directed acyclic graph*, or a taxonomy - with extra features, i.e., an ontology. Each theme is defined with an average of 64 words. The definitions lay out necessary and sufficient conditions for when a theme is present in a story.

There are 3981 annotated stories, normally defined with a reference to Wikipedia. Each story has been associated with an average of 13 themes. Each theme designation has been weighted according to it's importance to the story as "minor", "major", or "choice", and provided with a concise motivation. The average motivation is 16 words, with the longest 10% being 29 or more.

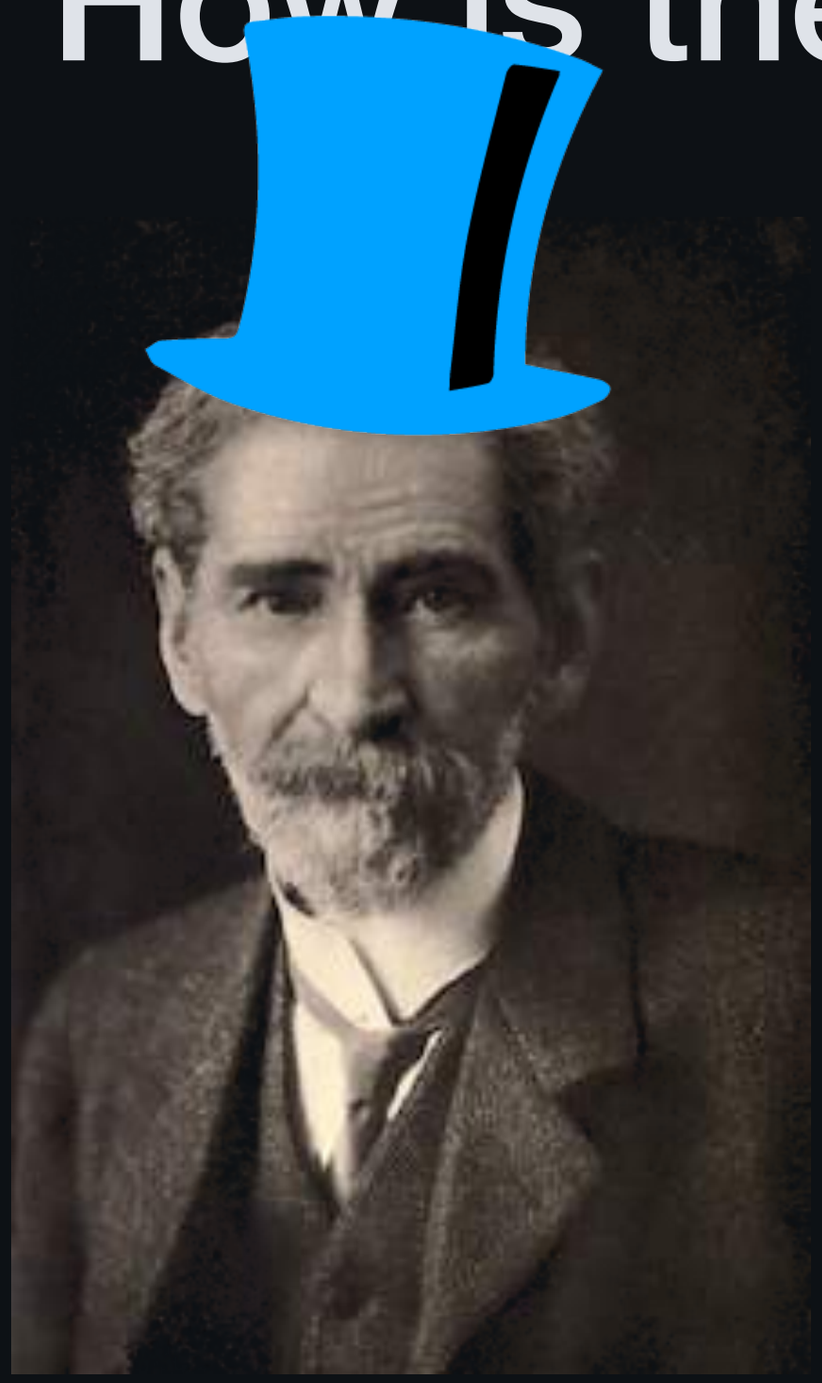
Search the stories, search the themes, or go to the github» repository for more information. Download, explore, and analyze data with the R package stoRy.



The Gentlemen Themers

# How is the LTO Structured?



William Henry Hudson (1841-1922)

- literary thematic entity
  - the human world
    - human idea about life
    - human nature
    - personal human experience
      - human regular activity
      - humans in group
      - human in pairs
      - individual humans
      - what life is like
    - society
      - cross cultural issue
      - international issue
      - national social issue
      - social ethical issue
  - the natural world
    - folk belief
    - history
    - organized religion
    - philosophy
    - science
    - superseded scientific theory
    - the art of war
  - alternate reality
    - crackpot theory
    - speculative ability
    - speculative being
    - speculative effect
    - speculative experience
    - speculative natural process
    - speculative place
    - speculative punishment
    - speculative society
    - speculative technology
    - speculative travel

Basic Formal Ontology compliant

Part I: The Vision

Part II: LTO in a Nutshell

Part III: LTO Today

Part IV: LTO Tomorrow

# Watch it, Fork it, Star it

theme ontology github

theme ontology homepage

Search or jump to... / Pulls Issues Codespaces Marketplace Explore

theme-ontology / theming Public

Edit Pins · Unwatch 5 · Fork 5 · Starred 11

Code Issues Pull requests Discussions Actions Projects Wiki Security Insights

master · Go to file · Add file · Code

paul-sheridan deleted notes fields ... last week 8,573

| | | |
|---|---|---|
| .github | typo fix | 2 years ago |
| notes | deleted notes fields | last week |
| CONTRIBUTING.md | initial import | 2 years ago |
| LICENSE.md | Added md extension to file name | 2 years ago |
| README.md | Update README.md | 4 months ago |

README.md

**Theme Ontology**

A community-based, open access knowledgebase of literary themes and thematically annotated stories.

Explore the themes » || Explore the stories »

Request a theme · Revise a theme

## Welcome to the Theme Ontology Community

Visit the Theme Ontology website: https://www.themeontology.org/

About

The core repository for the Literary Theme Ontology Project.

www.themeontology.org/

Readme
MIT license
Activity
11 stars
5 watching
5 forks
Report repository

Releases 10

LTO 2023.06 release Latest
last week

+ 9 releases

Packages

No packages published
Publish your first package

Contributors 3

paul-sheridan Paul Sheridan
odinlake Mikael Onsjö
brent-hagen

stories themes data github»

## Theme Ontology

Contains 2943 well defined literary themes arranged in a hierarchy. The hierarchy is a tree-like graph, a *directed acyclic graph*, or a taxonomy - with extra features, i.e., an ontology. Each theme is defined with an average of 64 words. The definitions lay out necessary and sufficient conditions for when a theme is present in a story.

There are 3981 annotated stories, normally defined with a reference to Wikipedia. Each story has been associated with an average of 13 themes. Each theme designation has been weighted according to it's importance to the story as "minor", "major", or "choice", and provided with a concise motivation. The average motivation is 16 words, with the longest 10% being 29 or more.

Search the stories, search the themes, or go to the github» repository for more information. Download, explore, and analyze data with the R package stoRy.

# Little Red Riding-hood

A Victorian-era retelling of a classic European cautionary tale about a young girl and the Big Bad Wolf.

It was published in the 1889 Andrew Lang edited collection of fairy tales *The Blue Fairy Book*.

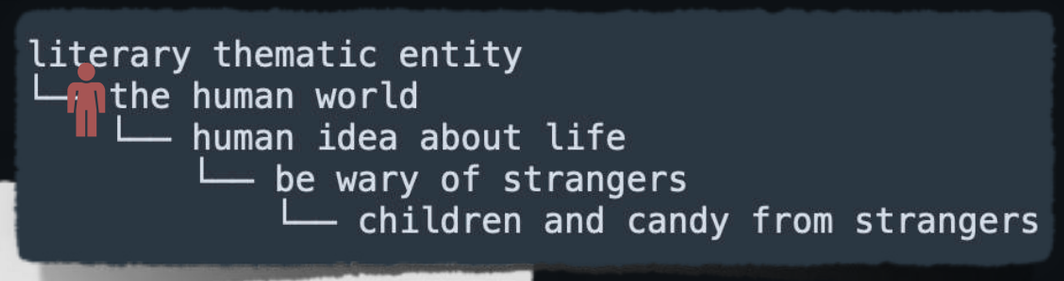
Wikisource text: https://en.wikisource.org/wiki/The_Blue_Fairy_Book/Little_Red_Riding-hood

# STORY: shortstory: Little Red Riding Hood (1889)

A Victorian-era retelling of a classic European cautionary tale about a young girl and a Big Bad Wolf. It was published in the 1889 Andrew Lang edited collection of fairy tales The Blue Fairy Book. Link to text: https://en.wikisource.org/wiki/The_Blue_Fairy_Book/Little_Red_Riding-hood

**References:**
https://en.wikipedia.org/wiki/Lang%27s_Fairy_Books#The_Blue_Fairy_Book_(1889)

| Theme | Level | Motivation |
|---|---|---|
| be wary of strangers | choice | Charles Perrault sums up the moral of the story as follows: "From this story one learns that children, especially young lasses, pretty, courteous and well-bred, do very wrong to listen to strangers, And it is not an unheard thing if the Wolf is thereby provided with his dinner". |




# THEME: be wary of strangers

The idea that we ought better be cautious around outsiders we do not know, is expressly stated or pointedly illustrated.

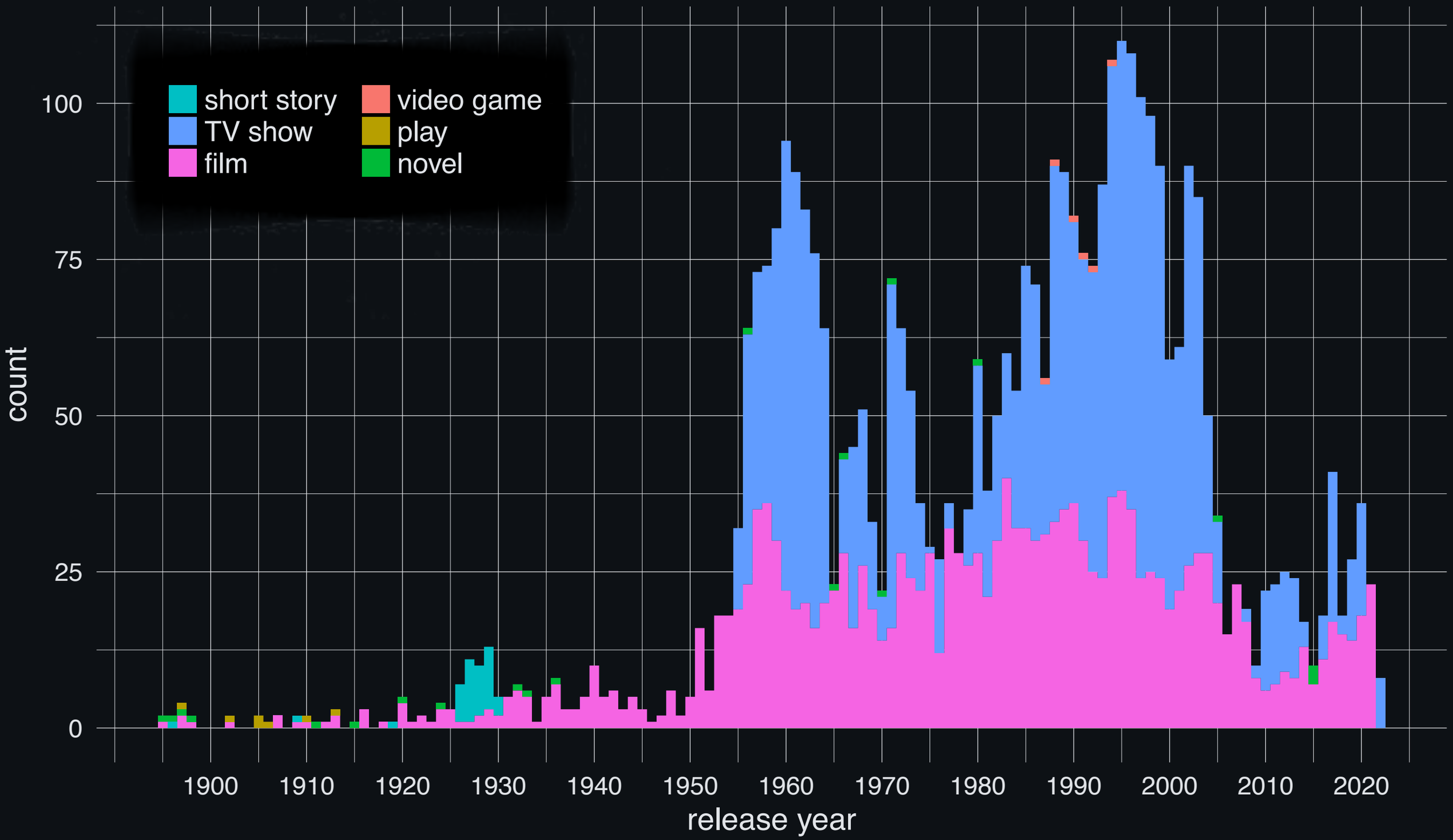
**Examples:**
In talesoftheunexpected5x16 "A Man with a Fortune", Janet Murdoch met her doom after she set out to travel with the strange American John Smith and it turned out he was a psychopathic killer descended from a long line of psychopathic killers.

# Red Riding-hood Themes

| Theme | Level | Comment |
|---|---|---|
| be wary of strangers | choice | Charles Perrault sums up the moral of the story as follows: "From this story one learns that children, especially young lasses, pretty, courteous and well-bred, do very wrong to listen to strangers, And it is not an unheard thing if the Wolf is thereby provided with his dinner". |
| appearances can be deceiving | choice | This common aphorism is illustrated by the Wolf lying to Little Red Riding-Hood and dressing up in her grandmother's clothing in order to lull the poor child into a false sense of security. |
| human childhood | major | Little Red Riding-Hood innocently trusted the Wolf, and engaged in childish diversions such as chasing butterflies. |
| wicked character vs. virtuous character | major | The conniving, deceitful Wolf was contrasted with the innocent little country girl Little Red Riding-Hood. |
| coping with a loved one being gravely ill | minor | The mother was concerned because the grandmother had recently been "very ill". |
| grandmother and granddaughter | minor | Little Red Riding-Hood set out to deliver a custard and some butter to her convalescing grandmother. |
| mother and daughter | minor | Little Red Riding-Hood happily went on an errand at her dotting mother's bidding. |

URL: https://github.com/theme-ontology/theming/wiki/Theming-Andrew-Lang's-Little-Red-Riding-Hood

# LTO thematically annotated stories by year



husband and wife
romantic love
father and daughter
father and son
mother and son
mother and daughter
friendship
infatuation
extraterrestrial being
speculative spaceship
romantic/jealousy
boyfriend and girlfriend
vengeance
law enforcement
human vs. captivity
coping with the death of a spouse
attack from outer space by a genocidal enemy
attack from outer space by a powerful conquering enemy
what if I had to fight to the death
what if I told the truth and nobody would believe me
facing organized pursuit
the quest for immortality
post-apocalyptic dystopia
the lust for gold
medical occupation
trust in a potential foe
brother and brother
coping with a disability
mad scientist stereotype
unethical business practices
coping with a terminal illness
Martian extraterrestrial
alien living secretly among us
facing financial ruin
coping with the death of a parent
extramarital affair
master and servant
government secrecy
humanoid robot
coping with the death of a lover
resistance movement
mind reading ability
coping with post-traumatic stress
engaged couple
unrequited love
coping with aging
human cloning
telepathic being
romantic infidelity
coping with unwelcome romantic attention
the dangers of unfettered scientific advancement
attitude of superiority
coping with the death of a child
the thirst for knowledge
human vs. sentient machine
artificial body part
illegal drug trade
telepathic society
what if I had amnesia
human vs. beast
career ambition
uncle and nephew
duty vs. conscience
love vs. career
alcohol abuse
cowardice
selfless service
sentient computer
alien abduction
space station
ethnic hatred
suspended animation
scientist occupation
the dangers of radioactivity
the lust for power
ironic twist of fate
master and pet
social oppression
the need for freedom
clash of wills
sister and sister
ruthlessness
living dinosaur
religious occupation
sexism in society
spouse murder
cyborg
rivalry
ghost
obsession
kindness
belonging
terrorism
hologram
sadism
heroism
theft
anger
fear
divorce
music
android
World War II
male bonding
murder
remorse
time travel
gold digging
flying saucer
AI rights
boredom
precognition
cryptid
personal identity
descent into madness
nuclear weapons
speculative virtual reality
interstellar space travel
flying saucer theory of UFOs
nuclear holocaust
interplanetary space travel
speculative genetic engineering
poetic justice
risk taking vs. playing it safe
guilt and evidence
human vs. monster
human vs. nature
space colonization
virtual reality room
telepathic ability
giant monster
compassion
organized crime
social inequality
shapeshifter
poison murder
hospitality
jealousy
living corpse
racism in society
loneliness
betrayal
reconciliation
journalism
love triangle suicide
alien point of view
humanoid mutant
teleportation device
military related work
coping with being disfigured
creative writing
marriage ceremony
coping with being tortured
what it is like in a legal proceeding
mentor and protégé
beating one's self up
facing a mortal enemy
sacrifice for a loved one
dealing with children
rise of the machines
what if I found myself in the future
coping with the death of a friend
boss and employee
disembodied head
the calculus of human life
transnational institution for peace
the entertainment industry
helping a stranger in need
what if the fate of the world was in my hands
coping with memories of a lost love
resisting a temptation
transcendental being
questioning one's sanity
what if I met myself from a different time
what if I met my double
what if I was accused of a crime that I didn't commit
what if I underwent a physical metamorphosis
coping with a loved one being in peril
coping with a loved one being gravely ill
how to murder someone and get away with it
the ethics of interfering in less advanced societies
mind control technology
telekinetic ability
organized religion
biological weapons
courtly intrigues
capital punishment
political assassination
illegal drug trade
reptilian being
telepathic society
what if I had amnesia
human vs. beast
speculative spaceship
extraterrestrial being
brother and sister
coping with the death of someone
coping with a loved one being in peril
what if I underwent a physical metamorphosis
coping with a loved one being gravely ill
how to murder someone and get away with it
the ethics of interfering in less advanced societies
mind control technology
telekinetic ability
legal occupation
young and old romance
the ethics of valuing human lives
Christianity
gambling
diplomacy
old flames
super strength
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
virtual person
escape from reality
xenophobia in society
high treason
monster
teen romance
childhood
cruelty
honor
serial murder
flying car
pollution in society
resentment
drug abuse
gender bending
loyalty to a leader
revival long after death
coping with getting dumped
coping with being tortured
facing an overpowering adversary
what it is like in a legal proceeding
mentor and protégé
beating one's self up
facing a mortal enemy
sacrifice for a loved one
dealing with children
rise of the machines
what if I had to fight to the death
attack from outer space by a genocidal enemy
unethical human experimentation
what if I found myself in a zero gravity environment
facing a hostage situation
coming to terms with one's own death
coping with personal failure
human self-sacrifice for another
disintegrating romantic relationship
romantic courtship
roommate and roommate
neighbor and neighbor
candidates by WMDs
intercultural politics
childish bullying
universal translation device
personal conviction
lesson in humility
Christmas traditions
single fatherhood
faith vs. reason
memory erasure
forbidden love
mass hysteria
self-healing ability
the game of baseball
self-confidence
flying car
racism in society
loneliness
betrayal
reconciliation
journalism
virtual person
escape from reality
xenophobia in society
high treason
monster
teen romance
childhood
cruelty
honor
serial murder
male bonding
World War II
music
android
super strength
master and servant
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
gambling
diplomacy
old flames
Christianity
vigilante justice
humility
slavery
fortitude
cooperation
sadism
cyborg
rivalry
ghost
obsession
kindness
belonging
terrorism
hologram
felinoid being
AI point of view
coping with aging
human cloning
leadership
con artistry
the horrors of war
resistance movement
cryogenic technology
expecting parents
mind reading ability
coping with post-traumatic stress
humanoid robot
engaged couple
unrequited love
telepathic being
career ambition
uncle and nephew
duty vs. conscience
love vs. career
alcohol abuse
cowardice
selfless service
sentient computer
alien abduction
space station
ethnic hatred
suspended animation
scientist occupation
the dangers of radioactivity
the lust for power
ironic twist of fate
master and pet
social oppression
the need for freedom
clash of wills
sister and sister
ruthlessness
living dinosaur
religious occupation
sexism in society
spouse murder
time machine
father and daughter
father and son
mother and son
mother and daughter
friendship
infatuation
extraterrestrial being
speculative spaceship
romantic/jealousy
boyfriend and girlfriend
vengeance
law enforcement
human vs. captivity
coping with the death of a spouse
attack from outer space by a genocidal enemy
attack from outer space by a powerful conquering enemy
what if I had to fight to the death
what if I told the truth and nobody would believe me
facing organized pursuit
the quest for immortality
post-apocalyptic dystopia
the lust for gold
medical occupation
trust in a potential foe
brother and brother
coping with a disability
mad scientist stereotype
unethical business practices
coping with a terminal illness
Martian extraterrestrial
alien living secretly among us
facing financial ruin
coping with the death of a parent
extramarital affair
master and servant
government secrecy
humanoid robot
coping with the death of a lover
resistance movement
mind reading ability
coping with post-traumatic stress
engaged couple
unrequited love
coping with aging
human cloning
telepathic being
romantic infidelity
coping with unwelcome romantic attention
the dangers of unfettered scientific advancement
attitude of superiority
coping with the death of a child
the thirst for knowledge
human vs. sentient machine
artificial body part
illegal drug trade
telepathic society
what if I had amnesia
human vs. beast
speculative spaceship
extraterrestrial being
brother and sister
coping with the death of someone
coping with a loved one being in peril
what if I underwent a physical metamorphosis
coping with a loved one being gravely ill
how to murder someone and get away with it
the ethics of interfering in less advanced societies
mind control technology
telekinetic ability
legal occupation
young and old romance
the ethics of valuing human lives
Christianity
gambling
diplomacy
old flames
super strength
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
virtual person
escape from reality
xenophobia in society
high treason
monster
teen romance
childhood
cruelty
honor
serial murder
male bonding
World War II
music
android
super strength
master and servant
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
gambling
diplomacy
old flames
Christianity
vigilante justice
humility
slavery
fortitude
cooperation
sadism
cyborg
rivalry
ghost
obsession
kindness
belonging
terrorism
hologram
felinoid being
AI point of view
coping with aging
human cloning
leadership
con artistry
the horrors of war
resistance movement
cryogenic technology
expecting parents
mind reading ability
coping with post-traumatic stress
humanoid robot
engaged couple
unrequited love
telepathic being
career ambition
uncle and nephew
duty vs. conscience
love vs. career
alcohol abuse
cowardice
selfless service
sentient computer
alien abduction
space station
ethnic hatred
suspended animation
scientist occupation
the dangers of radioactivity
the lust for power
ironic twist of fate
master and pet
social oppression
the need for freedom
clash of wills
sister and sister
ruthlessness
living dinosaur
religious occupation
sexism in society
spouse murder
time machine
father and daughter
father and son
mother and son
mother and daughter
friendship
infatuation
extraterrestrial being
speculative spaceship
romantic/jealousy
boyfriend and girlfriend
vengeance
law enforcement
human vs. captivity
coping with the death of a spouse
attack from outer space by a genocidal enemy
attack from outer space by a powerful conquering enemy
what if I had to fight to the death
what if I told the truth and nobody would believe me
facing organized pursuit
the quest for immortality
post-apocalyptic dystopia
the lust for gold
medical occupation
trust in a potential foe
brother and brother
coping with a disability
mad scientist stereotype
unethical business practices
coping with a terminal illness
Martian extraterrestrial
alien living secretly among us
facing financial ruin
coping with the death of a parent
extramarital affair
master and servant
government secrecy
humanoid robot
coping with the death of a lover
resistance movement
mind reading ability
coping with post-traumatic stress
engaged couple
unrequited love
coping with aging
human cloning
telepathic being
romantic infidelity
coping with unwelcome romantic attention
the dangers of unfettered scientific advancement
attitude of superiority
coping with the death of a child
the thirst for knowledge
human vs. sentient machine
artificial body part
illegal drug trade
telepathic society
what if I had amnesia
human vs. beast
speculative spaceship
extraterrestrial being
brother and sister
coping with the death of someone
coping with a loved one being in peril
what if I underwent a physical metamorphosis
coping with a loved one being gravely ill
how to murder someone and get away with it
the ethics of interfering in less advanced societies
mind control technology
telekinetic ability
legal occupation
young and old romance
the ethics of valuing human lives
Christianity
gambling
diplomacy
old flames
super strength
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
virtual person
escape from reality
xenophobia in society
high treason
monster
teen romance
childhood
cruelty
honor
serial murder
male bonding
World War II
music
android
super strength
master and servant
funeral rite
lovers' quarrel
second guessing one's self
disappearing parent
computer hacking
gambling
diplomacy
old flames
Christianity
vigilante justice
humility
slavery
fortitude
cooperation
sadism
cyborg
rivalry
ghost
obsession
kindness
belonging
terrorism
hologram
felinoid being
AI point of view
coping with aging
human cloning
leadership
con artistry
the horrors of war
resistance movement
cryogenic technology
expecting parents
mind reading ability
coping with post-traumatic stress
humanoid robot
engaged couple
unrequited love
telepathic being
career ambition
uncle and nephew
duty vs. conscience
love vs. career
alcohol abuse
cowardice
selfless service
sentient computer
alien abduction
space station
ethnic hatred
suspended animation
scientist occupation
the dangers of radioactivity
the lust for power
ironic twist of fate
master and pet
social oppression
the need for freedom
clash of wills
sister and sister
ruthlessness
living dinosaur
religious occupation
sexism in society
spouse murder
time machine

CEUR Workshop Proceedings
http://ceur-ws.org
ISSN 1613-0073
IAOA

# The Literary Theme Ontology for Media Annotation and Information Retrieval

Paul SHERIDAN[a,1], Mikael ONSJÖ[b] and Janna HASTINGS[c]
[a] *Tupac Bio, Inc., USA*
[b] *Independent Researcher, UK*
[c] *Department of Clinical, Educational and Health Psychology, University College London, UK*

**Abstract.** Literary theme identification and interpretation is a focal point of literary studies scholarship. Classical forms of literary scholarship, such as close reading, have flourished with scarcely any need for commonly defined literary themes. However, the rise in popularity of collaborative and algorithmic analyses of literary themes in works of fiction, together with a requirement for computational searching and indexing facilities for large corpora, creates the need for a collection of shared literary themes to ensure common terminology and definitions. To address this need, we here introduce a first draft of the Literary Theme Ontology. Inspired by a traditional framing from literary theory, the ontology comprises literary themes drawn from the authors own analyses, reference books, and online sources. The ontology is available at `https://github.com/theme-ontology/theming` under a Creative Commons Attribution 4.0 International license (CC BY 4.0).

**Keywords.** ontology, tagset, information retrieval, ontology-based information system, knowledge graph, standardization, literary theme

## 1. Introduction

Literary themes are the notable topics that structure and give focus to works of fiction, by relating art to life around such themes as "romantic love", "coping with death", and "the lust for power", or to the science fictional and fantastical in themes ranging from "astronomical-scale engineering" projects to "the occult". They are a natural organising hub for classification and retrieval of works of fiction.

Despite many informal textual collections of literary themes, no comprehensive *ontology* has yet been developed to underpin thematic analysis in digital literary studies. Ontologies are computationally formalised representations of entities from a given domain. By capturing domain knowledge in a standardised computable form, they enable sophisticated applications such as clustering and intelligent information retrieval. Based on best practices such as the use of the Basic Formal Ontology (BFO) [1] as upper level and the Web Ontology Language (OWL2) [2] as encoding formalism, we here introduce, and present a first draft of, the Literary Theme Ontology (LTO).

[1]Corresp[illegible]or; Chief Science O[illegible] Bio, Inc., 717 Market St., San Francisco, CA, 94103; E-mail[illegible]mail.co[illegible] for this paper by its authors. Use permitted under [illegible]Y 4.0).

CEUR-WS.org/Vol-2518/paper-WODHSA8.pdf

# THEORY: The Literary Theme Ontology

A

- literary thematic entity
  - speculative fiction thematic entity
    - crackpot theory thematic entity
    - extraordinary experience thematic entity
    - speculative being thematic entity
    - speculative future event thematic entity
    - speculative natural phenomenon thematic entity
    - speculative society thematic entity
    - speculative technology thematic entity
    - speculative travel thematic entity
    - speculative world thematic entity
  - the human condition thematic entity
    - human group thematic entity
    - human individual thematic entity
      - human challenge in life thematic entity
      - human character thematic entity
      - human dreaming thematic entity
      - human emotion thematic entity
      - human idea about life thematic entity
      - human thinking about self thematic entity
      - human tough decision thematic entity
      - human way of life thematic entity
      - human worrying about self thematic entity
      - purpose in life thematic entity
      - what life is like thematic entity
    - human pair thematic entity
    - human society thematic entity
      - cross cultural issue thematic entity
      - educational issue thematic entity
      - environmental issue thematic entity
      - form of government thematic entity
      - gender issue thematic entity
      - intersocietal issue thematic entity
      - law and order issue thematic entity
      - military issue thematic entity
      - political issue thematic entity
      - problem of language and meaning thematic entity
      - public health issue thematic entity
      - social ethical issue thematic entity
      - sociocultural issue thematic entity
      - socioeconomic issue thematic entity
      - sociotechnological issue thematic entity
      - special interest group issue thematic entity
  - the pursuit of knowledge thematic entity
    - religion and the supernatural thematic entity
    - science and philosophy thematic entity
    - the art of war thematic entity
    - the fine arts and the humanities thematic entity

B

- speculative fiction thematic entity
  - crackpot theory thematic entity
  - extraordinary experience thematic entity
  - speculative being thematic entity
    - artificial being thematic entity
    - biologically distinguished being thematic entity
    - culturally distinguished being thematic entity
    - drug enhanced supersoldier thematic entity
    - emergently intelligent being thematic entity
    - legendary being thematic entity
    - locationally distinguished being thematic entity
    - mentally distinguished being thematic entity
    - shape distinguished being thematic entity
    - size distinguished being thematic entity
    - transcendental being thematic entity
  - speculative future event thematic entity
  - speculative natural phenomenon thematic entity
  - speculative society thematic entity
    - alternate history thematic entity
    - dystopia thematic entity
    - existential risk to civilization thematic entity
    - institutionalized human blood sports society thematic entity
    - multi-species civilization thematic entity
    - robotic civilization thematic entity
    - society consisting of only children thematic entity
    - society living in space thematic entity
    - society with a maximum age limit thematic entity
    - subterranean civilization thematic entity
    - thoughtcrime society thematic entity
    - utopia thematic entity
    - what if everyone got pregnant thematic entity
    - what if everyone turned stupid thematic entity
    - what if men could get pregnant thematic entity
    - what if our thoughts became reality thematic entity
    - what if perpetrators were sentenced by their victims thematic entit
    - world with telepathy thematic entity
  - speculative technology thematic entity
    - artificial intelligence thematic entity
    - biological technology thematic entity
    - body altering technology thematic entity
    - gravity manipulating technology thematic entity
    - invisibility technology thematic entity
    - matter manipulating technology thematic entity
    - mind altering technology thematic entity
    - simulated reality thematic entity
    - spacetime manipulating technology thematic entity
    - speculative device thematic entity
    - speculative energy generation technology thematic entity
    - speculative engineering thematic entity
    - speculative nanotechnology thematic entity
    - speculative weapon thematic entity
    - stasis technology thematic entity
  - speculative travel thematic entity
    - space travel thematic entity
    - time travel thematic entity
    - travel into the Earth thematic entity
  - speculative world thematic entity

# APPLICATION:
# An Ontology-enhanced Recommender System

*future internet* MDPI

*Article*

## An Ontology-Based Recommender System with an Application to the Star Trek Television Franchise

**Paul Sheridan [1,*], Mikael Onsjö [2], Claudia Becerra [3], Sergio Jimenez [4] and George Dueñas [4]**

[1] Tupac Bio, Inc., San Francisco, CA 94103, USA
[2] Independent Researcher, London, SE13 7NZ, UK
[3] Systems and Computer Engineering Department, Universidad Nacional de Colombia, Ciudad Universitaria bldg. 453, Bogotá, D.C. 11001, Colombia
[4] Instituto Caro y Cuervo, Calle 10 # 4-69, Bogotá, D.C. 111711, Colombia
* Correspondence: paul.sheridan.stats@gmail.com

Received: 8 July 2019; Accepted: 14 August 2019; Published: 22 August 2019

**Abstract:** Collaborative filtering based recommender systems have proven to
in settings where user preference data on items is abundant. However
algorithms are hindered by their weakness against the item cold-start prob
interpretability. Ontology-based recommender systems exploit hierarchica
and items to enhance browsing, recommendation, and profile construction
approaches address the shortcomings of their collaborative filtering co
organizations of items can be difficult to obtain for items that mostly belo
(e.g., television series episodes). In this paper, we present an ontology-base
that integrates the knowledge represented in a large ontology of literary th
content recommendations. The main novelty of this work is an ontology-base
similarities between items and its integration with the classical Item-KN
algorithm. As a study case, we evaluated the proposed method again
performing the classical rating prediction task on a collection of Star Trek tel
an item cold-start scenario. This transverse evaluation provides insights in
information resources and methods for the initial stages of recommend
We found our proposed method to be a convenient alternative to collaborat
for collections of mostly similar items, particularly when other content-ba
applicable or otherwise unavailable. Aside from the new methods, this pap
for future research and an online framework to collaboratively extend the on
to cover other narrative content.

**Keywords:** knowledge-based recommender systems; knowledge repres
ontological engineering; ontology population; ontology-based recommend

### 1. Introduction

Recommender systems (RSs), or recommenders for short, help users to navigate large collections of items in a personalized way [1]. Broadly speaking, RSs function by correlating user preference data with item attributes to generate a list of recommended items for Systems of

## Story recommender

**Choose a story:**
voy3x05: False Profits

**Theme levels:**
- Central and Peripheral
- Central
- Peripheral

**Similarity function:**
cosine

**Minimum theme overlap:**
1

**Background storyset (SMT file format):**
Browse... StarTrek.smt
Upload complete

**Blacklisted themes (input one theme per line):**

Reset

Show 10 entries Search:

| Story ID | Title | Score | Common Themes | Count |
|---|---|---|---|---|
| tng4x13 | Devil's Due | 0.588 | avarice, exploitation of sentient beings, fraud, religion as a control mechanism, the fulfillment of prophesy, the lust for gold | 6 |
| tos2x20 | A Piece of the Action | 0.401 | avarice, the ethics of interfering in less advanced societies, the lust for gold | 3 |
| tng1x22 | Symbiosis | 0.343 | avarice, exploitation of sentient beings, the ethics of interfering in less advanced societies, the lust for gold | 4 |
| tos2x25 | The Omega Glory | 0.320 | avarice, the ethics of interfering in less advanced societies, the lust for gold | 3 |
| tas1x10 | Mudd's Passion | 0.289 | avarice, the lust for gold | 2 |
| tng6x18 | Starship Mine | 0.267 | avarice, the lust for gold | 2 |
| tng3x04 | Who Watches The Watchers | 0.250 | primitive point of view, the ethics of interfering in less advanced societies | 2 |
| voy7x06 | Inside Man | 0.250 | avarice, the lust for gold | 2 |
| tng5x09 | A Matter of Time | 0.236 | avarice, the lust for gold | 2 |
| voy7x14 | Prophecy | 0.236 | religion as a control mechanism, the fulfillment of prophesy | 2 |

Showing 1 to 10 of 44 entries Previous 1 2 3 4 5 Next

# APPLICATION: Theme Enrichment Analysis

## Theme Enrichment Analysis: A Statistical Test for Identifying Significantly Enriched Themes in a List of Stories with an Application to the Star Trek Television Franchise

**Mikael Onsjö** [1] **and Paul Sheridan** [2,*]

[1] *Independent Researcher*
[2] *Department of Active Life Promotion Science, Graduate School of Medicine, Hirosaki University, 5 Zaifu, Hirosaki, Aomori, Japan, 036-8562*

Correspondence*:
Paul Sheridan
paul.sheridan.stats@gmail.com

Digital Studies / Le champ numérique

**ABSTRACT**

In this paper, we describe how the hypergeometric test can be used to determine whether a given theme of interest occurs in a storyset at a frequency more than would be expected by chance. By a storyset we mean simply a list of stories defined according to a common attribute (e.g., author, movement, period). The test works roughly as follows: Given a background storyset and a sub-storyset of interest, the test determines whether a given theme is over-represented in the sub-storyset, based on comparing the proportions of stories in the sub-storyset and background storyset featuring the theme. A storyset is said to be "enriched" for a theme with respect to a particular background storyset, when the theme is identified as being significantly over-represented by the test. Furthermore, we introduce here a toy dataset consisting of 280 manually themed Star Trek television franchise episodes. As a proof of concept, we use the hypergeometric test to analyze the Star Trek stories for enriched themes. The hypergeometric testing approach to theme enrichment analysis is implemented for the Star Trek thematic dataset in the R package **stoRy**. A related R **Shiny** web application can be found at https://github.com/theme-ontology/shiny-apps.

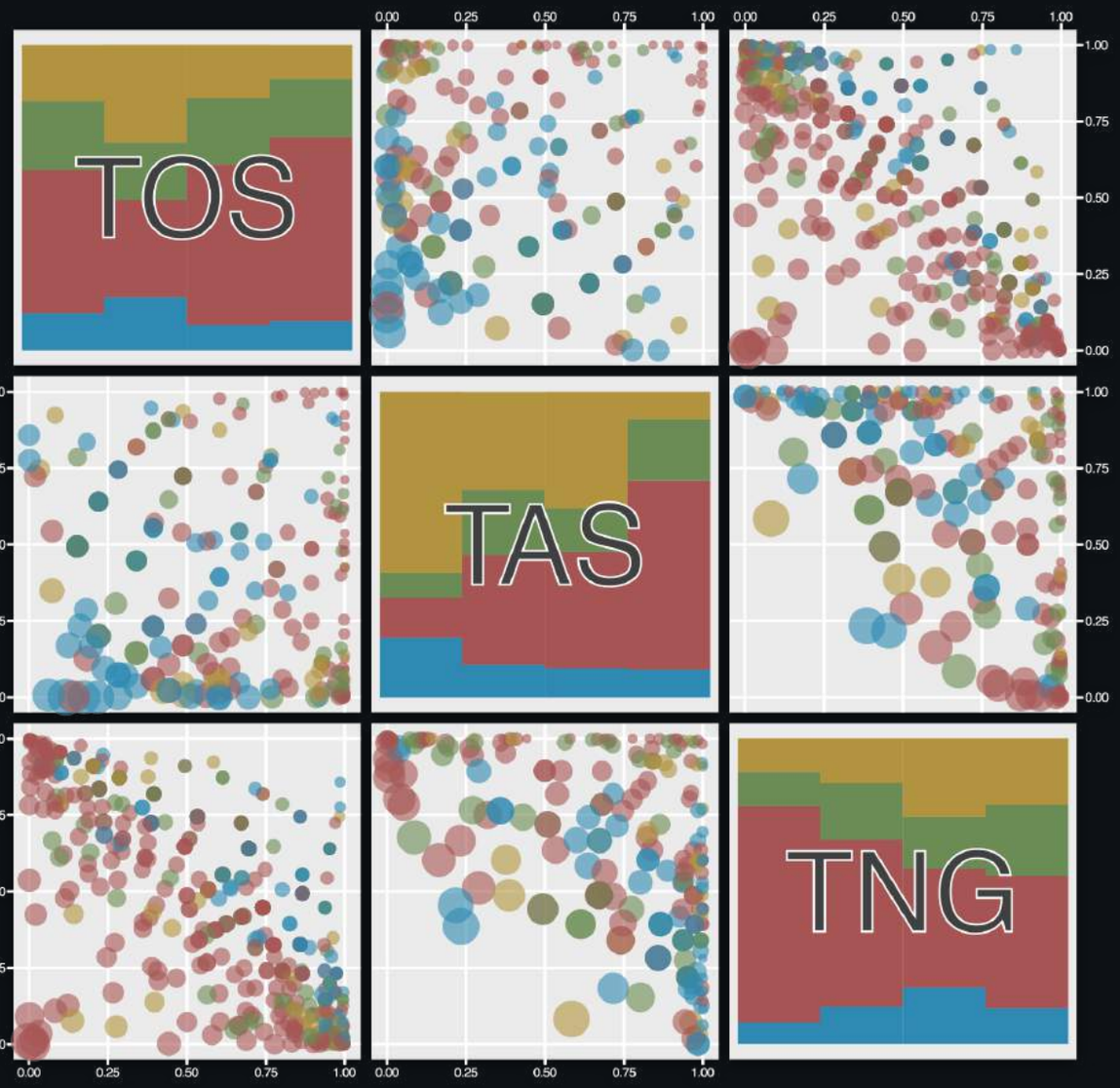
**Keywords: enrichment analysis, hypergeometric test, over-representation analysis, Star Trek, theme ontology**

### 1 INTRODUCTION

A *literary theme*, or *theme* for short, is loosely defined as "An idea that recurs in or pervades a work of art or literature" (e.g., a story) [1]. Themes are often expressible in a single word or short phrase, as is illustrated by such garden-variety themes as "love", "loyalty", and "the lust for gold". These examples all happen to be value-neutral abstractions. But themes can just as well take the form of morally charged messages, such as "be wary of strangers" and "do not judge prematurely". The consummate story-maker usually takes pains to imply a theme indirectly, rather than state it explicitly. Sometimes the story-maker is even unconscious of important themes found in their stories. A typical story will feature multiple themes. In the pr... we distingui... ...ween *central* themes (i.e., themes found to recur throughout a major part ...rwis... ...conclusion) and *peripheral* themes (i.e., briefly featured themes that

[1] https://en.oxforddictionaries.com/definition/theme/ [Online; accessed





# APPLICATION:
# The R Package stoRy

**stoRy: Download, Explore, and Analyze Literary Theme Ontology Data**

Download, explore, and analyze Literary Theme Ontology themes and thematically annotated story data. To learn more about the project visit <https://github.com/theme-ontology/theming> and <https://www.themeontology.org>.

| | |
|---|---|
| Version: | 0.2.2 |
| Depends: | R (≥ 3.5.0) |
| Imports: | cli, crayon, dplyr, fansi, httr, lifecycle, purrr, R6, rappdirs, readr, rlang, stringr, tibble, tidyjson, tidyr, utils |
| Suggests: | covr, curl, isa2, jsonlite, knitr, progress, rmarkdown, testthat |
| Published: | 2023-06-13 |
| Author: | Paul Sheridan [aut, cre], Oshan Modi [aut], Mikael Onsjö [aut] |
| Maintainer: | Paul Sheridan <paul.sheridan.stats at gmail.com> |
| BugReports: | https://github.com/theme-ontology/stoRy/issues |
| License: | GPL-3 |
| URL: | https://github.com/theme-ontology/stoRy, https://github.com/theme-ontology/theming, https://www.themeontology.org/ |
| NeedsCompilation: | no |
| Citation: | stoRy citation info |
| Materials: | README NEWS |
| CRAN checks: | stoRy results |

**Documentation:**

| | |
|---|---|
| Reference manual: | stoRy.pdf |
| Vignettes: | stoRy |

**Downloads:**

| | |
|---|---|
| Package source: | stoRy_0.2.2.tar.gz |
| Windows binaries: | r-devel: stoRy_0.2.2.zip, r-release: stoRy_0.2.2.zip, r-oldrel: stoRy_0.2.2.zip |
| macOS binaries: | r-release (arm64): stoRy_0.2.2.tgz, r-oldrel (arm64): stoRy_0.2.2.tgz, r-release (x86_64): stoRy_0.2 r-oldrel (x86_64): stoRy_0.2.2.tgz |
| Old sources: | stoRy archive |

**Linking:**

Please use the canonical form https://CRAN.R-project.org/package=stoRy to link to this page.

stoRy-package {stoRy} R Documentation

## stoRy: Download, Explore, and Analyze Literary Theme Ontology Data

### Description

Download, explore, and analyze Literary Theme Ontology themes and thematically annotated story data. To learn more about the project visit https://github.com/theme-ontology/theming and https://www.themeontology.org.

### Details

lifecycle stable

The **stoRy** package provides utilities for working with LTO data. The LTO is a hierarchically organized collection of carefully defined "themes" that can be expected to arise in multiple "stories" (i.e. works of fiction). Included in the package are functions to download and cache LTO data, explore LTO themes and thematically annotated stories, and analyze the thematically annotated story data in interesting ways.

General resources:

- stoRy package GitHub repository: https://github.com/theme-ontology/stoRy
- LTO project website: https://www.themeontology.org
- LTO project GitHub repositories: https://github.com/theme-ontology
- LTO conference paper in *Proceedings of the Joint Ontology Workshops 2019 Episode V: The Styrian Autumn of Ontology*

### Author(s)

**Maintainer**: Paul Sheridan paul.sheridan.stats@gmail.com (ORCID)

Authors:

- Oshan Modi
- Mikael Onsjö

### See Also

Useful links:

- https://github.com/theme-ontology/stoRy
- https://github.com/theme-ontology/theming
- https://www.themeontology.org/
- Report bugs at https://github.com/theme-ontology/stoRy/issues

[Package *stoRy* version 0.2.2 Index]

Part I: The Vision

Part II: LTO in a Nutshell

Part III: LTO Today

Part IV: LTO Tomorrow

# Foundations

We need a theory of literary themes that is suited to the age of machine learning in which we find ourselves.

A *literary theme* (or "theme" for short) in the LTO is any topic of interest that is featured in a story (For a more scholarly discussion see [1]). Themes may sometimes be adequately understood on a suitable level of generalization by a single word or short phrase, as is illustrated by such garden-variety themes as courage, crime and coming of age. These examples happen to be value-neutral abstractions. Themes may just as well take the form of morally charged messages, such as ignorance is bliss and be wary of strangers. Themes may also represent more complex ideas to which the short name is a best-effort guide, but for which we must read a longer definition in order to fully understand.

# Foundations

## What is the scope for themes?

While there are no strict rules for what makes a good theme, we do have a few rules of thumb:

- Good themes are topics that are featured significantly in various different stories.
- Don't waste time including uninteresting minor themes but feel free to include what interests you.
- Prefer to use themes that are already defined.
- Don't introduce themes that are specific to a particular fictional universe; generalize them instead.
- Look for themes that are obvious and seem uncontroversial.
- Look for themes that expose our human nature through the stories we tell.

Such themes as **the desire for vengeance**, **the horrors of war**, **faith vs. reason**, and **what if I underwent a physical metamorphosis** are examples of good themes that pop up in many different stories.

# Foundations

Applicability: Does vengeance apply to the bear in Robinson Crusoe?

"*… if you are really afraid, your best way is to look another Way, and keep going on; for sometimes if you stop, and stand still, and look steadily at him, he takes it for an Affront; but if you Throw or toss any thing at him, and it hits him, though it were but a bit of a Stick, as big as your Finger, he (the bear) takes it for an Affront, and sets all his other Business aside to pursue his Revenge; for he will have Satisfaction in Point of Honour; that is his first Quality: The next is, That if he be once affronted, he will never leave you, Night or Day, till he has his Revenge; but follows at a good round rate, till he overtakes you.*"

Source: Robinson Crusoe, Norton Critical Editions (1993), p211

# Practicalities

- Thematic annotation best practices
- Strategies for theme alignment to text
    - Annotate text with summaries, and tag summaries with themes.
        - Anchor abstract themes to concrete “minable motifs” (e.g., anchor the theme “materialism” to instances of “shopping sprees”)
- Build up a true online community
- Augment on existing corpora (e.g., *BookNLP*, *Schoomp*, *BookCorpus2*, *Movie Scripts datasets*, etc.)

# Applications

- Create thematically annotated corpora of narrative texts.
- Train machine learning models to automatically detect themes in narrative text; integrate diverse knowledgebases, including GOLEM graphs and ontologies, WikiPlots, etc.
- Open-source everything and get it out there.

# Thank You

# Extras

# LTO Origins

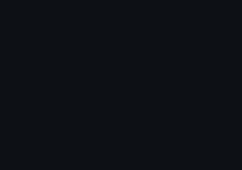
Keith Johnson

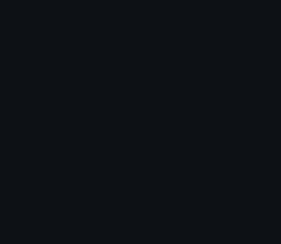
BSc/MSc

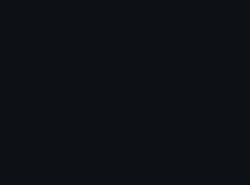
DALHOUSIE UNIVERSITY

Edward Susko

$$e^{i\pi} + 1 = 0$$







PhD

東京工業大学 Tokyo Institute of Technology

Hidetoshi Shimodaira

Postdoc

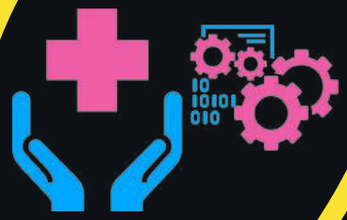
東京大学 THE UNIVERSITY OF TOKYO

Lab. of DNA Info. Analysis
PI: Satoru Miyano

Department of Active Life Promotion
PI: Shigeyuki Nakaji

弘前大学 HIROSAKI UNIVERSITY

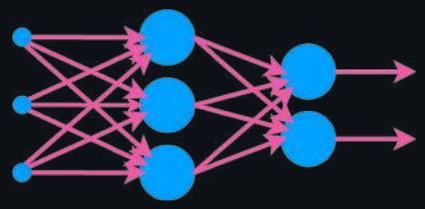
Assistant Prof.



UNIVERSITY of Prince Edward ISLAND

Assistant Prof.

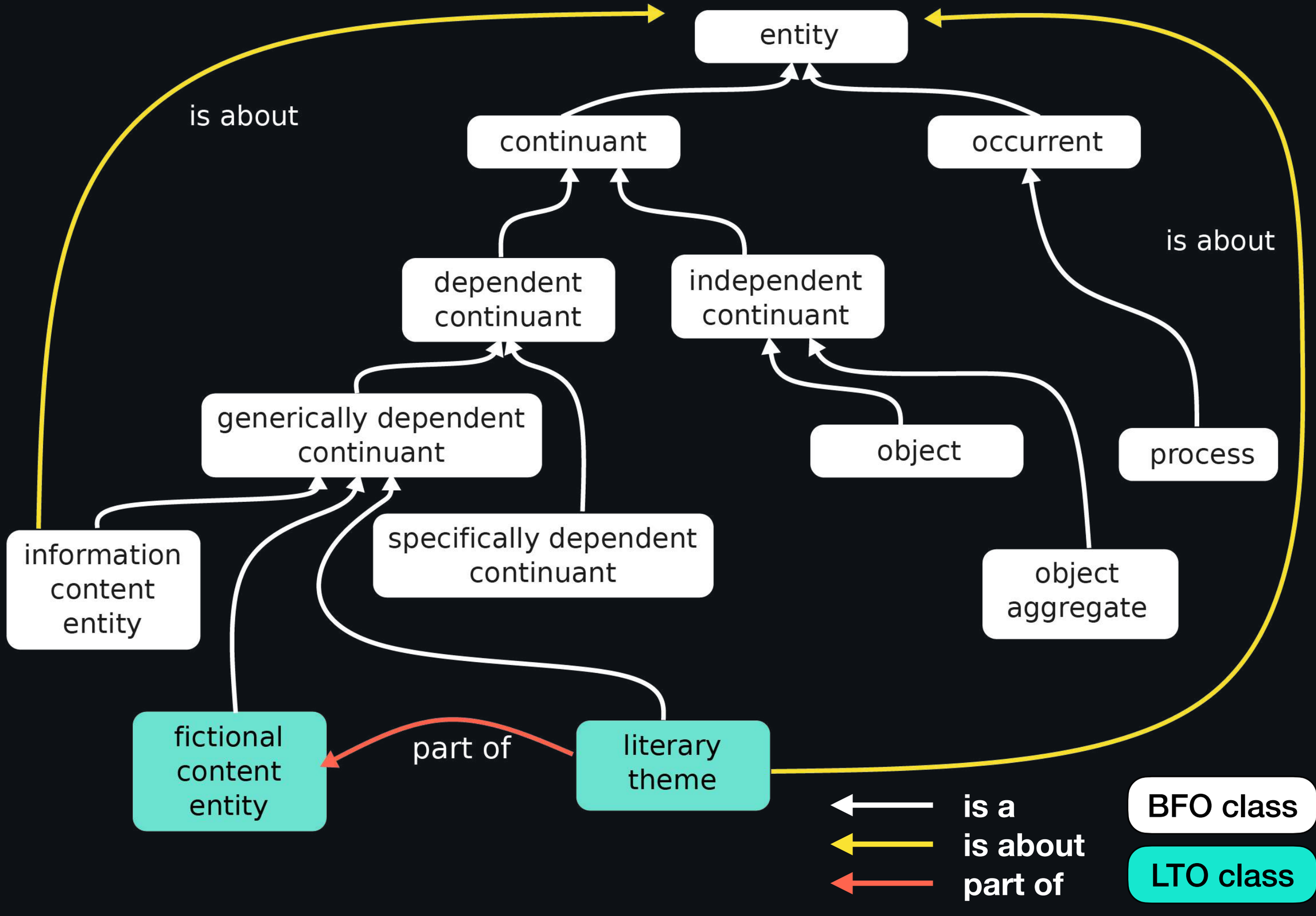
?



GENOMEMINER AI

Cofounder/CSO

# LTO is Basic Formal Ontology-compliant

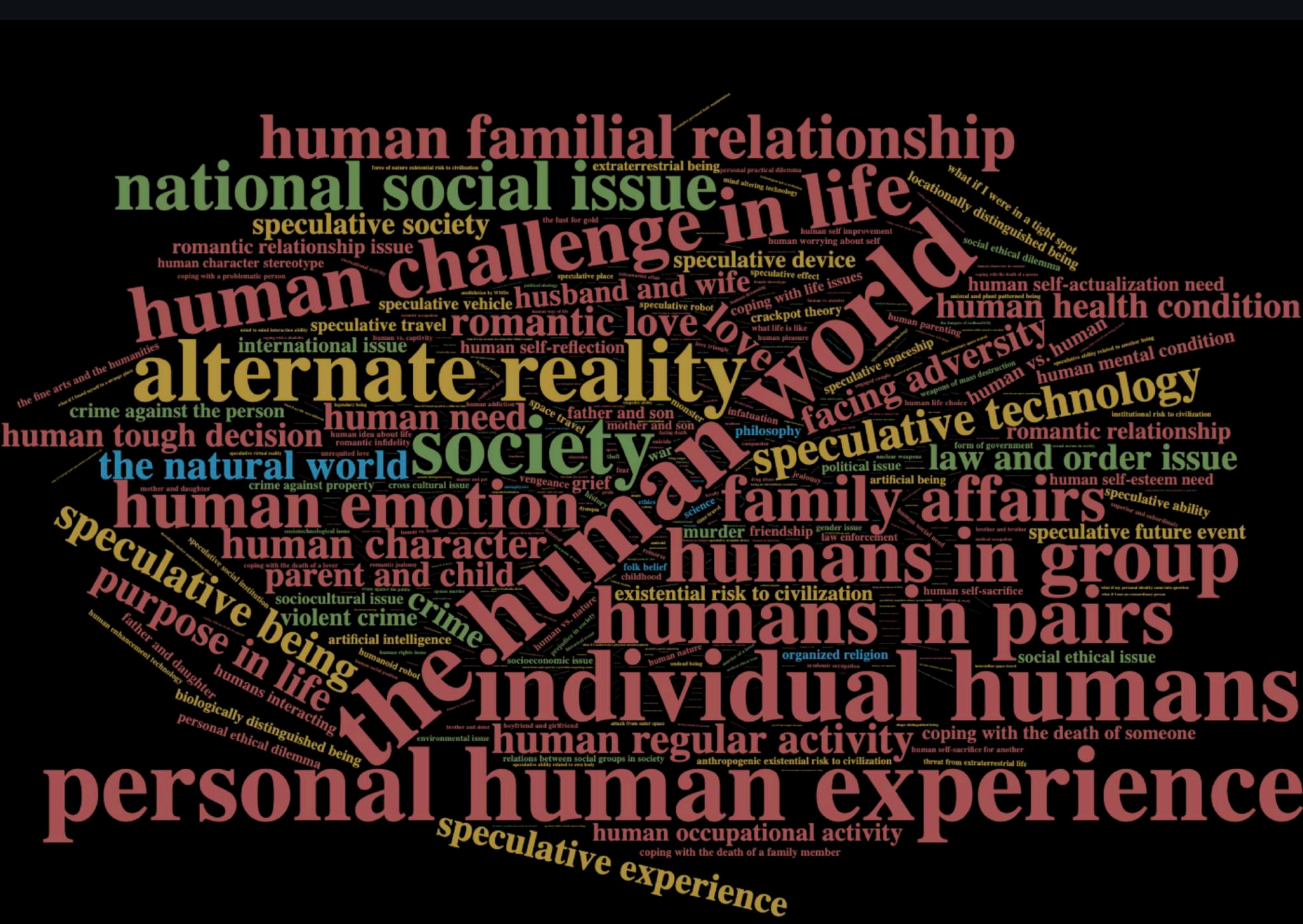


# Top-down Tagging Protocol | Identify an important topic in the story: who or what is at the center of that topic?

- **humanity**
  - **a single individual**
    - their emotional states → anger, boredom, fear, grief, hope love, shame, etc.
    - their challenges in life → coping with death, tough decision, coping with aging
    - the purpose in life → the lust for gold, the desire for vengeance, the quest for immortality, the thirst for knowledge, etc.
    - introspection → seeing the error of one's ways, having a preconception challenged, overcoming a limitation, etc.
  - **a pair of individuals** → a familial relationship, a friendship, a romantic relationship, etc.
  - **a small group of individuals** → family life, a workplace issue, a matter of social status, etc.
- **society**
  - an intra-societal issue → a gender issue, a socioeconomic issue, a law and order issue, etc.
  - an inter-societal issue → diplomacy, war, cross cultural issue, etc.
  - a universal societal issue → human rights, social ethical dilemma, social organization, etc.
- **reality**
  - folkloral worldview → hexes and curses, omens, lucky charms, witchcraft, etc.
  - a religious worldview → heresy, monasticism, sin, the afterlife, etc.
  - a secular worldview → chemicals, electricity, nuclear fusion, etc.
  - a fringe worldview → Atlantis, Bigfoot, alien abduction, ESP, flying saucer theory of UFOs, etc.
- **...and beyond**
  - a fantastical experience → what if I found myself on a desert island, second childhood, physical metamorphosis
  - a speculative technology → AI, human enhancements, speculative devices, simulated reality, etc.
  - a speculative society → utopia, dystopia, multi-species society, existential risk to civilization, etc.
  - a speculative being → extraterrestrials, angels, monsters, cyborgs, giants, etc.

Where to look for best practices?

**Bottup-up Approach: Look up specific themes at https://www.themeontology.org/themes**


human familial relationship
national social issue
human challenge in life
human world
alternate reality
society
human emotion
family affairs
the natural world
human character
the human condition
humans in group
humans in pairs
individual humans
personal human experience
speculative experience
speculative society
romantic relationship issue
human character stereotype
speculative device
husband and wife
speculative vehicle
romantic love
speculative travel
international issue
human self-reflection
crime against the person
human need
human tough decision
father and son
mother and son
human idea about life
romantic infidelity
crime against property
cross cultural issue
vengeance
grief
war
philosophy
facing adversity
speculative technology
romantic relationship
law and order issue
political issue
artificial being
human self-esteem need
speculative ability
murder
friendship
gender issue
law enforcement
speculative future event
parent and child
folk belief
childhood
existential risk to civilization
human self-sacrifice
sociocultural issue
violent crime
crime
artificial intelligence
speculative being
purpose in life
father and daughter
humans interacting
biologically distinguished being
personal ethical dilemma
socioeconomic issue
human nature
organized religion
social ethical issue
boyfriend and girlfriend
environmental issue
human regular activity
coping with the death of someone
human self-sacrifice for another
relations between social groups in society
anthropogenic existential risk to civilization
threat from extraterrestrial life
human occupational activity
coping with the death of a family member
human self improvement
human worrying about self
what if I were in a tight spot
locationally distinguished being
social ethical dilemma
human self-actualization need
human health condition
coping with life issues
crackpot theory
what life is like
human pleasure
human parenting
speculative spaceship
human vs. human
human mental condition
human life choice
weapons of mass destruction
institutional risk to civilization
infatuation
monster
space travel
form of government
nuclear weapons
jealousy
science
ethics
time travel
the fine arts and the humanities
coping with a problematic person
speculative place
speculative effect
speculative robot
human vs. captivity
human addiction
unrequited love
mother and daughter
coping with the death of a lover
romantic jealousy
human vs. nature
prejudice in society
humanoid robot
human rights issue
brother and sister
attack from outer space
brother and brother
force of nature existential risk to civilization
extraterrestrial being
personal practical dilemma
mind altering technology
the lust for gold
animal and plant patterned being
speculative ability related to another being
engaged couple
suicide
theft
fear
pride
history
dystopia
coping with the death of a spouse
mind to mind interaction ability
coping with a disability
speculative virtual reality
societotechnological issue
human enhancement technology
speculative social institution
human social issue
academic occupation
medical occupation
human existence vs. nonexistence
human vs. machine
human vs. animal
human vs. human
human vs. supernatural
human vs. self
human vs. technology
human vs. environment
human vs. society
human vs. fate
human vs. god
human vs. alien
human vs. monster
human vs. nature
human vs. animal
human vs. machine