ISKO UK Meetup

How the BBC is approaching metadata quality measurement …

Jeremy Tarling, Lead Data Governance Specialist
BBC Design + Engineering

How the BBC is approaching metadata quality measurement

- BBC content tagging 101
- Problems with the current approach
- Building better metadata - the Common Metadata project
- Introducing machine tagging
- Metadata quality measurement

BBC content tagging 101:
Content <- about -> Thing

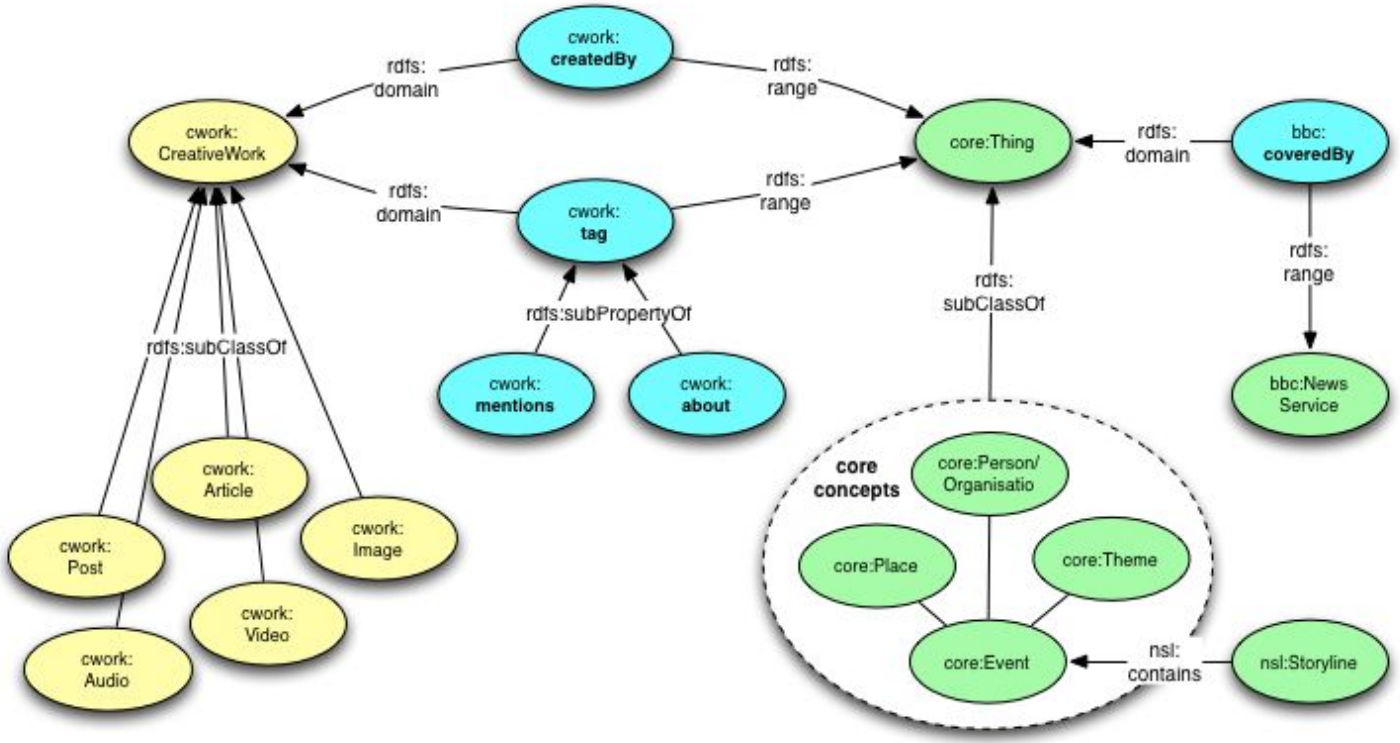
BBC content tagging 101

Journalism

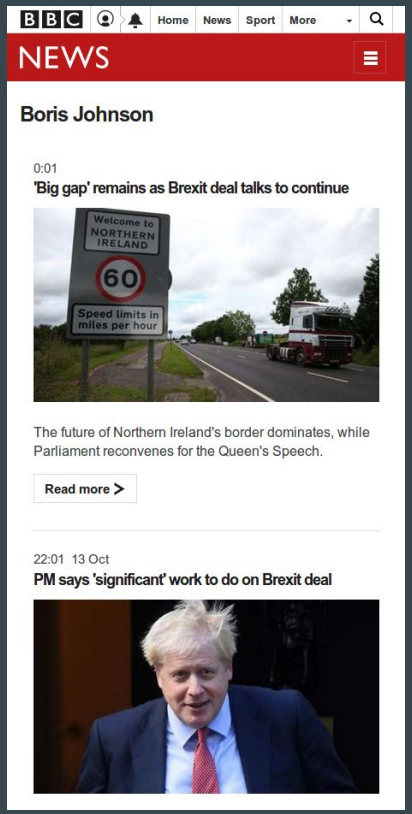
News, Sport

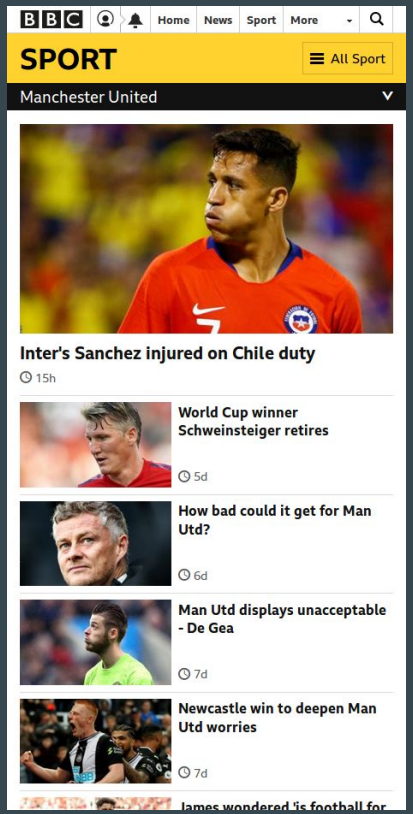
- Human tagging by subject
- > 2,000,000 tagged articles
- > 70,000 ‘Thing’ tags
- > 5,000 topic pages

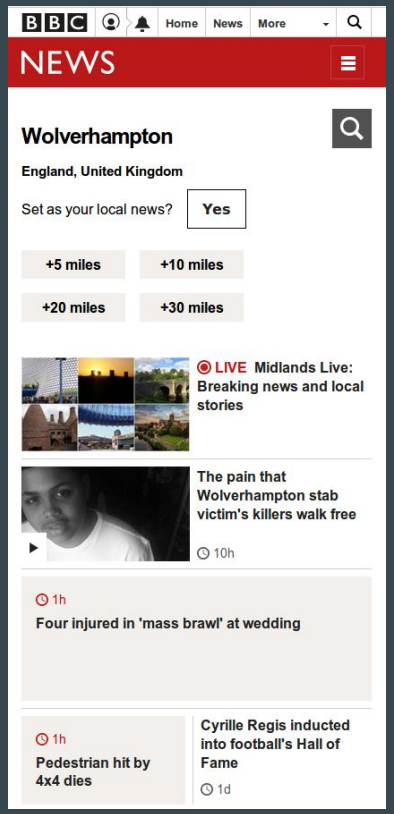
BBC content tagging 101: journalism

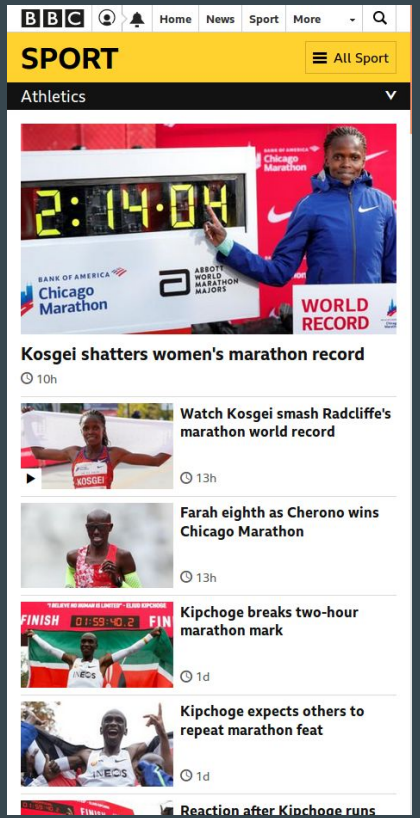


BBC content tagging 101: journalism

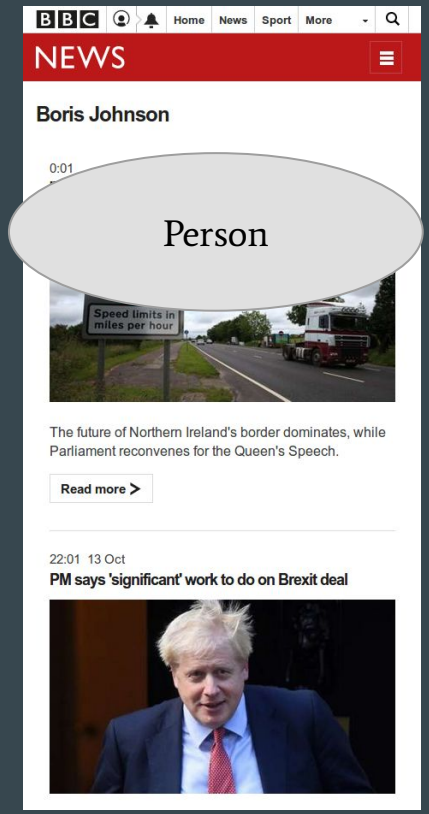


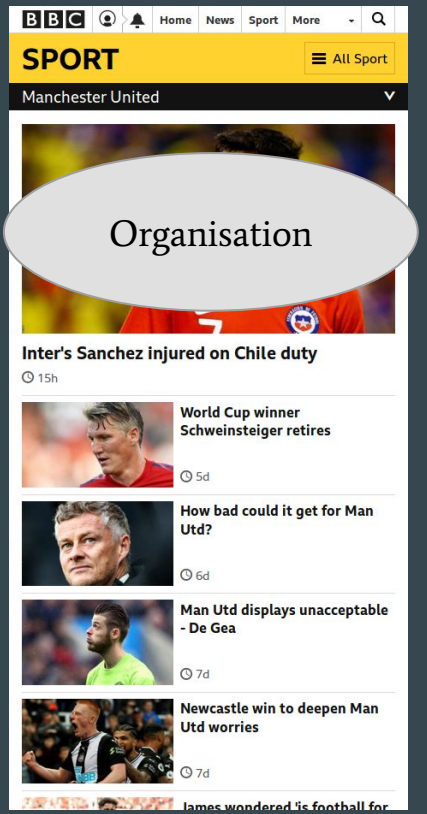


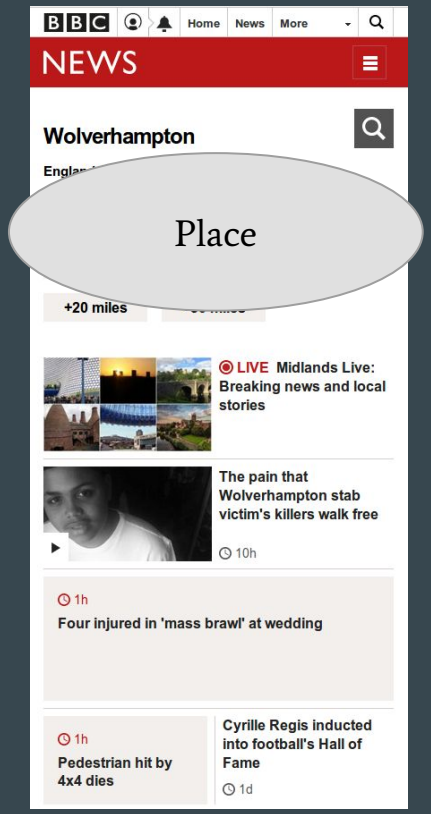


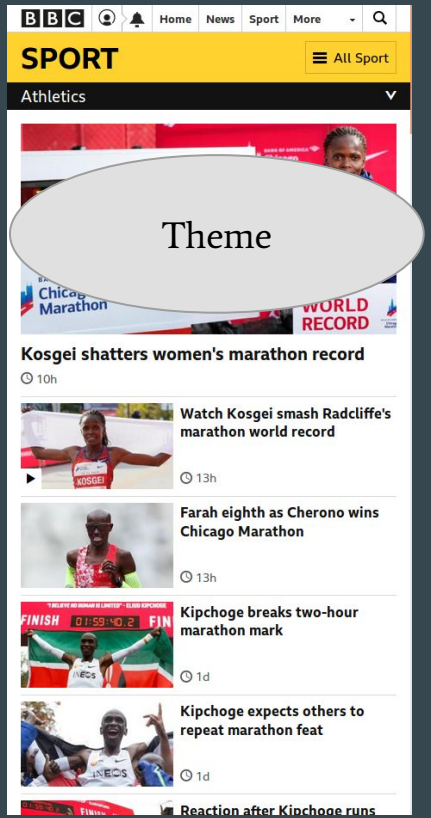


BBC content tagging 101: journalism









BBC content tagging 101

Journalism

News, Sport

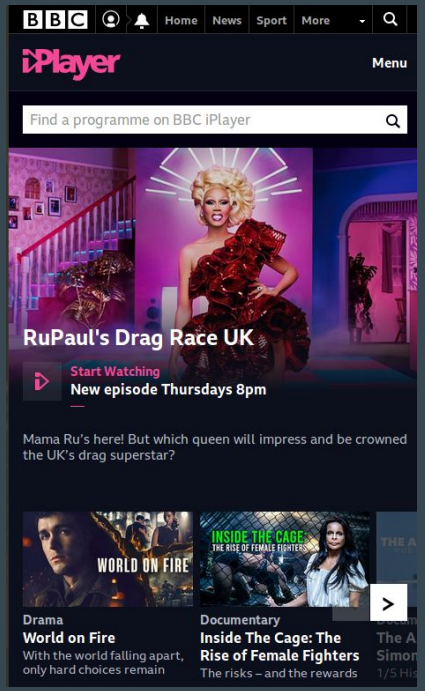
- Human tagging by subject
- > 2,000,000 tagged articles
- > 10,000 topic pages

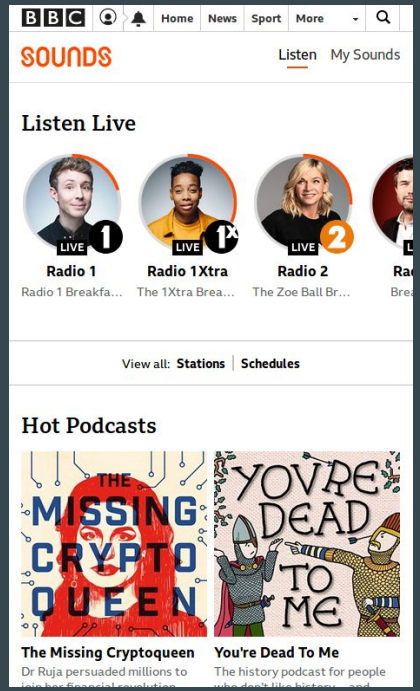
Programmes

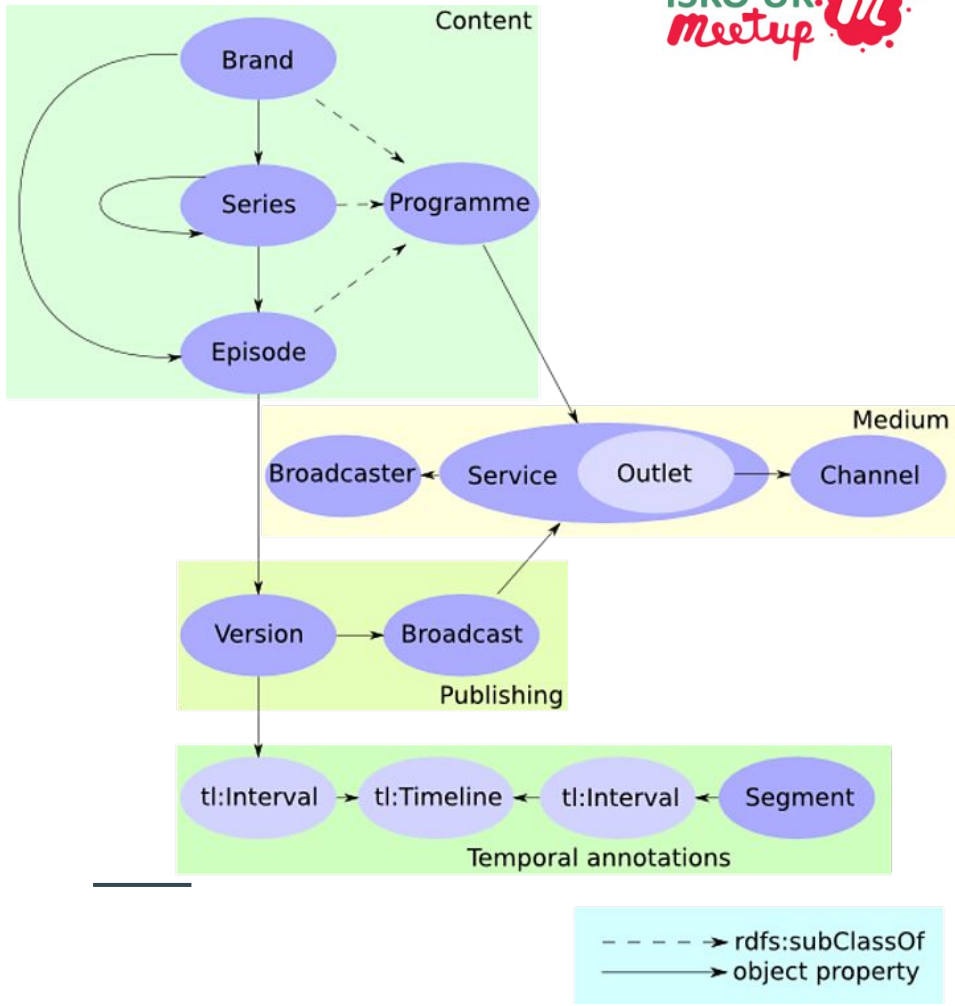
iPlayer, Sounds

- No tagging by subject (except R4)
- Human curation of content by genre and format

BBC content tagging 101: iPlayer and Sounds







BBC content tagging 101

Journalism

News, Sport

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Programmes

iPlayer, Sounds

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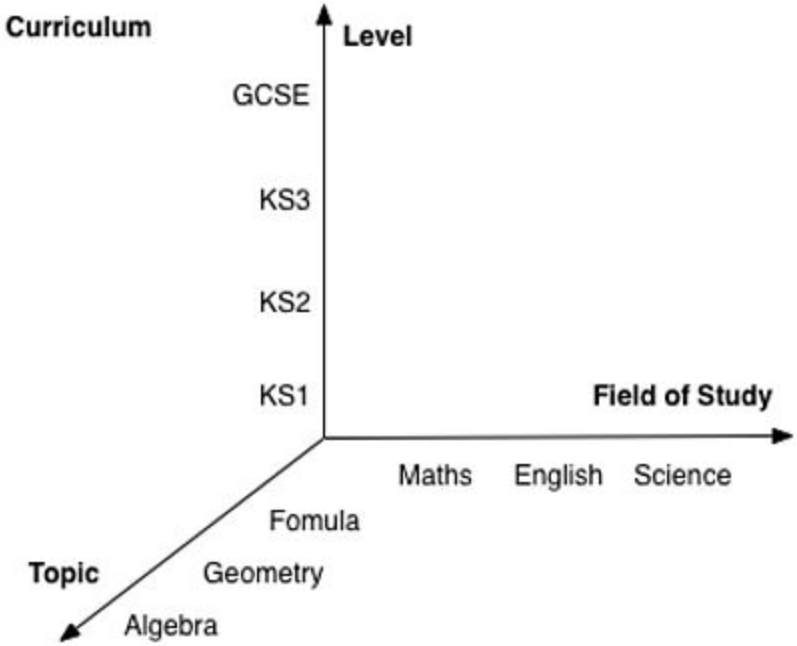
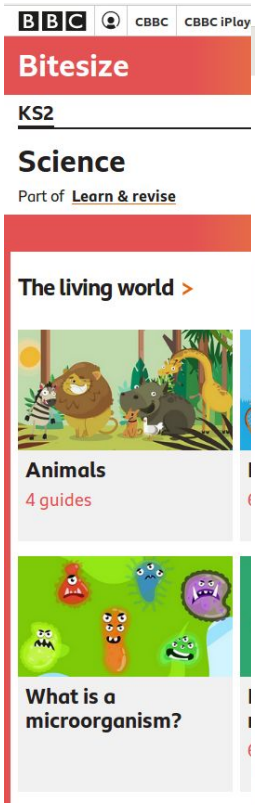
the rest...

Bitesize, Recipes, etc

- Bespoke domain models
- Human tagging and curation

BBC content tagging 101: Bitesize, Recipes, etc...





Problems with the current approach

Process, accuracy, quality and scale

Poor tagging process

embedded in journalism workflows 😀

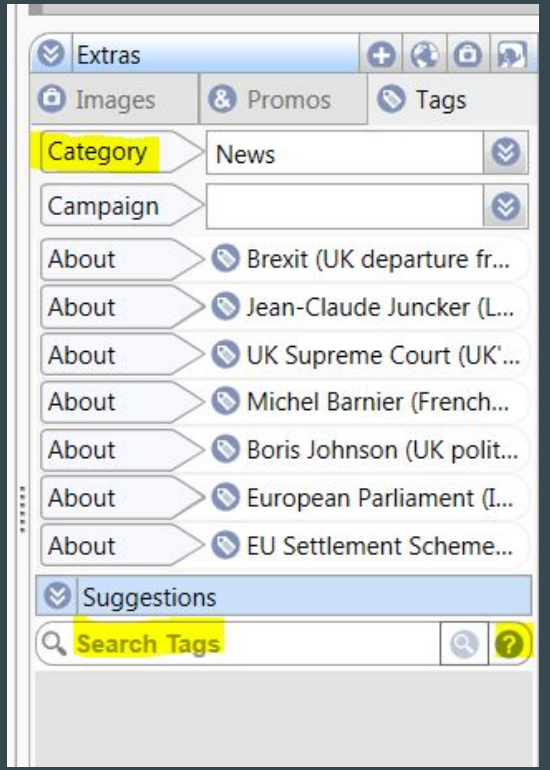
but...

70,000 tags to choose from 😩

no taxonomic hierarchy to filter on 😩

easy to mis-tag, no second pair of eyes 😩

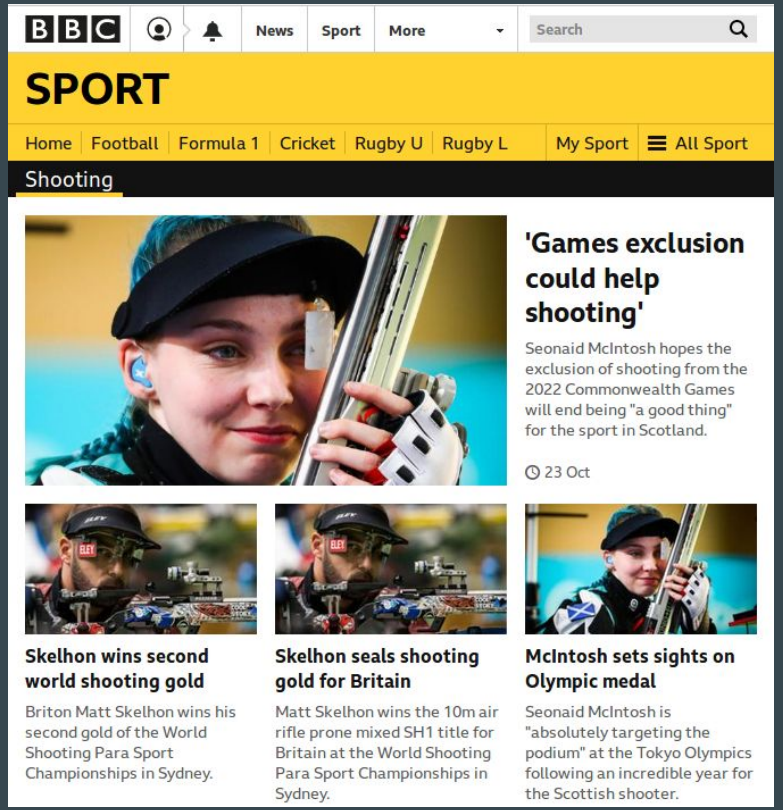
some tags are ambiguous 😩



Poor tagging accuracy

It can be hard for a human to deal with tag ambiguity

For example, Sport have topic pages for all olympic disciplines, including shooting...

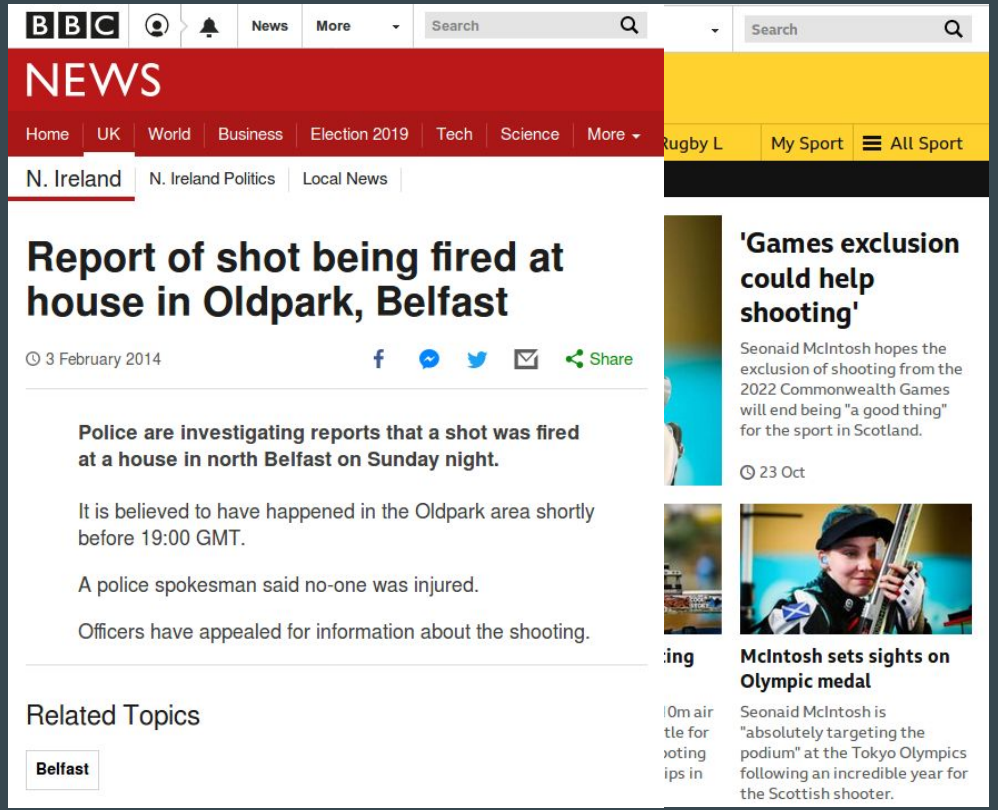


Poor tagging accuracy

It can be hard for a human to deal with tag ambiguity

For example, Sport have topic pages for all olympic disciplines, including shooting...

But shooting can sometimes happen outside of sport...



Poor tagging accuracy

SPORT SHOOTING

Home | Football | Formula 1 | Cricket | Rugby U | Rugby L | Tennis | Golf | Athletics | Winter Olympics More Sport

Shooting

Report of shot being fired at house

Police are investigating reports that a shot was fired at a house in north Belfast on Sunday night.

Sykes waits for Glasgow call-up

Teenage shooter Larissa Sykes says an England call-up for the Commonwealth Games would cap a brilliant 12 months.

Pub landlord targets eighth Games

A pub landlord from the Isle of Man is targeting his eighth successive Commonwealth Games in Glasgow.

Headlines

- Shotgun star Hill eyes Glasgow 2014
- Hill wins Young Sports Personality
- Trio on Young Sports Personality list
- Shooters & triathlete join Scots team
- Bevis wins gold and silver at Euros
- Kerwood wins shotgun gold for GB
- Delays affect 2014 ticket emails
- 2014 ticket draw 'random and fair'
- Fans told about Glasgow 2014 tickets
- Allen puts Olympic pain behind her

Photo Galleries

Olympics Shooting

Complete London 2012 archive

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Business | Election 2019 | Tech | Science | More

Politics | Local News

shot being fired at Oldpark, Belfast

Share

stigating reports that a shot was fired orth Belfast on Sunday night.

ave happened in the Oldpark area shortly T.

nan said no-one was injured.

pealed for information about the shooting.

Search | My Sport | All Sport

'Games exclusion could help shooting'

Seonaid McIntosh hopes the exclusion of shooting from the 2022 Commonwealth Games will end being "a good thing" for the sport in Scotland.

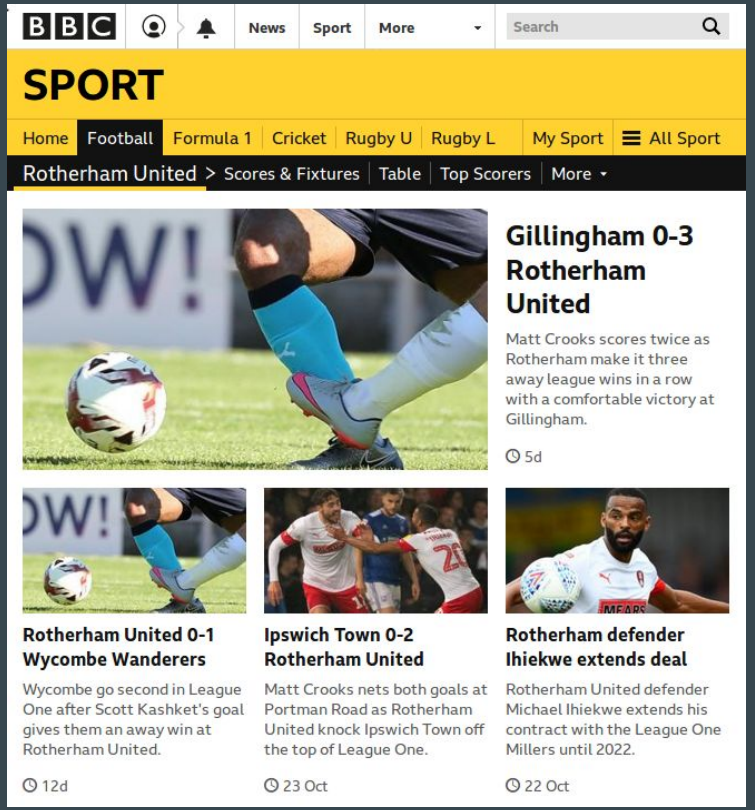
23 Oct

McIntosh sets sights on Olympic medal

Seonaid McIntosh is "absolutely targeting the podium" at the Tokyo Olympics following an incredible year for the Scottish shooter.

Poor tagging accuracy

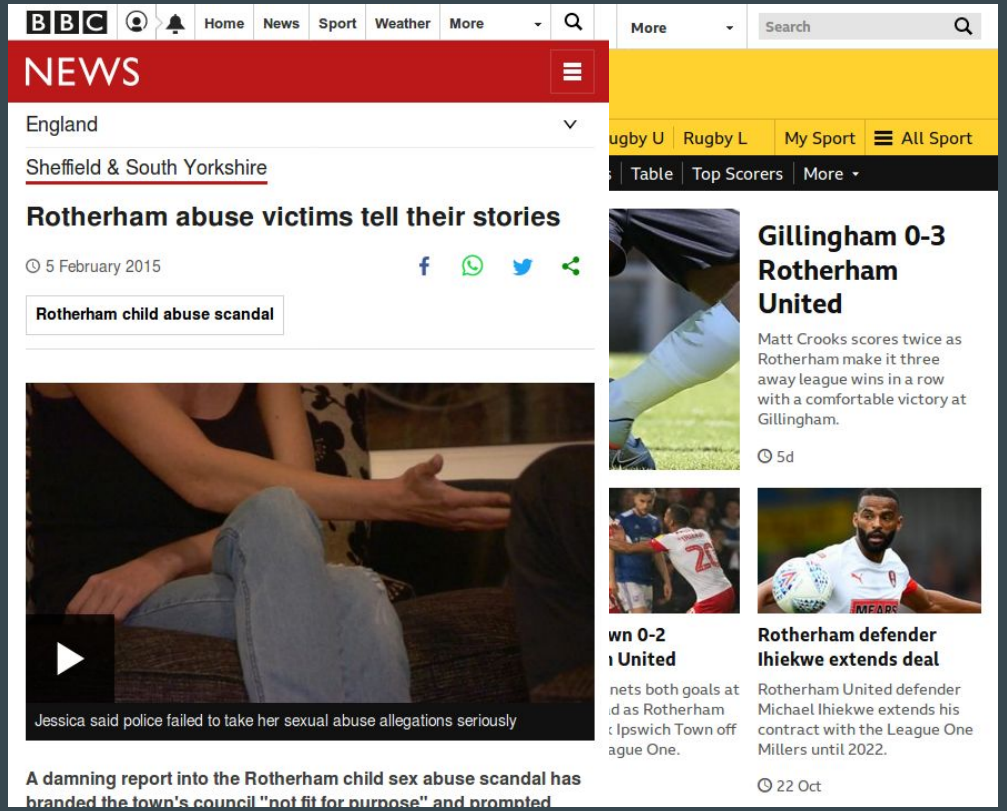
Place names can be particularly problematic, especially when there are sports teams with the same name



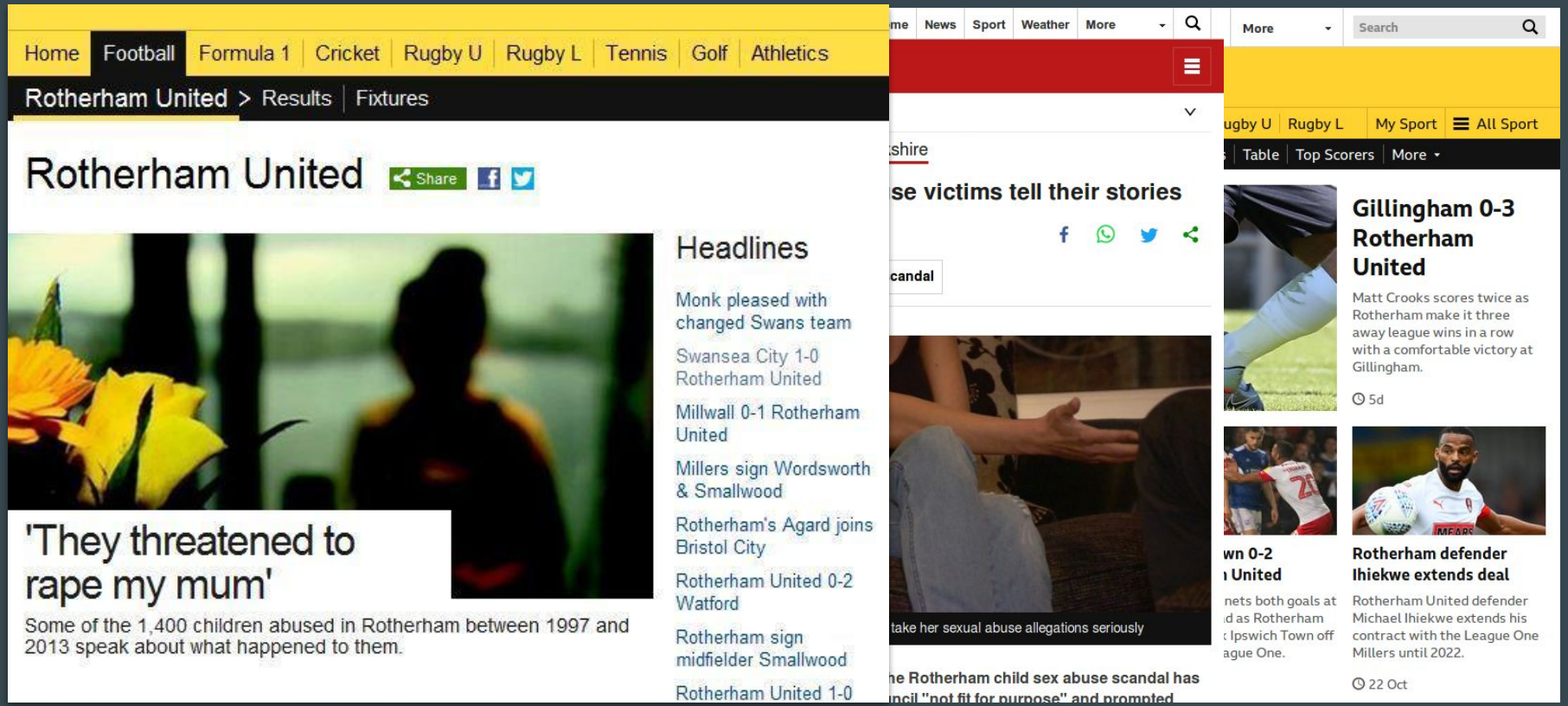
Poor tagging accuracy

Place names can be particularly problematic, especially when there are sports teams with the same name

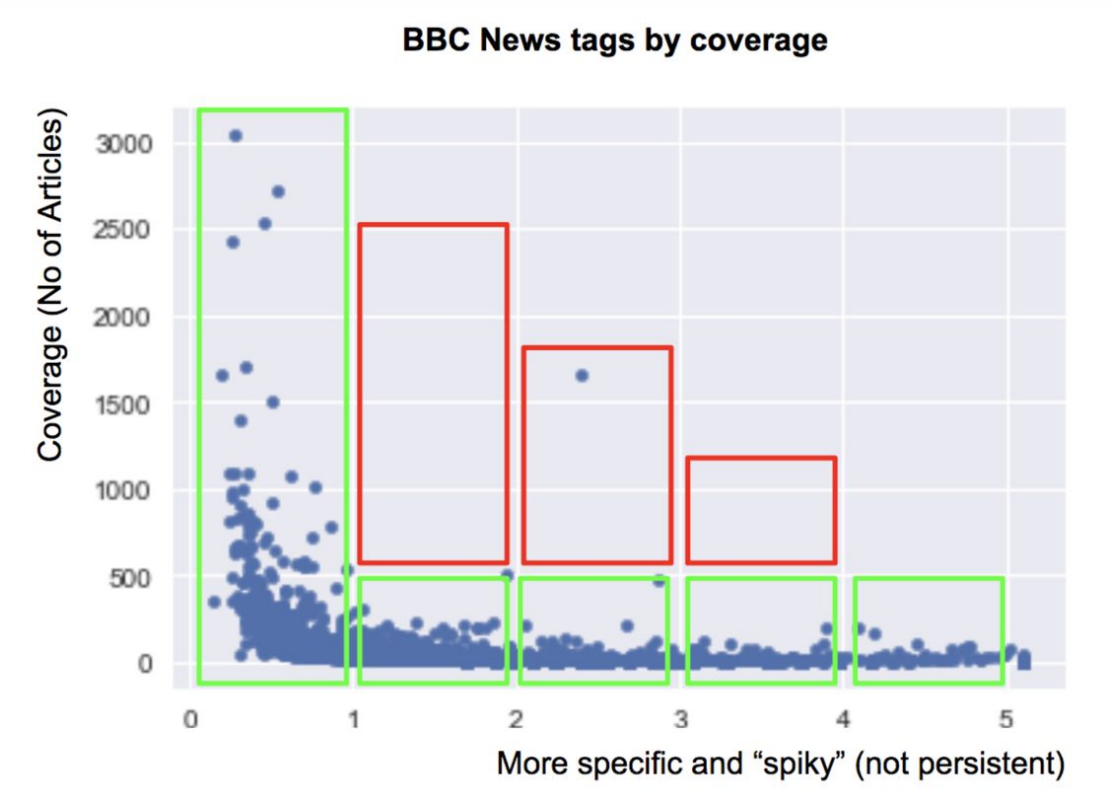
When a big News story is associated with a place it's all too easy to mistake the team for the location



Poor tagging accuracy



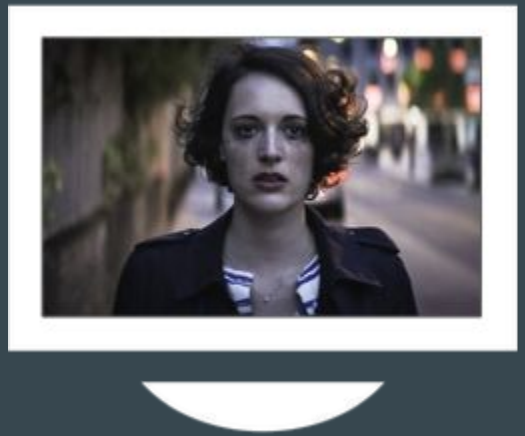
Poor tagging quality



5% of our tags are broad and cover 85% of our content

95% of are tags are specific and cover 15% of our content

Hardly any TV and radio tagging



Genre: 20010 (comedy)

Genre: 20010 (comedy)

according to our TV metadata these programmes are the same...

Building better metadata: the Common Metadata project

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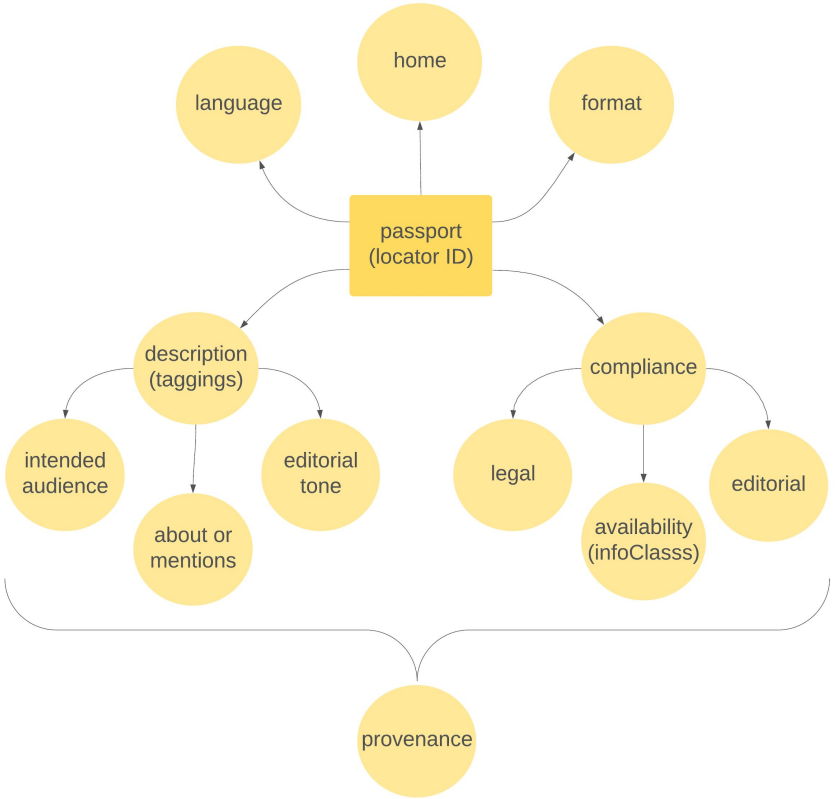
Building better metadata: defining common metadata

generalised schema for any BBC content object

new controlled vocabularies for editorial tone and intended audience

building in automation from the start by modelling *provenance*



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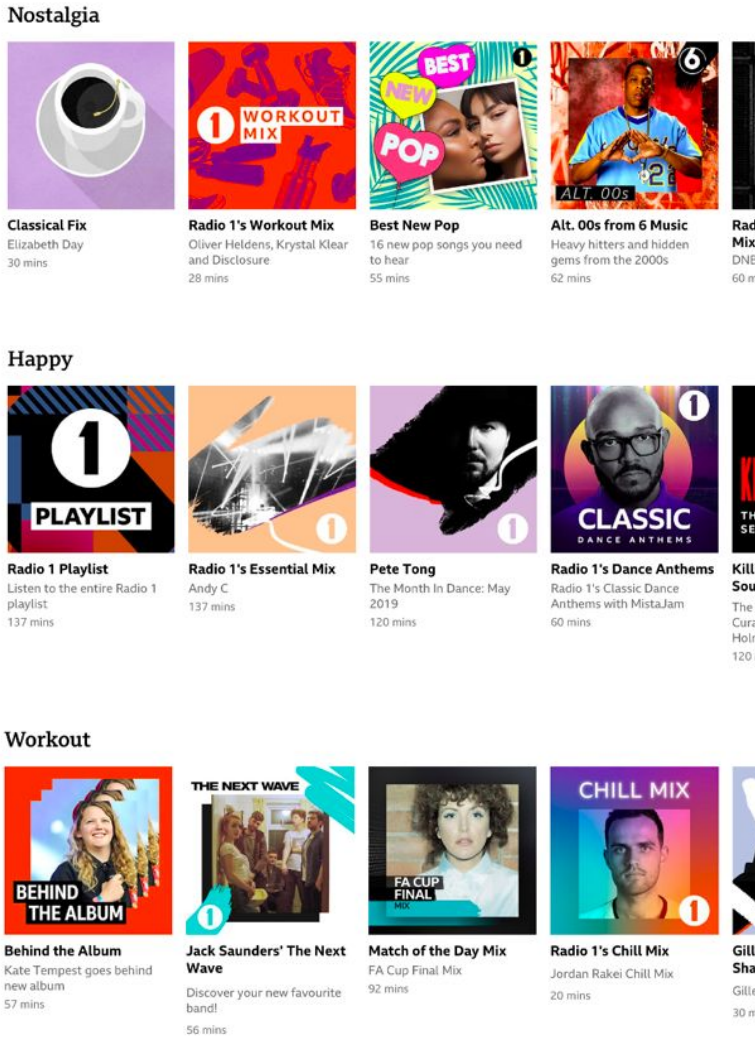
Building better metadata: more than just ‘about’ tagging

There’s a strong appetite in TV and Radio teams for better metadata, especially around editorial tone and audience behaviour

There’s a willingness to experiment with automatic classification by these dimensions, but with human curation on top... for now



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Building better metadata: editorial tone

working with commissioning experts and UX to define metadata to represent the editorial of a piece of content

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preferredLabel	type(s)	disambiguationHint	URI
absurd	core:Thing **core:EditorialTone** tagging:TagConcept	nonsensical, ridiculous, silly	https://www.bbc.co.uk/things/161d7418-f265-4768-a348-b3cd4fcc8302#id
camp		theatrical, exaggerated, ostentatious	https://www.bbc.co.uk/things/05ff0284-975e-49dc-b780-8dc9d695c816#id
cerebral		intellectual, clever	https://www.bbc.co.uk/things/469989a7-ad22-48cb-b1f9-a4e1421b9952#id
challenging		provocative, questioning, difficult	https://www.bbc.co.uk/things/90f03e7e-0f3b-4086-943e-7fcded85aa2a#id
complex		complicated, intricate	https://www.bbc.co.uk/things/c62d5f56-86da-4407-a609-060fa6cd022d#id
complimentary		praising, approving, flattering	https://www.bbc.co.uk/things/8d273e3e-ee5b-40bc-8174-33260839e549#id
critical		disapproving, fault-finding	https://www.bbc.co.uk/things/e8f0e6f3-b751-4148-967d-8568f17d6bb5#id
cynical		mistrusting, disbelieving, suspicious	https://www.bbc.co.uk/things/d0c8fd9a-dea8-4e6e-8381-35877f092812#id
dark		sinister, bleak, morbid, mysterious	https://www.bbc.co.uk/things/119ea00e-55a4-4c97-a687-60ce9062e2d8#id
deadpan		straight-faced, expressionless, impassive	https://www.bbc.co.uk/things/d47f1078-9498-4e0a-8cd3-d36de557f7bb#id

Building better metadata: intended audience

working with UX and M&A experts to define metadata to represent the intended audience of a piece of content

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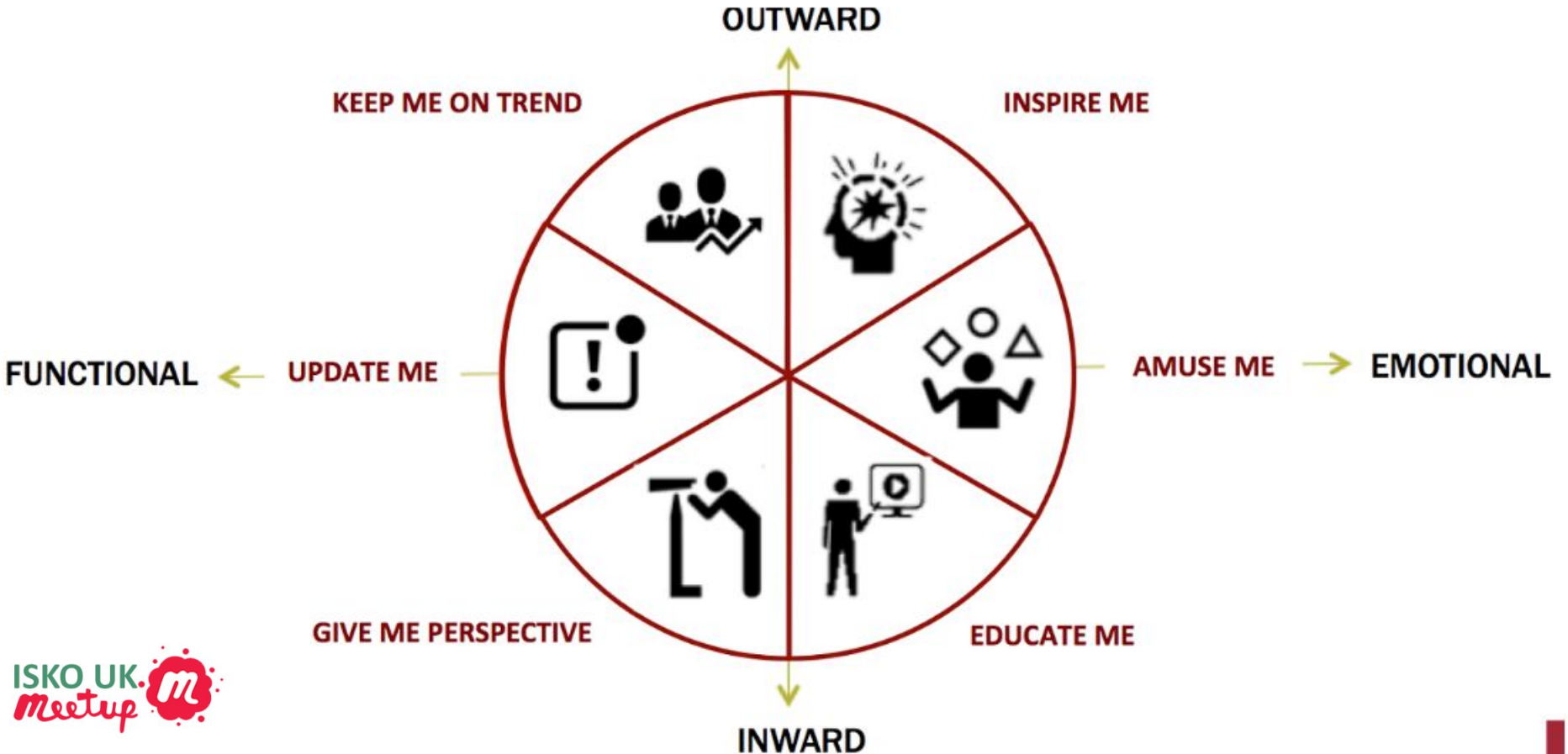
preferredLabel	disambiguationHint	type(s)	URI
Male	Intended audience: gender	core:Thing **core:IntendedAudience** tagging:TagConcept audience:Gender	http://www.bbc.co.uk/things/15eb702e-c630-4612-b6c9-5c59da6c6634#id
Female		core:Thing **core:IntendedAudience** tagging:TagConcept audience:Gender	http://www.bbc.co.uk/things/3aa70400-7571-421c-97e6-01a8e762dfa1#id
Non-binary		core:Thing **core:IntendedAudience** tagging:TagConcept audience:Gender	http://www.bbc.co.uk/things/ed90b445-1f04-486a-9527-20b812aa203e#id
ABC1	Intended audience: situation	core:Thing **core:IntendedAudience** tagging:TagConcept audience:Situation	http://www.bbc.co.uk/things/8c91e0e6-1159-48b0-9dc9-73e5a2deda9e#id
C2DE		core:Thing **core:IntendedAudience** tagging:TagConcept audience:Situation	http://www.bbc.co.uk/things/2fc5c337-b0d7-404c-a852-fde8892c0b39#id
Under-35	Intended audience: age	core:Thing **core:IntendedAudience** tagging:TagConcept audience:Age	http://www.bbc.co.uk/things/376c1218-21c8-496f-a66b-d025dc71dbce#id
Over-35		core:Thing **core:IntendedAudience** tagging:TagConcept audience:Age	http://www.bbc.co.uk/things/e54e8a5a-9fde-41f4-accd-75177ce3c058#id
Inform me	Intended audience: motivation	core:Thing **core:IntendedAudience** tagging:TagConcept audience:Motivation	http://www.bbc.co.uk/things/bf928ac3-b3bd-4d47-924e-cca1bdc29174#id
Educate me		core:Thing	http://www.bbc.co.uk/things/b1a660eb-

Audience behaviours as metadata - “News needs”



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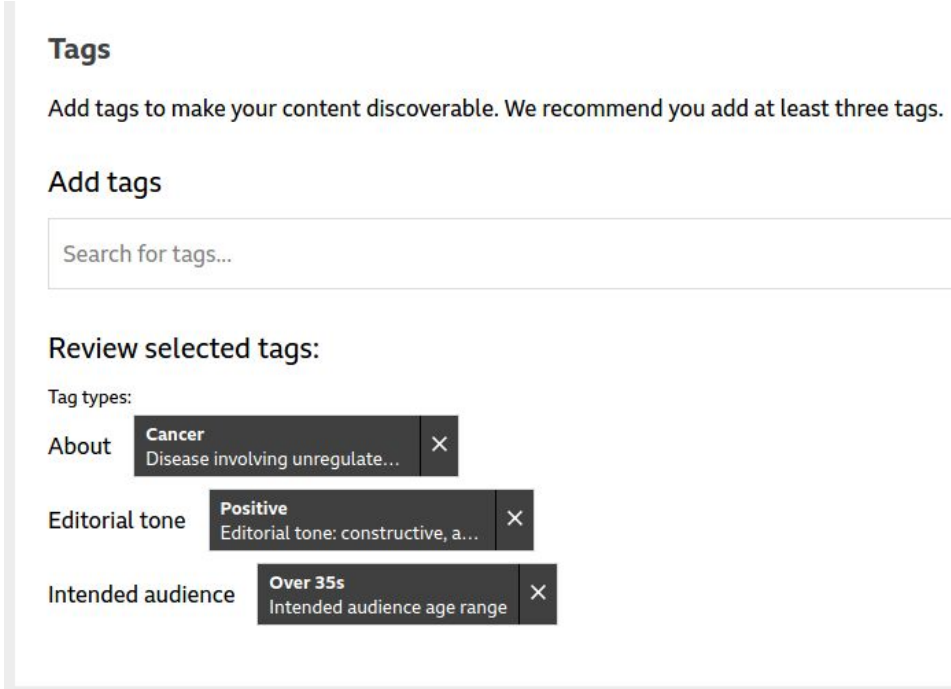
Building better tooling: Passport Control

Passport Control is the user interface to CRUD Passports

Useable as a standable tool or (better) embedded as an activity in an existing content production workflow

https://passport-control.tools.bbc.co.uk/



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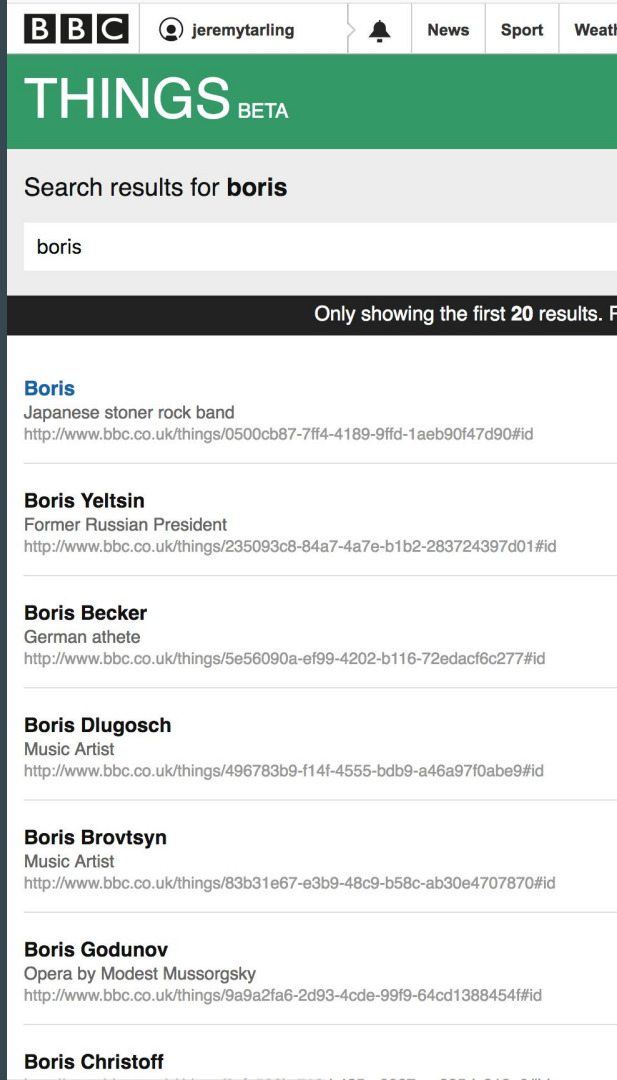
Improving metadata governance

Over the past decade we've evolved a vocabulary of 70,000 Things that can be used as tags

This makes it much harder for a human to tag a piece of content with (for example) Boris Johnson

Machine tagging can help, but really we need better structure and governance of our tags



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Introducing machine tagging

Starfruit, pace/valence and Vox

First steps in automation: about and mentions

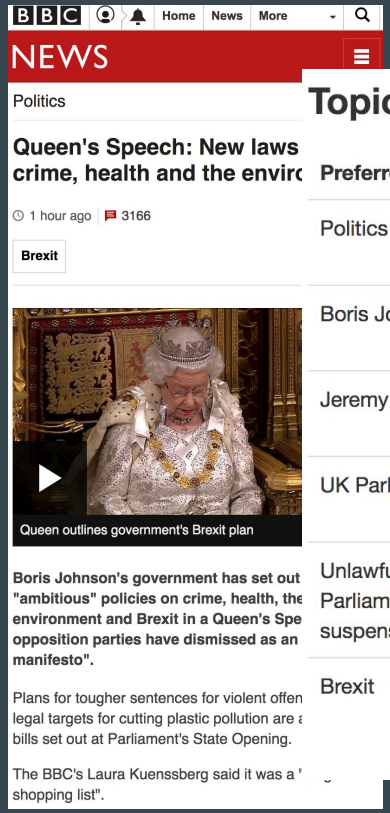
Starfruit **-** developed by BBC R&D

uses a standard machine learning approach to text classification (Multi-label Classification)

trained on a subset of the 70,000 tags that have been used at least 10 times to describe journalism content over the past few years

can be used to suggest tags to a journalist

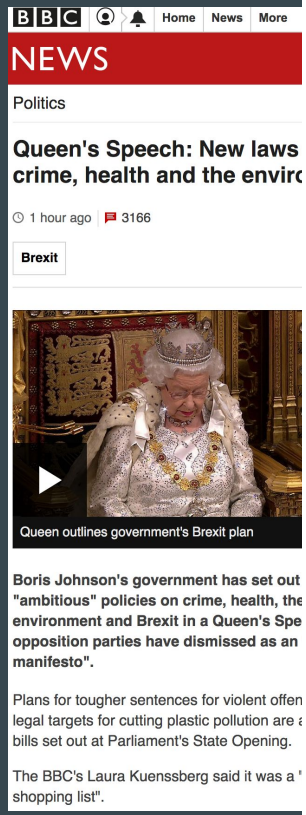
First steps in automation: Starfruit “aboutness”



Topics Results

Preferred Label	URI	Disambiguation Hint	Score	Types
Politics	http://www.bbc.co.uk/things/75612fa6-147c-4a43-97fa-fcf70d9cced3#id	Governance of states	0.8580	tagging:TagConcept, core:Theme, core:Thing
Boris Johnson	http://www.bbc.co.uk/things/0b79dd85-35b5-40cd-b65e-cb152dd89fba#id	UK politician	0.7953	tagging:TagConcept, core:Person, core:Thing
Jeremy Corbyn	http://www.bbc.co.uk/things/71e97cc0-8bec-416b-82f0-a6bbb85d7f1f#id	UK politician	0.6565	tagging:TagConcept, core:Person, core:Thing
UK Parliament	http://www.bbc.co.uk/things/1d41fbc6-c505-4437-8139-7536c7cfc07e#id	Legislative body of the UK	0.5871	tagging:TagConcept, core:Thing, core:Organisation
Unlawful Parliament suspension	http://www.bbc.co.uk/things/9f4b5957-ac41-4e5a-829d-36a173a4b1b9#id	Suspension of Parliament in the run up to Brexit, 2019	0.5501	tagging:TagConcept, core:Thing, core:Event
Brexit	http://www.bbc.co.uk/things/f94293fd-ff83-400e-8bc0-89ec01930fce#id	UK departure from the EU	0.5337	core:Thing, tagging:TagConcept, core:Event

First steps in automation: Starfruit “mentions”



Parliament	http://www.bbc.co.uk/things/02af43eb-7f41-4f06-9086-f52e6e46beb6#id	Music Group	Parliament	0.3000 2	tagging:TagConcept, core:Thing
Country	http://www.bbc.co.uk/things/3a609713-8001-426f-a60b-a8cc4ee95e77#id	Distinct region	country	0.3000 1	tagging:TagConcept, core:Theme, core:Thing
Butter	http://www.bbc.co.uk/things/a44b7ad7-1211-492d-a014-a0d5a57f0c16#id	Dairy product	butter	0.3000 1	core:Theme, tagging:TagConcept, core:Thing
Bread	http://www.bbc.co.uk/things/04d84519-0db8-4b7c-805b-b1451a09398b#id	Staple food	bread	0.2923 1	core:Thing, tagging:TagConcept, core:Theme
Shopping	http://www.bbc.co.uk/things/11ab5d9e-43db-492d-91a3-458bc84553fe#id	Buying goods	shopping	0.2890 1	core:Thing, core:Theme, tagging:TagConcept
Manifesto	http://www.bbc.co.uk/things/00a4152d-a172-4c79-bc51-f3fb1277cc9b#id	Published declaration of intentions	manifesto	0.2794 1	core:Theme, tagging:TagConcept, core:Thing
Healthcare	http://www.bbc.co.uk/things/27a675ec-1a68-4f13-b498-a77ee2bacbdc#id	Provision of medical care	health	0.2785 1	core:Theme, core:Thing, tagging:TagConcept
Exercise	http://www.bbc.co.uk/things/a73c80ca-eaa4-4ae6-9d55-b1600bb19eb4#id	Physical activity	exercise	0.2710 1	core:Thing, tagging:TagConcept, core:Theme
Queen	http://www.bbc.co.uk/things/6d23f160-cbd6-4473-aa11-e3a1faa60cdf#id	UK rock group	Queen	0.2578 2	tagging:TagConcept, core:Thing
Elderly people	http://www.bbc.co.uk/things/3892335e-43d8-489b-b0a1-9e2cf25ff486#id	Senior citizens.,Stage of life	elderly	0.2517 1	core:Thing, tagging:TagConcept, core:Theme

“Our political editor said the PM was keen to focus on "bread and butter issues" like investment in schools and the NHS, or coming up with, at long last, a new way of funding care for the elderly.”

First steps in automation: auto-tagging works for journalism

R&D's Starfruit is building confidence about machine classification in our editorial community

So far we are only using it for suggesting tags, but we are pushing for full auto-tagging

Content creators worry about automation of these editorial tasks, both for accuracy and for their job security

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Last month, Sports Direct complained that its rival JD Sports' planned £90m takeover of Footasylum could reduce Mr Ashley's access to the top brands.

In the past, Adidas and Nike have preferred to work with JD Sports but Sports Direct has attempted to make inroads, appointing former Nike executive David Daly as chairman of the its board.

"Sports Direct has consistently aimed to provide the widest range of products at attractive prices and will continue to work constructively with all its suppliers to enhance its product offering for the benefit of consumers," the company said.

The BBC has asked Nike and Adidas for comment. In response to the Sunday Times story, Nike told the newspaper that it made adjustments to its sales channels from "time to time" to "optimise distribution".

Related Topics

Sports Direct **Retailing** **Mike Ashley** **Companies**

Adidas **Nike, Inc.**

First steps in automation: editorial tone

BBC R&D are developing an automated editorial tone classifier for TV drama segments based on *valence* and *arousal*

"**Valence**, as used in psychology, especially in discussing emotions, means the intrinsic attractiveness/ "good"-ness (positive valence) or averseness/"bad"-ness (negative valence) of an event, object, or situation"

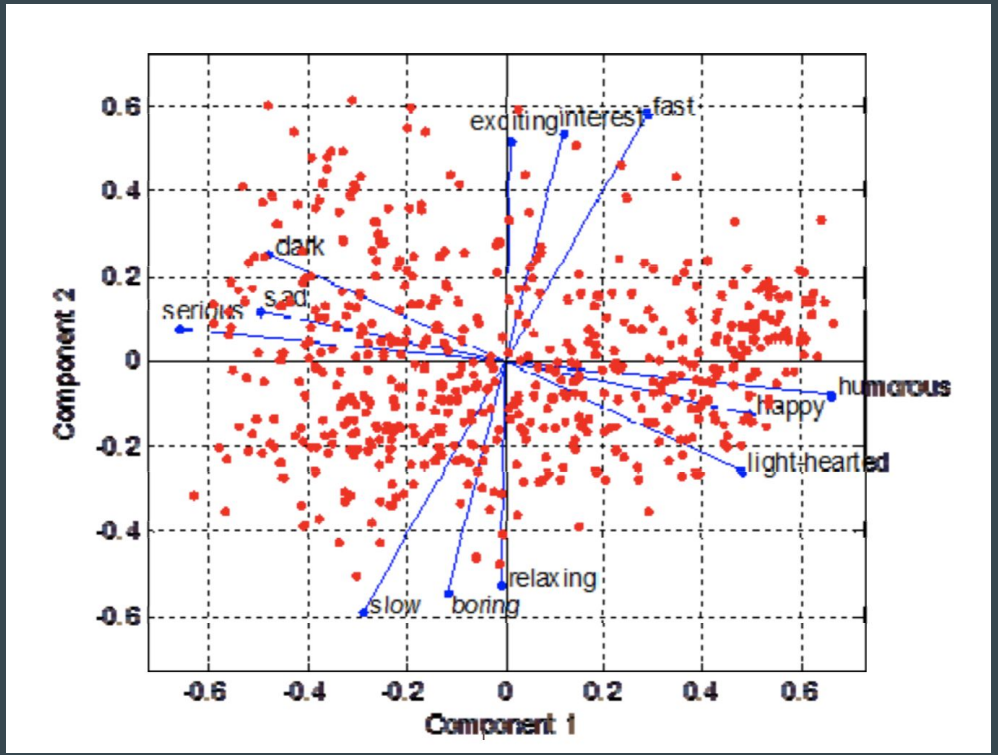
"**Arousal** involves activation of the ascending reticular activating system in the brain, which mediates wakefulness, the autonomic nervous system, and the endocrine system, leading to increased heart rate and blood pressure and a condition of sensory alertness, mobility, and readiness to respond."

First steps in automation: editorial tone

initial model built on human classification of comedy and drama clips

small controlled vocabulary representing the vectors - “slow/fast”, “exciting/boring”, “happy/sad”, etc.

machine classification based on existing model then retained



First steps in automation: editorial tone

Metadata quality measurement

Completeness, Accuracy, Provenance

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Metadata quality measurement

Metadata quality measurement is well documented in library and information science

How might we develop a quality metric for the BBC's descriptive content metadata?

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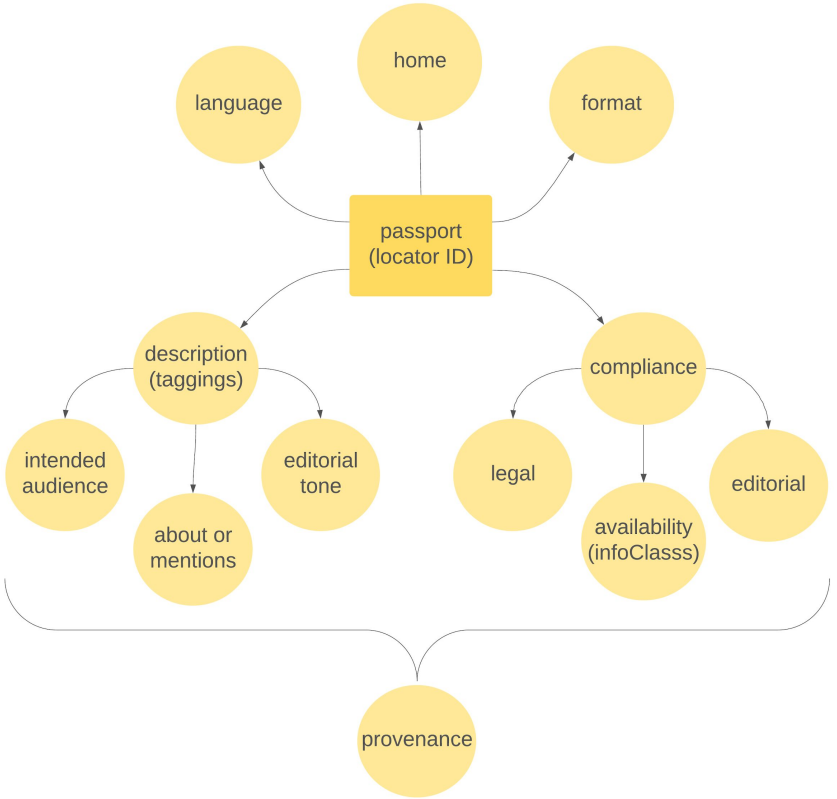
Metadata quality measurement: Completeness

Given an agreed set of metadata properties, is there any metadata present for these fields?

Are all fields equal in importance?

Across all domains/products?



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Metadata quality measurement: Completeness

property	News articles	Sounds music mixes
about	90%	10%
editorial tone	10%	80%
Intended audience	20%	30%

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Metadata quality measurement: Provenance

Initially we are dealing with two provenances, human vs machine

But...

- Human tagging quality will be domain-specific and affected by experience and knowledge

- Machine tagging quality will be model-specific and only as good as the quality and timeliness of the training set

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Metadata quality measurement: Provenance

source	News articles	Sounds music mixes
Journalist	90%	40%
Music producer	50%	90%
Starfruit (model 94)	75%	25%

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Metadata quality measurement: Accuracy

Accuracy is a calculated as a function of provenance and completeness at the individual property level

“User X with provenance score 25% for news articles says https://www.bbc.co.uk/news/uk-england-derbyshire-51611555 is
→ about → TripAdvisor, NatWest bank, Ilkeston”

“User Y with provenance score 75% for news articles says https://www.bbc.co.uk/news/uk-england-derbyshire-51611555 is
→ about → Ilkeston
→ tone → funny”

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Metadata quality measurement: CAP scores

We take **Curation**, **Accuracy** and **Provenance** together to generate a '**CAP score**' for a given set of metadata assertions

```
CAP = (threshold + SUM(relevant assertion confidence scores))/(number of relevant assertions + 1)
```

(relevant assertions = assertions that support the value, e.g. assertions that would add the same About tag A to the metadata set)

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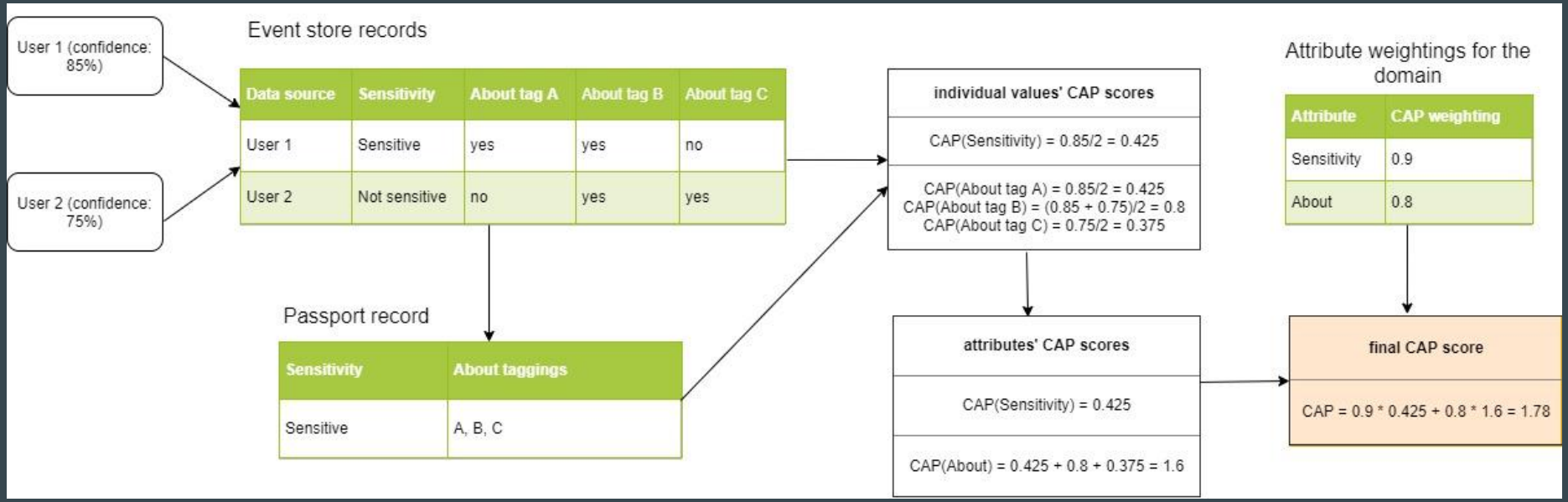
Metadata quality measurement: CAP scores



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Thanks for listening!

Links:

BBC Things (tags): https://www.bbc.co.uk/things/

BBC Ontologies: https://www.bbc.co.uk/ontologies/

Starfruit: http://starfruit.virt.ch.bbc.co.uk/

Vox: http://vox.virt.ch.bbc.co.uk/

@jeremytarling
jeremy.tarling@bbc.co.uk

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