

Tourists in Smart Cities: Data mining for hidden treasures

Jon Oberlander



Structure of this presentation

1. The SICSA Smart Tourism Programme

- Partners
- Challenges
- Project landscape

2. Three projects on a common theme – geo-culture

- Palimpsest
- Botanitours
- Travelling Treasures

Smart Tourism: Partners & Challenges

A. Cultural visitor attractions:

- Edinburgh Festivals Innovation Lab, Historic Scotland, Museums Galleries Scotland

B. Academics:

- Edinburgh, Glasgow, St Andrews, Robert Gordons, Aberdeen

C. Small tech companies:

- ADS, Bitwink, Neatebox, Qraqrbox, ...

1. Personalisation:

- Improve how visitors navigate the city/country and volume of events/sites.

2. Elastic demand and greening:

- Make available more resources ... during times of peak demand.

3. New channels, new content:

- New digital channels ... for sharing performance and cultural content, and new 'born digital' content ...

Smart Tourism: Project Landscape

	Archives	Augmentation
Locate globally	Curios Mobile Botanitours Travelling Treasures Palimpsest *	Historical Echoes Minerva Summit
Locate locally: beacons & displays	Living Histories Content Beyond SmartBeacons Talisman	SMART LADDIE PAST
Don't locate	Shaping Festivals	Navigating Festivals
All SFC funded, except * AHRC funded		

Shaping the Festivals / Navigating the Festivals

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9 AUGUST - 1 SEPTEMBER

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Members' area

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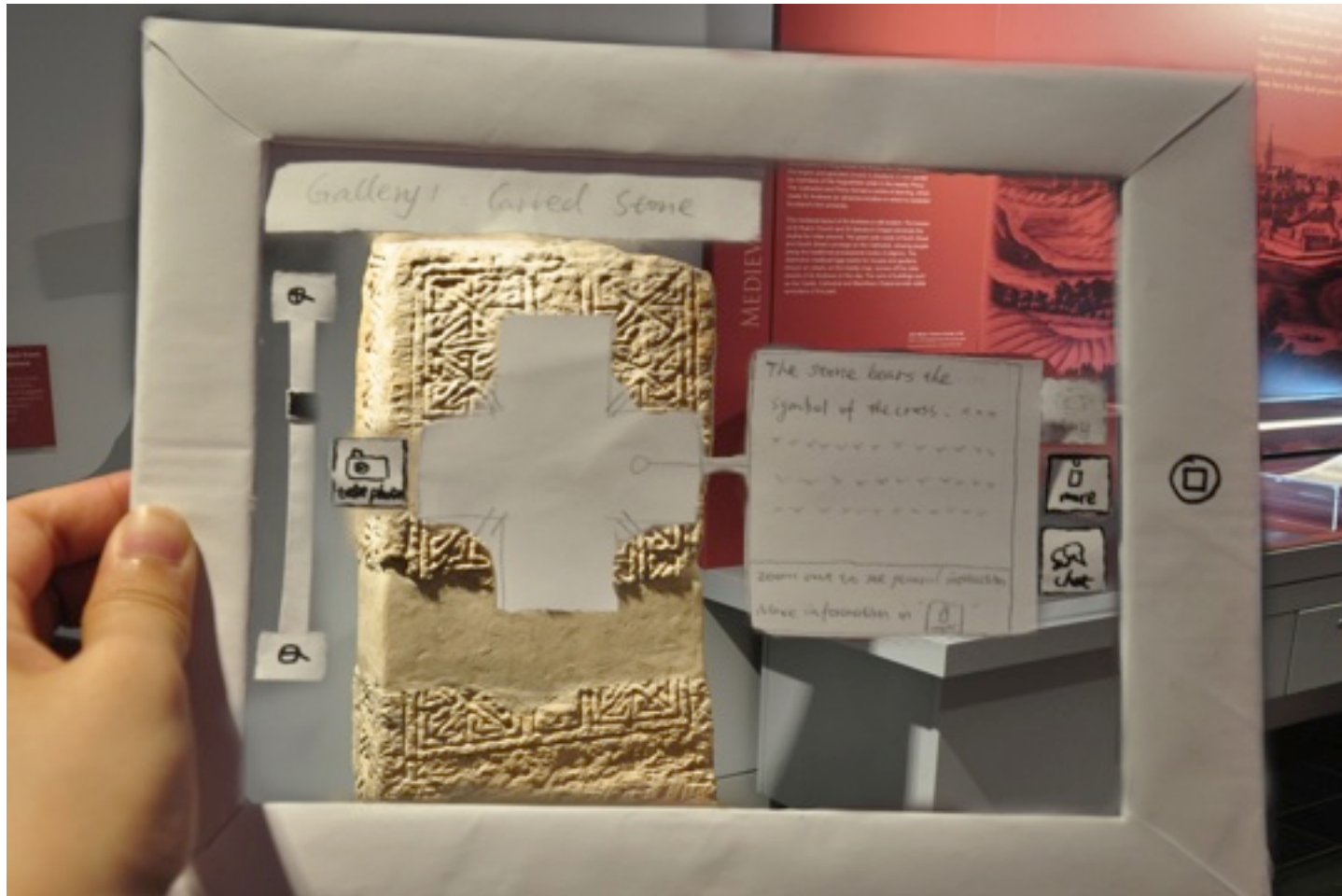
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Go to "http://www.eif.co.uk/"

SMART

St Andrews University, MUSA, Interface3



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LADDIE

St Andrews University, Historic Scotland and ADS Ltd

- High Quality
 - Heavy use LCD for outdoor
 - Design Customizing
 - LCD Screen size
46", 70" (coming)
- Option**
- Frame color
 - Touch screen
 - Web camera
 - Telephone (VoIP)
 - Customer Logo
 - Other requirements



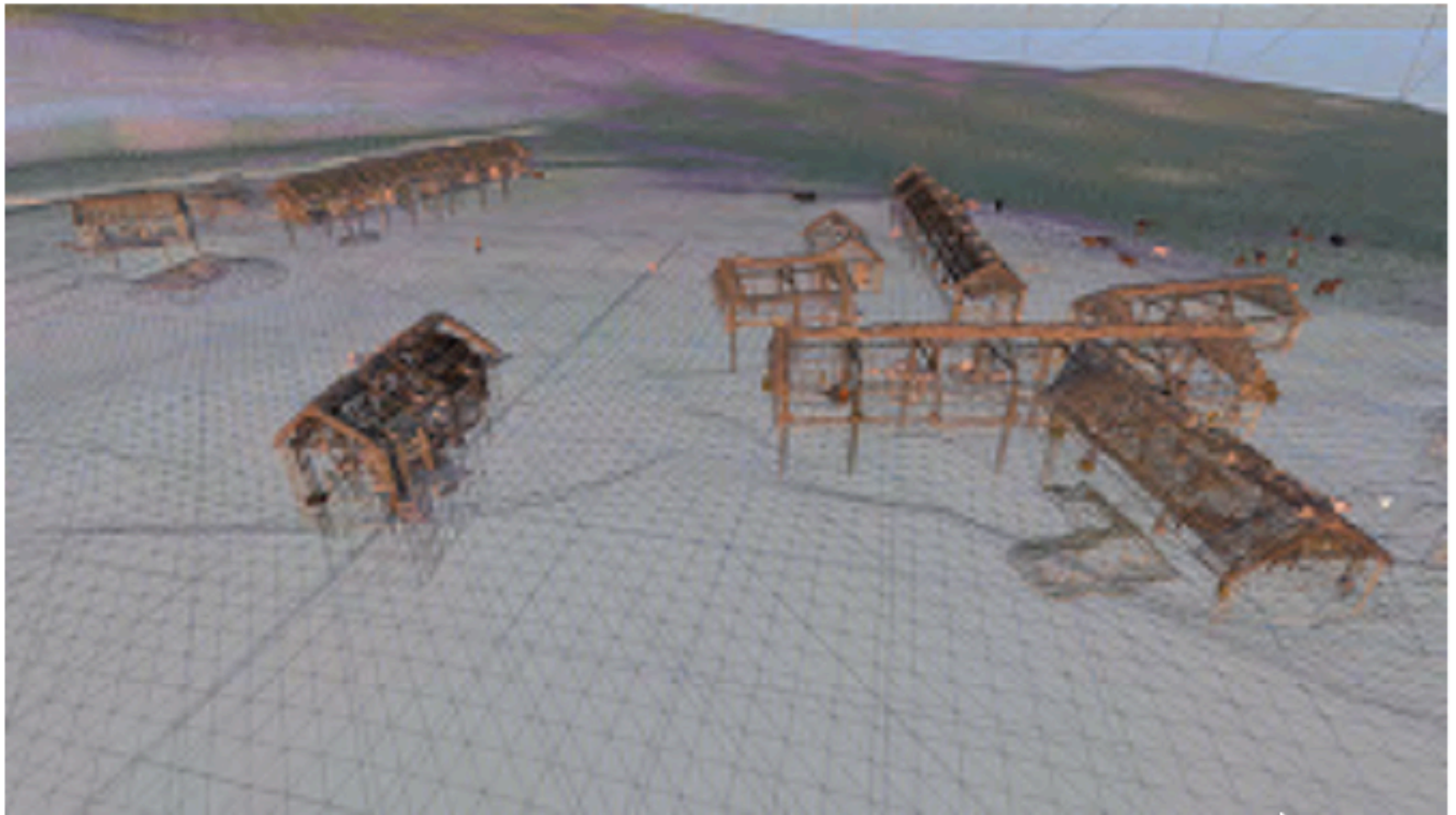
Water-proof , Dust-proof , Heat-proof, Cold-proof



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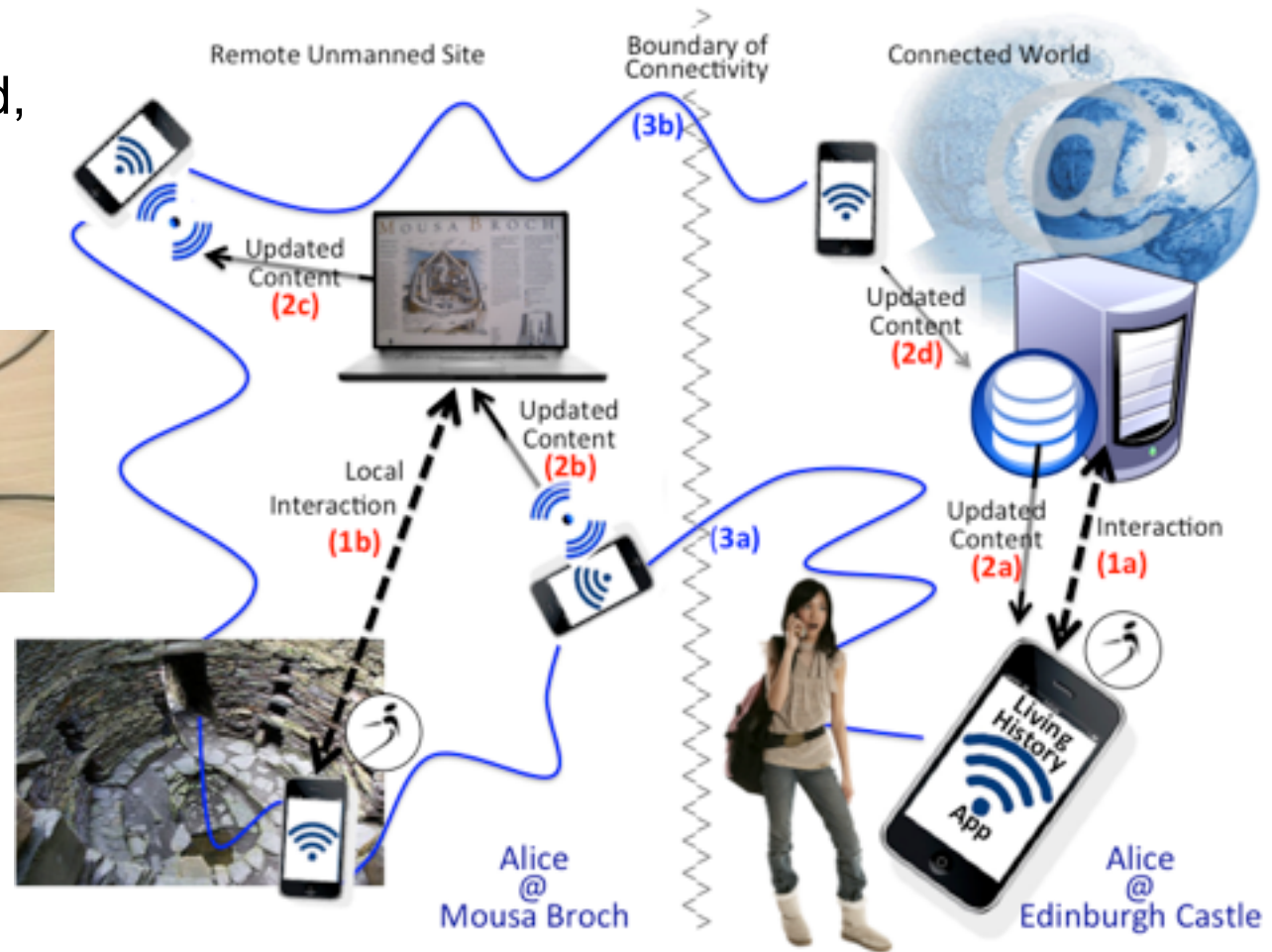
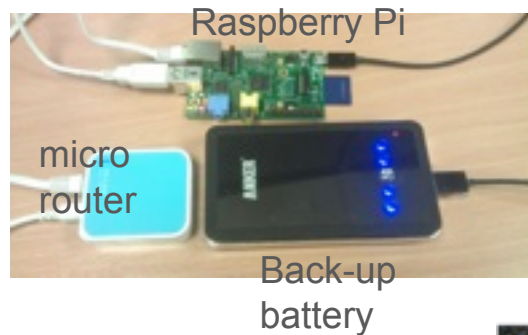
PAST

Timespan Museum (Helmsdale), SCAPE Trust,
University of St Andrews



Living History

Robert Gordon
University,
Historic Scotland,
Ambiesense Ltd



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Content beyond the edge

St Andrews
University,
StAnza
Poetry
Festival,
Qraqrbox
Ltd



6/10.03.13 **Digital Poetry Map of St Andrews**
Online and various locations around town
Stroll through the legacy of poetry in Scotland's Poetry Town.
In partnership with the School of Computer Science, University of St Andrews

7/10.03.13 **Found in the Fields: Carry Akroyd**
The Preservation Trust Museum, North Street
Hand-drawn lithographs responding to the poet John Clare.
In partnership with the St Andrews Preservation Trust

7/9.03.13 **Unmapped: Anna King & Rebecca Sharp**
Public Library Meeting Room, Church Square
Contemporary landscapes of peripheral places in paintings and text.
In partnership with Fife Council Libraries, Arts, Museums & Archives and supported by Creative Scotland and the Royal Glasgow Institute Kelly Gallery

7/10.03.13 **Stitched and Spoken: Anja Hertenberger & Meg Grant**
The Byre Theatre Level 2, Abbey Street
Lace Sensor Dresses from Holland embroidered with text and sound.
Supported by Millers Tale

8/10.03.13 **Breakfast Postscripts: Ariadne Radi Cor**
Byre Theatre Conference Room, Abbey Street
Visual minuting outcomes of this year's breakfast discussions.

9/10.03.13 **The Poetry Postie: Sally Crabtree**
Roaming the streets of St Andrews
Special deliveries of poems and cakes throughout the festival weekend.
Supported by Stuart's the Bakers and the Byre Theatre

Ask at Festival Desk about StAnza Bookshelves and Poetry Match

Exhibitions/installations during regular opening hours at The Byre Theatre & The Town Hall; the Town Library 1-5pm Thu-Sat
Preservation Trust Museum 2-5pm Thu/Fri, 10am-5 pm Sat/Sun

John Clare
"The Blackbird"



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Talisman

- Bitwink, NMS, Scottish Fisheries Museum, Stirling Smith Gallery, U of Edinburgh



SmartBeacons

Neatebox, National Museums Scotland, RGU



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Smart To

creative commons credit: jambox899, 2013

Historical Echoes

Edinburgh Napier, Historic Scotland and Veemee Ltd

Historical Echoes

Edinburgh Napier, Historic Scotland and Veemee Ltd



Minerva

Virtual Excavator

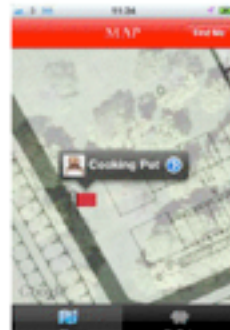
iPhone app that uses 3D sound to guide around
Antonine Wall, Bar Hill fort

Unstewarded site

Sounds of activities around fort

Virtual actors that lead you around

Can excavate objects by gesture



University of
Glasgow,
Glasgow City
Council,
Interpretive
Media,
Cereproc



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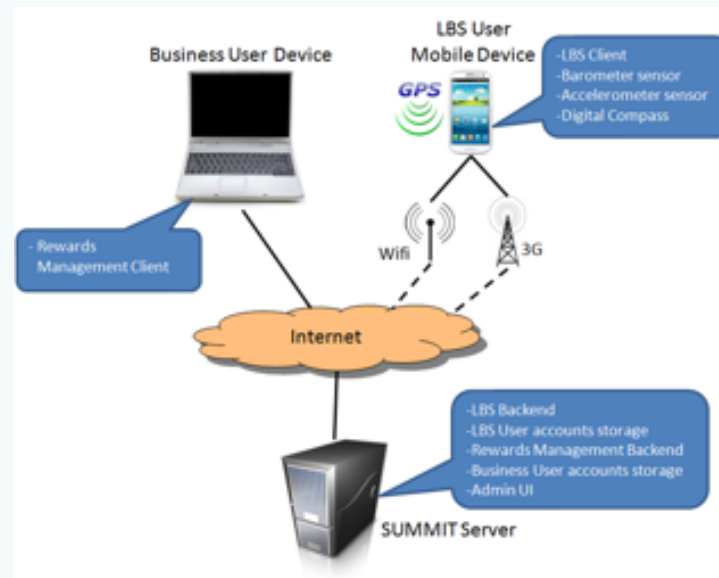
Summit: Heriot Watt, Visit Fort William

SUMMIT : Supporting rUral tourisM with Motivational Intelligent Technologies

Key technical challenges

1. Personalisation.
2. Reward management.
 - Virtual “Always-On” Connectivity (VAOC) to mitigate effects of signal loss and conserve battery power.

Deployment



- Personalised Location Based Service (LBS) running on user's mobile device
- Management system running on backend server
- Business users running local clients on own devices

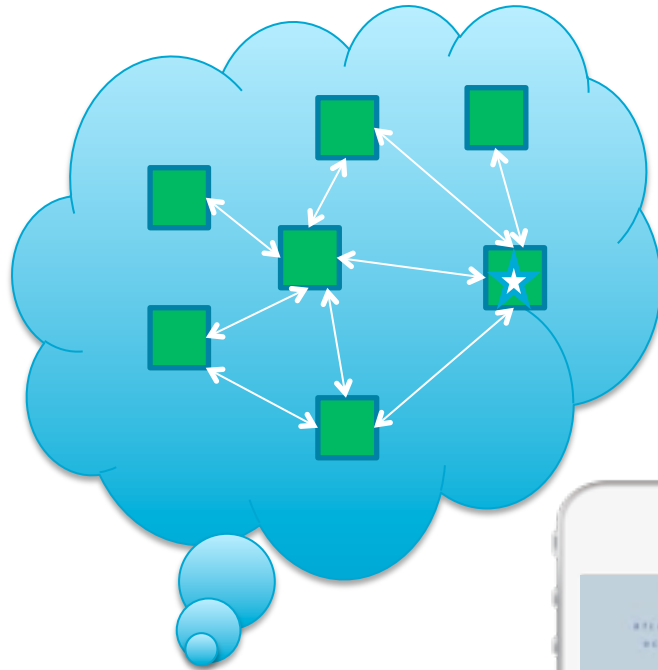
Beneficiaries

Tourists, small rural enterprises, regional & national bodies



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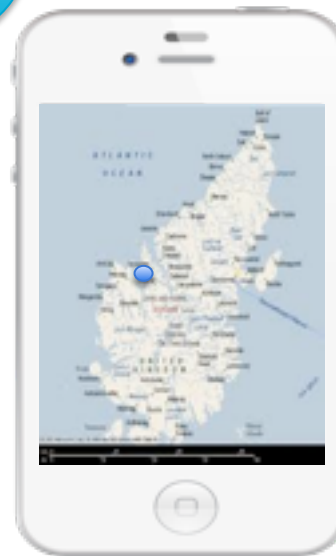
Curios Mobile: Aberdeen, Bluemungus



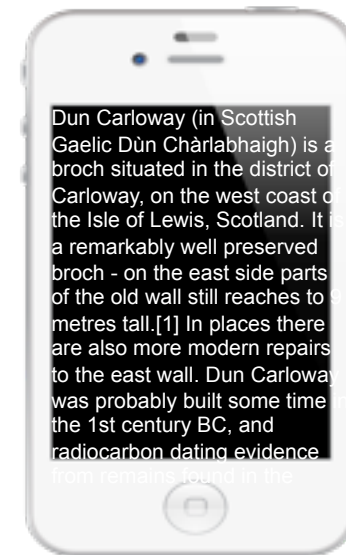
Linked Data Cloud – including
Hebridean Connections



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Location



Archival Data

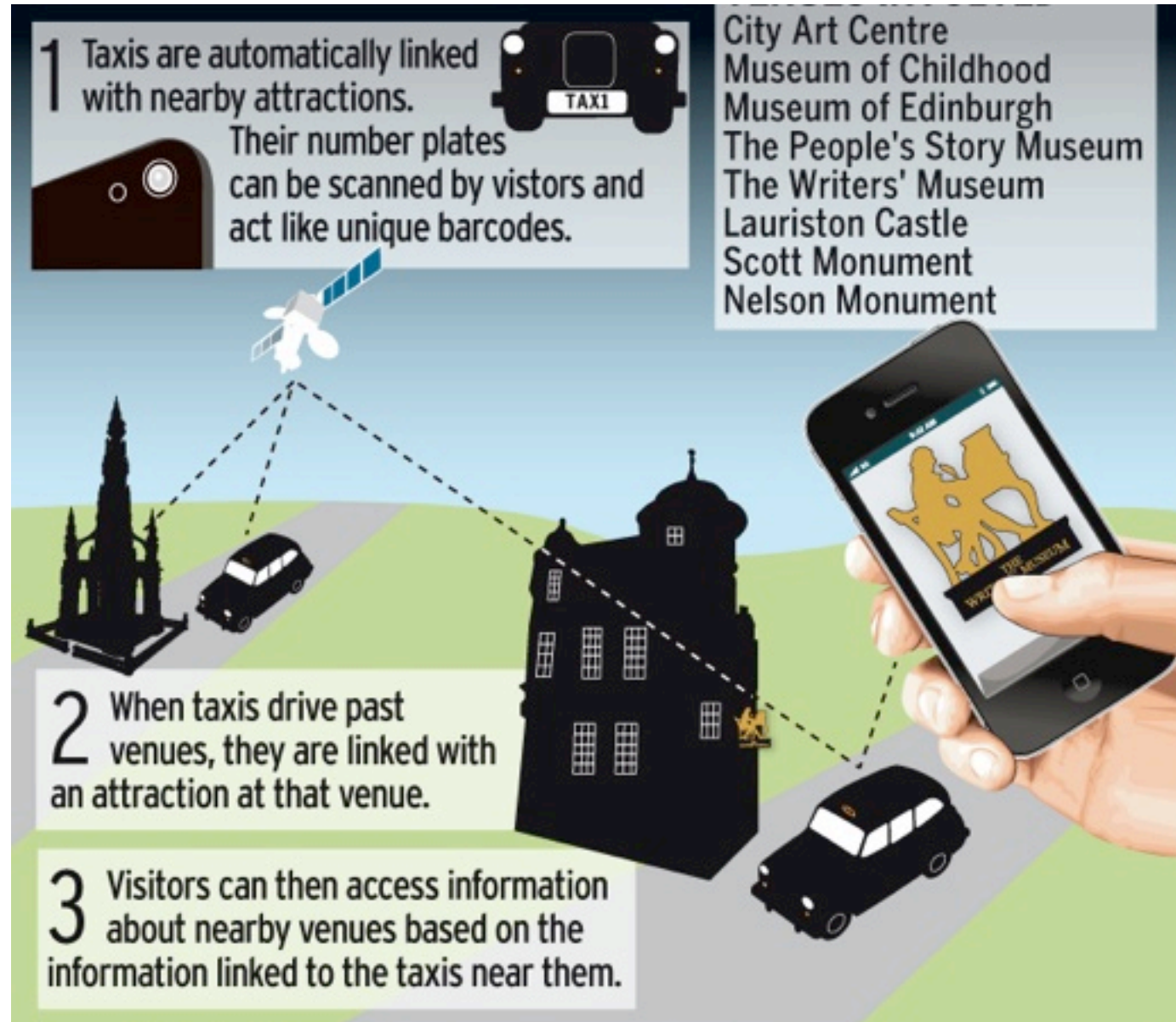
BotaniTours

Royal Botanic Gardens Edinburgh, EDINA, U of Edinburgh



Travelling Treasures

Edinburgh
Museum and
Galleries,
Assembly
Rooms,
Lothian
Buses,
U of
Edinburgh



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Palimpsest: Text mining for Literary Edinburgh



THE UNIVERSITY
of EDINBURGH



University of
St Andrews

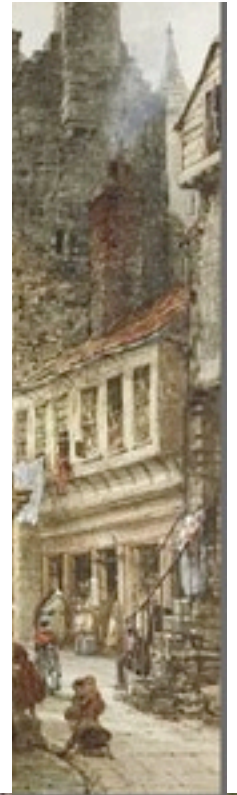
EDiNA



Arts & Humanities
Research Council

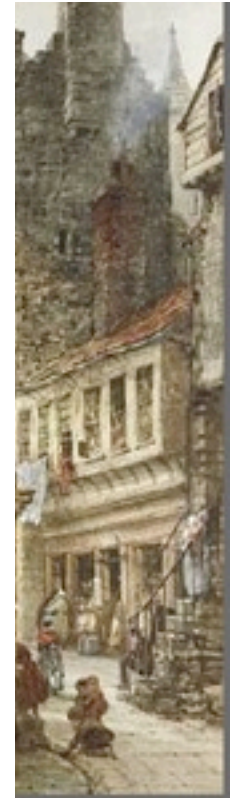
It seemed to me as if the rock and castle
assumed a new aspect every time I looked at
them; and Arthur's Seat was perfect
witchcraft. I don't wonder that anyone
residing in Edinburgh should write poetically.

Washington Irving (1817)



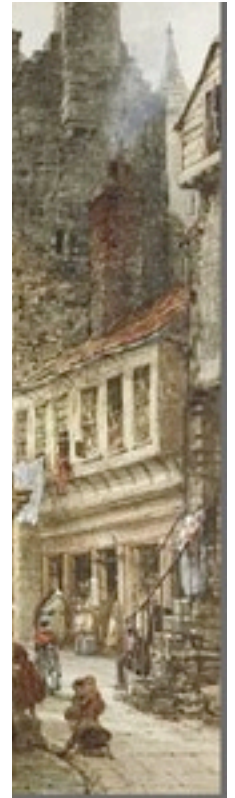
Project Overview

- AHRC big data project: Jan 2014 – Mar 2015
 - Interdisciplinary research project between literary scholars and computer scientists working on text mining and visualisation
- Aims:
 - Capture and visualise the spatial and temporal dimensions of Edinburgh as a city of the literary imagination.
 - Focus on the setting of literature and its context.
- Support:
 - UNESCO City of Literature adopted the Palimpsest prototype.
 - Collaboration with the Scottish Storytelling Centre and the International Book Festival
 - Data provided so far by the National Library of Scotland, Oxford Text Archive, The British Library, HathiTrust.



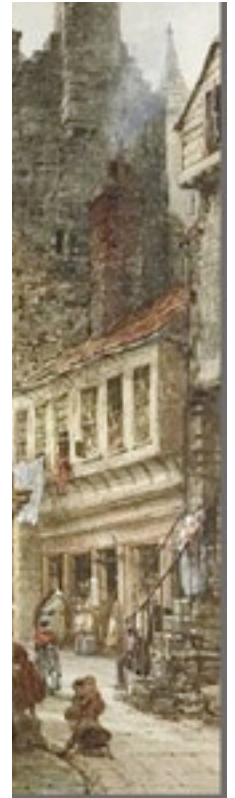
Processing the archive

1. Retrieve a “collection” of literary works which are at least partly set in Edinburgh from all available literature.
2. Devise a method of identifying “loco-specificity” in literature automatically.
3. Create a fine-grained location gazetteer for Edinburgh.
4. Use this to filter the collection, via assisted curation.
5. Textmine, identify and geo-reference locations – including street names and buildings – using the Edinburgh Geoparser.
6. Analyse the linguistic context of locations.
7. Document and publish all methods to recreate similar outputs for other cities of literature.



Datasets: $\sim 10^{10}$ words

- The British Library Nineteenth Century Books collection.
- HathiTrust collection
 - all out-of-copyright material
- Internet Archive literature
 - based on meta-data-specific queries
- English Project Gutenberg books
- Oxford Text Archive data
- Eighteenth Century Collections Online
- Early English Books Online (?)



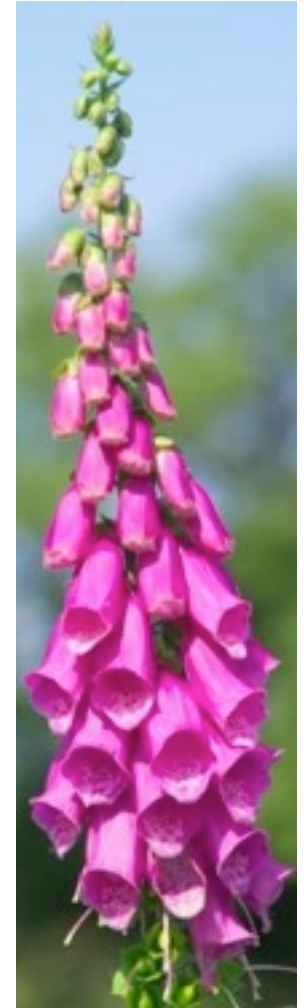
BotaniTours: Text Mining for Botanical Tourism

Royal Botanic Gardens Edinburgh, EDINA, U of Edinburgh



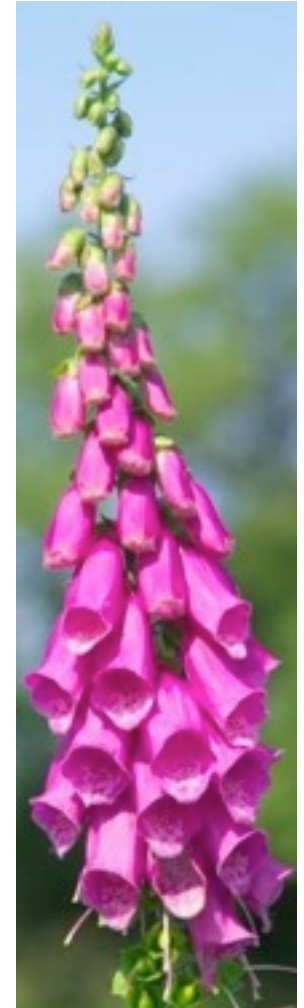
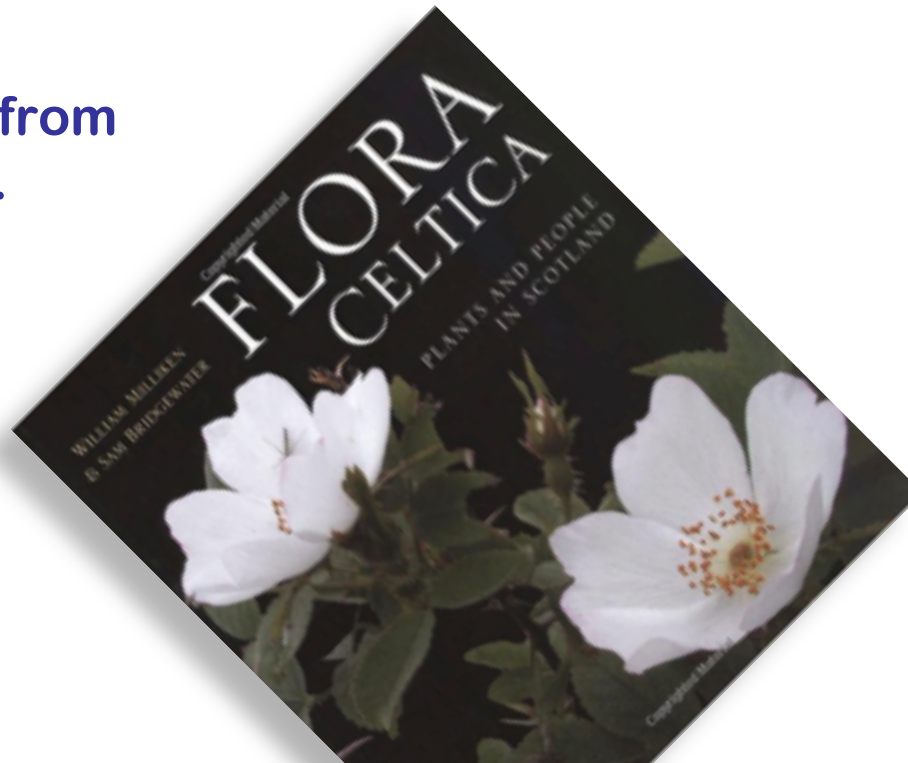
Project Overview

- Smart Tourism/dot.rural project (Oct 2013 - June 2014)
 - Creating a GPS- and time-aware app/web service to identify interesting botanical points of interest
 - e.g. plants in the wild or in gardens.
 - Planning to extend the app to crowd-source images from users for phenology research.
- Text mining unstructured and semi-structured text to extract relevant information including plant descriptions, usages and images from aggregated sources:
 - Global Biodiversity Information Facility (GBIF), Encyclopedia of Life (EOL), Flora Celtica, Flora Scotica?, Wikipedia, Wikispecies.
- Mobile app based on FieldTrip GB
- Future part of RBGE's 'Scotland's Plants'



Progress

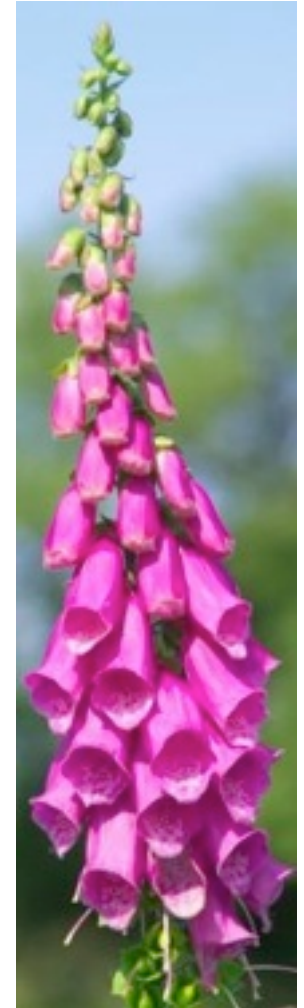
- Collected nearly 26K geo-located observations (from Year 2000) of 2,150 flowering plant species from GBIF.
- Common names for the species from GBIF and Flora Celtica.
- Images from EOL and Wikispecies.
- Textual descriptions from Wikipedia.
- Garden information from Scotland's Gardens.
- Usages from Flora Celtica.



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Geo-coordinates, Images, Gardens

- GBIF: <http://www.gbif.org/species/5414995>
- EOL: <http://eol.org/pages/578392/overview>
- Scotland's Gardens:
- <http://www.scotlandsgardens.org/gardens/district/5>



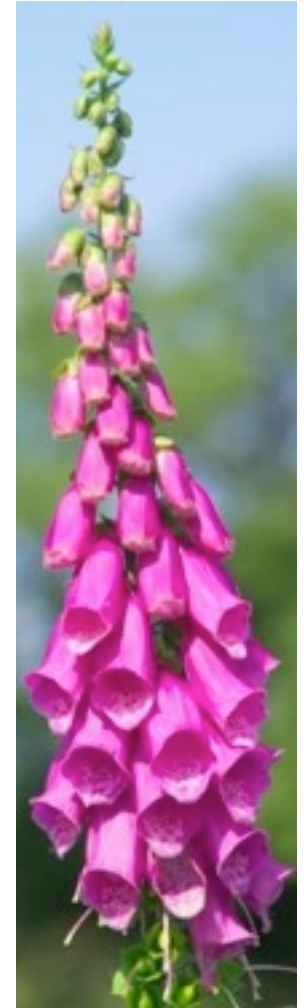
Flora Celtica Common Names: e.g. Species Digitalis Purpurea

- Foxglove
- Dead men's bells
- Witch's Thimbles
- Gensie Pushon
- Lus a bhalgair
- Lus nam Ban-sìdh
- Bloody fingers
- Foxter
- Witch's thimble
- Bloody bells
- Fairy's thimbles
- Deadmen's fingers
- Scotch mercury
- Wild mercury
- An lus mor (the big plant)
- Ciochan nan cailleachan marblia (dead old women's paps)
- Meuran nan caillich mharbha (dead women's thimbles)
- Meuran nan davine marbh (dead men's thimbles)
- Sionn



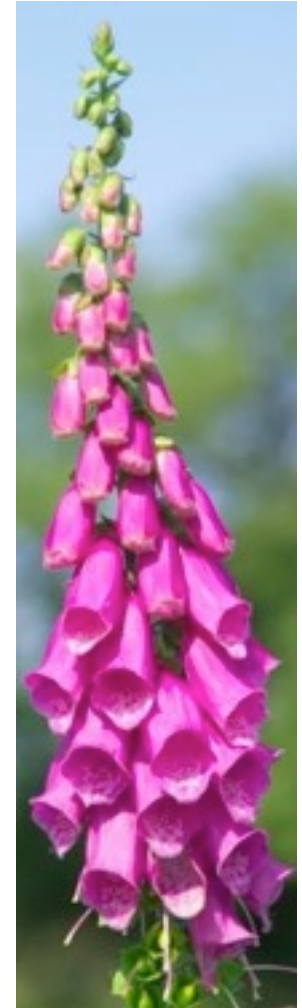
Flora Celtica (Usages)

- **3 MATERIALS - Dyes/Inks/Pigments**
- **2 SOCIAL USES - Witchcraft/Charms/Magic**
- **2 MEDICINES - Skin/Subcutaneous Cellular Tissue Disorders**
- **2 MEDICINES - Inflammation**
- **1 SOCIAL USES - Stories, myths, literature**
- **1 SOCIAL USES - Religious Uses**
- **1 MEDICINES - Respiratory System Disorders**
- **1 MEDICINES - Pain**
- **1 MEDICINES - Muscular-Skeletal System Disorders**
- **1 MEDICINES - Digestive System Disorders**
- **1 MEDICINES - Circulatory System Disorders**
- **1 MATERIALS - Toys and games**



Flora Celtica (References)

- **Lightfoot (1777)** The bitter qualities of this plant made a decoction of the leaves suitable for use as an emetic and cathartic, as well as in cases of scrofula (in ointment).
- **Beith (1995)** The roots of foxgloves, when pounded up, heated and used in a poultice were employed to counteract swelling and internal growths.
- **NULL** 2nd year leaves were boiled in water and then taken when cool as a circulatory stimulant, although the process had to be supervised.
- **Beith (1995)** A condition called 'the rose' (from the Gaelic 'Ros') was cured by applying a moistened foxglove leaf onto the affected area. 'The rose' is thought to refer to a variety of skin conditions, such as eczema.
- **Beith (1995)** "In the braes of Lochaber chopped foxglove leaves and butter and garlic or onion heated were deemed 'good for drawing things, good for bad knees and for diphtheria - as a poultice on the knees, neck, and so on.'"



Text Mining Descriptions

Digitalis purpurea

From Wikipedia, the free encyclopedia

This article is about the flowering plant. For the band, see [Digitalis Purpurea \(band\)](#).

Digitalis purpurea (**foxglove**, **common foxglove**, **purple foxglove** or **lady's glove**), is a [species](#) of flowering plant in the [genus](#) *Digitalis*, in the [family](#) [Scrophulariaceae](#), [native](#) and widespread throughout most of [temperate](#) Europe. It is also naturalised in parts of North America and some other temperate regions. The plants are well known as the original source of the heart medicine [digoxin](#), (also called digitalis or digitalin).

Contents [\[hide\]](#)

- 1 Description
- 2 Subspecies
- 3 Hybrids
- 4 Toxicity
- 5 Uses
 - 5.1 Use in molecular biology
- 6 In literature and music
- 7 Gallery
- 8 References

Description [\[edit\]](#)

Digitalis purpurea is an [herbaceous biennial](#) or short-lived perennial plant. The [leaves](#) are spirally arranged, simple, 10–35 cm long and 5–12 cm broad, and are covered with gray-white pubescent and glandular hairs, imparting a woolly texture. The foliage forms a tight rosette at ground level in the first year.

The flowering stem develops in the second year, typically 1 to 2 m tall, sometimes longer. The [flowers](#) are arranged in a showy, terminal, elongated cluster, and each flower is tubular and pendent. The flowers are typically purple, but some plants, especially those under cultivation, may be pink, rose, yellow, or white. The inside surface of the flower tube is heavily spotted. The flowering period is early summer, sometimes with additional flower stems developing later in the season. The plant is fragmented by base, which allows it to

Text Mining Descriptions

- Using WordNet?

Part Meronyms of noun flower
1 of 3 senses of flower

Sense 2

flower, bloom, blossom

HAS PART: stamen

HAS PART: pistil

HAS PART: carpel

HAS PART: ovary

HAS PART: floral leaf

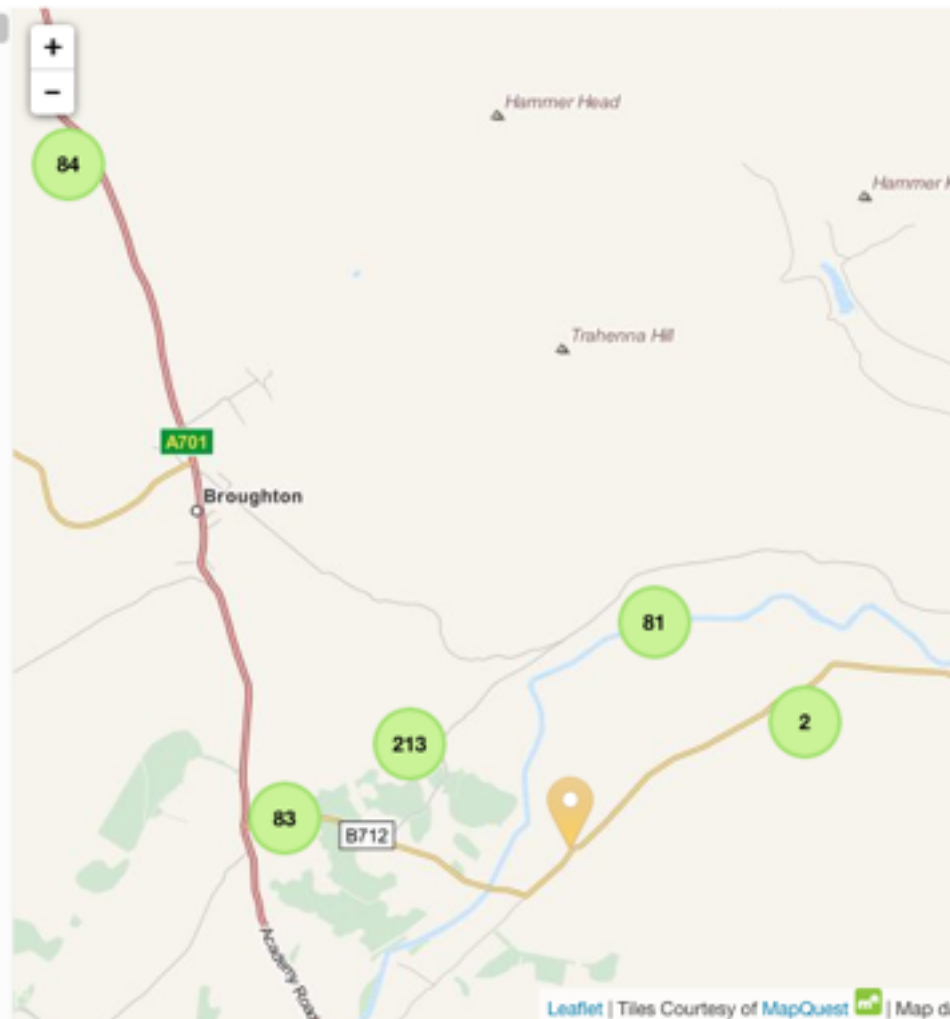
HAS PART: perianth, chlamys,
floral envelope, perigone, perigonium



dawyck Maximum Distance Date Search

640 results found. All

Dawyck Botanic Garden	More
Stobo Japanese Water Garden	More
<i>Platanthera chlorantha</i> (Custer) Rchb.	More
<i>Cardamine corymbosa</i> Hook.f.	More
<i>Juncus articulatus</i> L.	More
<i>Juncus effusus</i> L.	More
<i>Juncus conglomeratus</i> L.	More
<i>Juncus acutiflorus</i> Ehrh. ex Hoffm.	More
<i>Deschampsia cespitosa</i> (L.) P.Beauv.	More
<i>Poa annua</i> L.	More
<i>Poa nemoralis</i> L.	More
<i>Cynosurus cristatus</i> L.	More
<i>Arrhenatherum elatius</i> (L.) P.Beauv. ex J.Presl & C.Presl.	More
<i>Dactylis glomerata</i> L.	More
<i>Glyceria</i> R. Br.	More
<i>Anthoxanthum odoratum</i> L.	More
<i>Holcus mollis</i> L.	More
<i>Holcus lanatus</i> L.	More
<i>Lolium perenne</i> L.	More
<i>Agrostis stolonifera</i> L.	More
<i>Aerostis canina</i> L.	More



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dawyck Maximum Distance Date Search

Lathyrus pratensis L. [More](#)
 Common names: common vetchling, meadow pea,
 Meadow pea, Meadow vetchling, Yellow vetchling
 Year of observation: N/A

Lotus pedunculatus Cav. [More](#)

Lotus corniculatus L. [More](#)

Trifolium repens L. [More](#)

Trifolium pratense L. [More](#)

Urtica dioica L. [More](#)

Ulmus glabra Huds. [More](#)

Geum urbanum L. [More](#)

Geum rivale L. [More](#)

Caltha palustris L. [More](#)

Salix cinerea L. [More](#)

Capsella bursa-pastoris (L.) Medik. [More](#)

Stellaria media (L.) Vill. [More](#)

Taraxacum officinale (L.) Weber ex
 F.H.Wigg. [More](#)

Primula vulgaris Huds. [More](#)

Chrysosplenium oppositifolium Walter [More](#)

Phleum pratense var. tenue [More](#)

Juncus bufonius L. [More](#)

Juncus effusus L. [More](#)



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From Walking Through Time to Travelling Treasures



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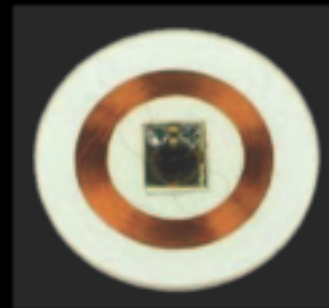
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Pilot: 40 buses, 100 objects

Deployment: 750 buses, 10⁶ objects

Conclusions

- Cities contain tourists as well as residents
- Mining for hidden gems helps meet two of the three challenges
 1. **Personalisation:**
 - Improve how visitors navigate the city/country and volume of events/sites.
 2. Elastic demand and greening:
 - Make available more resources ... during times of peak demand.
 3. **New channels, new content:**
 - New digital channels ... for sharing performance and cultural content, and new 'born digital' content ...
- Hidden Gems = Data + Places + Visitor experience
 - Rich archives
 - Text mining
 - Geo grounding
 - Mobile access