出國報告（出國類別：其它）

參加「2013 太平洋鄰里協會年會及聯合大會」會議報告

服務機關：行政院農業委員會林業試驗所
姓名職稱：王豫煌 特聘研究員
派赴國家：日本
出國期間：民國 102 年 12 月 09－13 日
報告日期：民國 103 年 03 月 03 日

目　　錄

摘　要

太平洋鄰里協會(Pacific Neighborhood Consortium, PNC)是在 1993 年由美國加州柏克萊大學田長霖校長所創立，其目的為促進太平洋周邊國家透過網路相互交流各國之數位知識及內容，藉由資訊技術及數位成果分享，充分發揮網路天涯若比鄰的境界，將有助於太平洋周邊各國之學術交流及合作。此一組織後來由中研院負責主導及推動，即每年在台灣或其他太平洋周邊國家來輪流主辦每一年度的 PNC 會議。2013 年大會由日本京都大學主辦，並於京都大學 Clock Tower Centennial Hall 舉行；會議主題為「建立數位人文新典範－鏈結人類活動新知識」。12 月 10－12 日的會議期間，有 47 場次的研討會報告，內容涵蓋數位圖書館、數位典藏、數位學習、生物多樣性資料庫整合、氣候變遷、視訊技術、數位出版，到智慧財產權等主題；共有來自 10 個國家、超過 300 位專家學者出席。參加本次會議係受邀於亞洲生物多樣性資訊整合的主題場次中報告以鏈結開放資料技術建置自動相機觀測網資訊管理系統的發展。此會議中有許多講題討論知識本體論(Ontology of Knowledge)、鏈結開放資料(Linked Open Data, LOD)、語意網(Semantic Web)在各領域知識整合的應用，顯見鏈結開放資料和語意網帶領下一波網路發展的應用已在各研究領域積極展開。因此，參與亞洲生物多樣性資訊整合主題會議的講者均認為，未來亞洲區域性生物多樣性資訊的整合發展應積極邁向 LOD；並決議 2014 年的 PNC 會議應繼續延伸此議題。

壹、前言

太平洋鄰里協會(Pacific Neighborhood Consortium, PNC)是在1993年由美國加州柏克萊大學田長霖校長所創立，其目的為提倡融合電腦網路與人文內涵，促進太平洋周邊國家透過網路相互交流各國之數位知識及內容，藉由資訊技術及數位成果充分發揮天涯若比鄰的境界，建立太平洋東西岸完善的學術交流平台。過去20年間，已經結合過3千位學者之參與和智慧分享；從最早期的單純分享資訊科技，到今日的數位典藏資源之橫向與縱向的累聚綜效成果，PNC見證了太平洋東西岸城市資訊科技的發展歷史。不論在人文或自然科學範疇，讓全球學者取得資源或典藏，甚至研究方法之啟發等，PNC所建立的學術平台，已然達到最佳的交流示範與啟迪效果。1997年經李遠哲前院長爭取，成功的將總部轉移至台北；此一組織後來由中研院負責主導及推動，後來即每年在台灣或其他太平洋周邊國家來輪流主辦每一年度的PNC會議。今年(2013年)度會議在去年大會中即已決定由日本京都大學主辦。

本屆之主題為「建立數位人文新典範－鏈結人類活動新知識」(New Paradigms on Humanities Computing – Linking Knowledge of Human Activities[1])。內容從數位圖書館、數位典藏、數位學習、生物多樣性資料庫整合、氣候變遷、視訊技術、數位出版，到智慧財產權等主題，涵蓋的內容及領域相當廣泛。茲條列如下:

1. Humanities Computing and Digital Humanities (1.1 Archeology; 1.2 History; 1.3 Philosophy; 1.4 Linguistics; 1.5 Area Studies; 1.6 Disaster Management; 1.7 Cultural Heritage)
2. Knowledge Information Processing
3. Sensibility/Sensitivity (Kansei) Information Processing
4. Digital Museums
5. Digital Libraries
6. Digital Archives
7. MLA
8. Resource Sharing
9. Semantic Web
10. Linked Open Data (LOD)
11. Ontology

[1] http://www.pnclink.org/pnc2013/english/index.html

12. Records Preservation
13. Conservation Science
14. Protecting Cultural Properties
15. Computer Aided Education
16. Computer Literacy
17. Data Mining
18. Spatiotemporal Information Processing
19. GIS
20. Remote Sensing
21. Digitization
22. Digital Documentation
23. Database
24. Metadata
25. Information Retrieval
26. Image Processing
27. Voice Processing
28. Color Processing
29. Visualization
30. Web Technology
31. Intellectual Property and Copyright
32. Security
33. Social Computing
34. Media Application
35. Austronesian Dispersal
36. Biodiversity

貳、目的

2013年「太平洋鄰里協會」(Pacific Neighborhood Consortium, PNC)聯合會議，於12月10日至12日在日本京都大學(Kyoto University)召開。此次是20年來PNC首度在京都召開會議，也是PNC自2002年大阪會議之後，再度回到日本舉行；本屆會議共有6個合作機構參與盛會。

本屆會議主題為「數位人文新典範—人類活動知識的鏈結」，旨在呈現資訊科技的無窮穿透力與整合力，以鏈結人類活動產生新知識與新典範，並且期待在人類面臨全球資源耗竭、環境變遷、巨大災害等問題時，提供新的思考方案。為解決這些全球問題，透過資訊科技的整合與重組，將分散於不同層面之各種人類

活動的知識，得以重新被審視，以建立更富裕成熟的社會、環境、與文化為目標。今年PNC會議主題聚焦於資訊科技應用於人文範疇的最新發展。例如：資訊科技中，本體論(ontology)、語意網(semantic web)、開放資料(linked open data)等，以及其所據以發展的新技術，對重組人類知識已然產生重要的影響。這些影響包括創造新的研究領域，例如歷史資訊學與地域資訊學；以及當這些新興學科範疇進一步結合自然科學，例如環境、健康與災害等研究範疇時，其所引起的鏈結綜合效應，更使學術知識日益精進的蓬勃發展。

為舉辦此次研討會，中研院在今年初即已召開籌備會，邀請籌備委員及院內主要執行數位典藏計畫的研究員研提規劃會議之主題及場次。其中，一主題場次為整合亞洲區域生物多樣性資訊，由生物多樣性研究中心研究員及TaiBIF執行秘書邵廣昭研究員負責籌組。藉由此會議主題，配合GBIF在亞洲節點(Asian Nodes)及亞太地區生物多樣性觀測網所需推動的工作，來延續推動生物多樣性研究與資料開放共享的區域合作。由於大會分配各主題的經費有限，在日本生物多樣性資訊機構JBIF節點負責人(node manager)及協助推動ESABII活動的Dr. Tsuyushi Hosoya協助與全力支持，得以邀請並資助印尼GBIF節點InaBIF負責人Lukman及本人(TaiBIF台灣節點負責人)兩人之旅費。此生物多樣性資訊整合主題共有六篇口頭報告及一篇壁報論文。本人參加此會議是受邀報告以鏈結開放資料技術建置自動相機觀測網資訊管理系統的發展。

參、行程

12 月 09 日　　啟程

12 月 10-12 日　　參加會議

12 月 13 日　　返程

肆、會議內容與感想

本次會議是在 2013 年 12 月 10－12 日在日本的京都大學(Kyoto University) Clock Tower Centennial Hall 舉行(圖 1)。此三日會議共有 47 場次的研討會報告[2]，

[2] http://www.pnclink.org/pnc2013/english/program.html

吸引來自 10 個國家、超過 300 位專家學者出席，台灣共有 88 位學者出席(圖 2)。12 月 10 日上午是開幕，接著是兩場大會報告，之後則分成許多主題(組)在 7 個不同的場地進行平行的分組研討。第二天下午 14:00-15:00 則是參觀京都大學博物館之設施及標本展示；第三天中午則有壁報展示，於下午 18:00 行閉幕典禮及晚宴。

此次大會精心安排兩場主題演講。其中，中研院特聘講座暨災害風險研究中心召集人劉兆漢院士，以「邁向全球永續」為題發表第一場演講(圖 3)。劉院士在演講中說明人類在各個領域的活動，已然造成地球系統的過量負荷，以及價值、信念與教育系統在地球永續的議題上，對個人或團體行為具有巨大的影響力。

第二場主題演講，邀請日本立命館大學資訊工程學院院長八村廣三郎教授，以「無形文化資產數位化—從舞蹈表演到傳統節慶」為題發表演講。八村教授與聽眾分享，日本立命館大學藝術中心如何透過新的資訊科技，將日本傳統與各式舞蹈數位化的努力與成果，以展現日本當代數位人文的特色。

今年 47 場次豐富的研討子題還包括：學術雲端架構與永續、日本經典文學本體論分析、線上遊戲、佛教等，及 PNC 原創宗旨的基礎課題：數位人文、數位圖書館、數位學習等日程。而各會議子題中有許多講題都圍繞在知識本體論(Ontology of Knowledge)、鏈結開放資料(Linked Open Data, LOD)、語意網(Semantic Web)在各領域的應用，顯見鏈結開放資料和語意網帶領下一波網路發展的應用已在各領域展開。

亞洲地區生物多樣性資訊整合的主題安排在 12 月 11 日下午舉行。6 場次的報告中，包括韓國、印尼與台灣推動生物多樣性資訊整合的現況與未來發展，GBIF 日本節點 JBIF 報告亞洲區域生物名錄整合工作成果；此外，有關 LOD 在生物多樣性資訊整合的應用，由日本國家資訊研究所研究員武田英明博士介紹 LOD 的基礎－資源描述架構(Resource Description Framework, RDF)的概念，並以 RDF 發展日本生物多樣性資訊的整合應用－建置日本生物名錄 LOD，藉由生物學名的鏈結資料與 EOL(生命大百科)和 NCBI 等外部資源建立資訊整合的應用。台灣則由本人報告發展自動相機觀測網資訊管理的 ontology，結合網站管理系統、RDF 技術及 TaiBIF 發佈的台灣生物名錄 LOD，來收集和發佈自動相機觀測網資訊系統所匯集的生物分佈 LOD(附錄 1、2)。

由於 LOD 和語意網技術在各領域資訊整合的應用已日趨蓬勃發展，參與此主題會議的講者都有共識，未來亞洲區域性生物多樣性資訊的整合發展應積極邁向 LOD；因此決議 2014 年的 PNC 會議應繼續延伸此議題，在這一年期間，各國將積極發展生物多樣性鏈結開放資料，並相約在 2014 年於台北故宮舉行的 PNC 會議中報告最新進展。

伍、建議

資訊整合對於各研究領域的應用發展及跨領域知識的融合扮演關鍵的角色。目前世界各國面臨的政治、經濟、文化、環境、生態各面向的重大問題，都是彼此相互關聯的議題，亟需各科學領域知識的融合，以尋求不同層次的完善解決之道。而科學知識的融合仰賴於資訊科技的輔助，應用知識本體論(ontology)可以獲得描述事物關係的共通架構和語言，語意網技術可以建立資訊彼此的鏈結，並進一步整合應用，但是這一切都必須奠基於各領域開放的資料和知識內容。我國推動數位典藏計畫、國土地理資訊計畫，及其他大大小小、琳琳總總的科學調查研究計畫，應該早已累積許多可觀的資料，可惜能見於公開的卻不多；國家欲提昇整體文化、知識與科技的發展，唯有各研究領域貢獻開放的資料與知識，才可能以日新月異的資訊技術發揮跨領域整合資訊的無窮潛力。政府應落實公共預算資助研究資料、資訊、知識的公開共享，並獎勵跨領域資訊整合的研究。

陸、會議活動照片

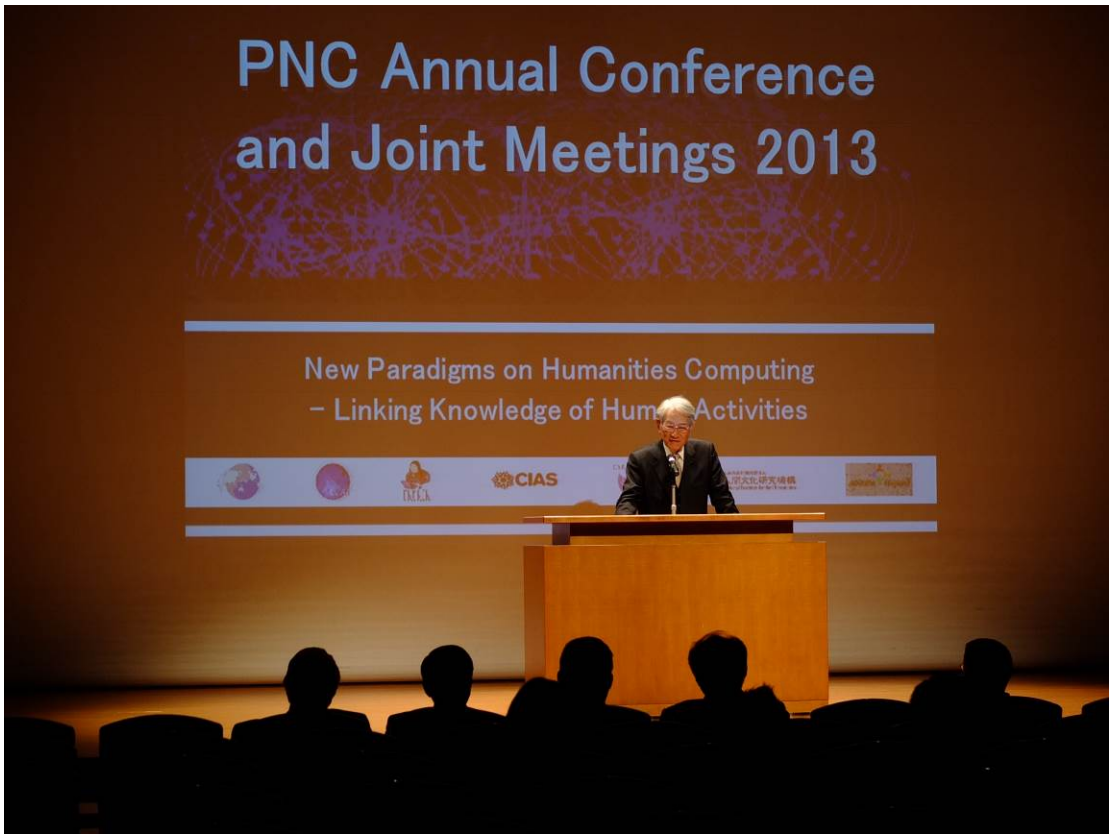

圖 1 2013 PNC 大會開幕－京都大學校長致詞

圖 2 大會合照

圖 3 劉兆漢院士大會開幕演講

附錄 參加會議發表報告摘要與簡報

附錄 1 報告摘要

附錄 2 簡報

The Development of an Information Management System for Camera Trap Sensor Network

Yu-Huang Wang*[1], Sheng-Shan Lu[1], Chau-Chin Lin[1], Kwang-Tsao Shao[2], Guan-Shuo Mai[2], Cheng-Hsin Hsu[3]

1 Taiwan Forestry Research Institute, Taiwan

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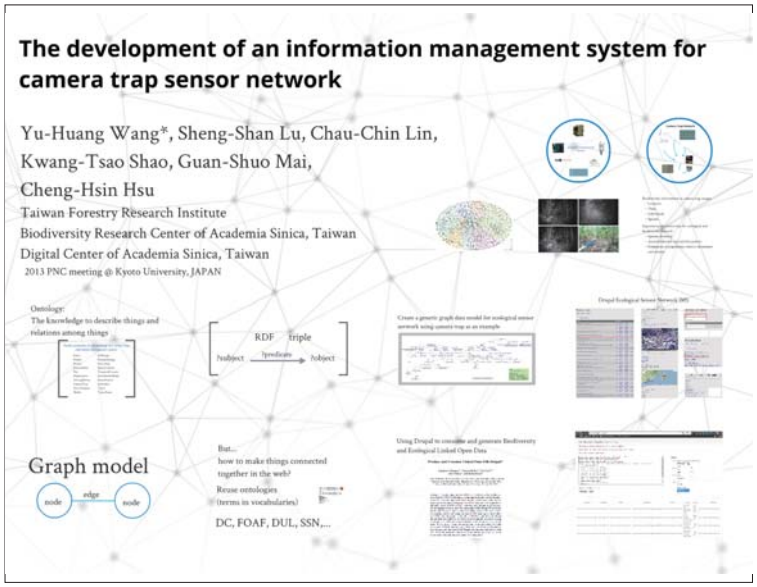
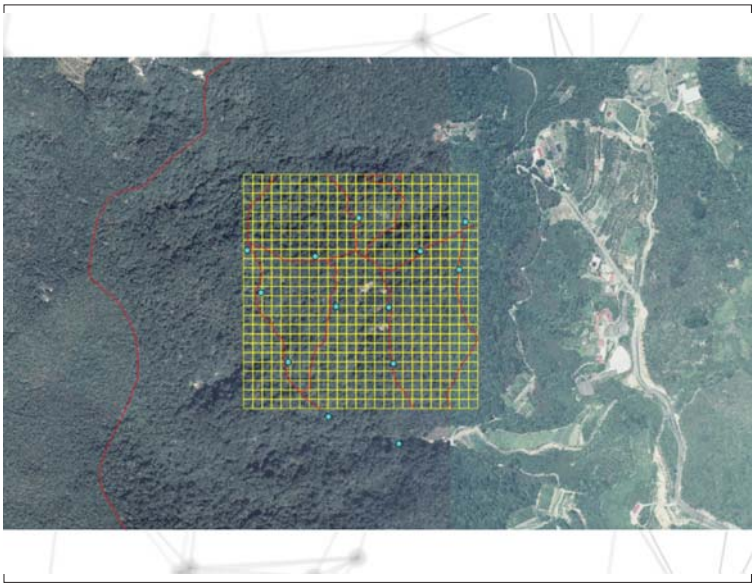
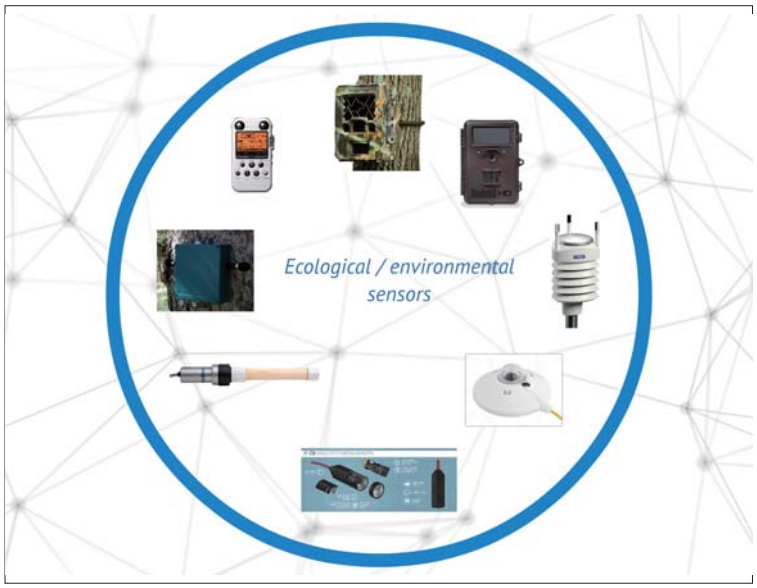
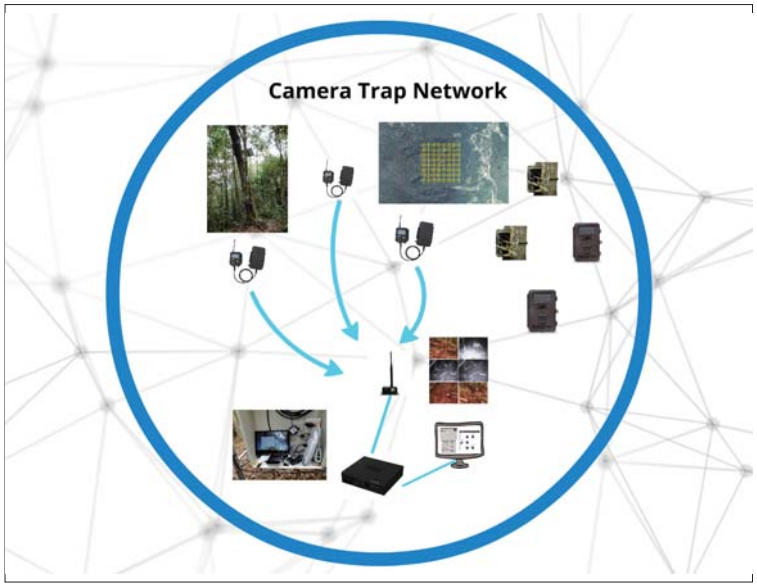
3 Center for Digital Culture, Academia Sinica, Taiwan

Camera trap has become an important research and monitoring tool for wildlife ecology as well as conservation. Many projects deployed camera traps around the world and generated huge volume of image data, which could greatly enhance wildlife conservation if the data is open to web. Although some organization has developed desktop or online tools for managing images and ancillary data generated from camera traps; however, there is still a lack of general data model for managing camera trap data as well as a platform publishing linked open data of camera traps. To facilitate camera trap data opened to the web we developed a data model to fit into the Drupal 7 content management system as an information management system for camera traps. Then we adopted the resource description framework (RDF) and related modules in Drupal 7 to publish the linked open data of camera traps. Registered data managers can input data about project, research sites, trap locations, cameras, deployment events, and upload images into this system. Based on the predefined file name format of uploaded images, i.e., location code prefix conjunct with the date and time of the image been lastly modified, then the system will automatically feed the code of trap location, date, and time of each captured image into relational content types holding all data about each image, including the identified species name, age class, and gender of animal(s) in each image. For avoiding the typo of species name and inconsistency of taxonomic naming system introduced by users, we integrated into system with the scientific name service published by TaiBIF at the Biodiversity Research Center of Academia Sinica, Taiwan. Registered users can help identified the animal and tag species name in each image by inputting the name code or common name/scientific name with the help of auto-completing function supported by the integrated species name service. All camera traps related data in this system can be published as RDFa embedded in HTML format and a SPARQL endpoint. Such a framework of this open information management system for camera traps can promote the collaboration among wildlife ecologists, citizen scientists, and policy makers by sharing labor, data, and resources, which will benefit large scale wildlife conservation in the long run.


The development of an information management system for camera trap sensor network
Yu-Huang Wang*, Sheng-Shan Lu, Chau-Chin Lin, Kwang-Tsao Shao, Guan-Shuo Mai, Cheng-Hsin Hsu
Taiwan Forestry Research Institute
Biodiversity Research Center of Academia Sinica, Taiwan
Digital Center of Academia Sinica, Taiwan
2013 PNC meeting @ Kyoto University, JAPAN
Ontology:
The knowledge to describe things and relations among things
RDF triple
/subject
/predicate
/object
Graph model
node
edge
node
But...
how to make things connected together in the web?
Reuse ontologies
(terms in vocabularies)
DC, FOAF, DUL, SSN,...




Ecological / environmental sensors


Camera Trap Network

Biodiversity information in camera trap images

- Location
- Time
- Individuals
- Species

Importance of camera trap for ecological and biodiversity research

- Species diversity
- Animal behavior and activity pattern
- Estimation of population relative abundance and density

Ontology:
The knowledge to describe things and relations among things

Partial vocabulary for the ontology of a camera trap information management system

Event	StillImage
Project	DynamicImage
Person	Recording
ResearchSite	SpatialContext
Plot	TemperalContext
Deployment	IndividualInMedia
SensingDevice	Identification
CameraTrap	Individual
SensorOutput	Taxon
Media	TaxonName

Partial vocabulary for the ontology of a camera trap information management system

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CameraTrap	Individual
SensorOutput	Taxon
Media	TaxonName

Graph model

Web Semantics: Science, Services and Agents on the World Wide Web 17 (2012) 25–32

Contents lists available at SciVerse ScienceDirect

Web Semantics: Science, Services and Agents on the World Wide Web

journal homepage: www.elsevier.com/locate/websem

Ontology paper

The SSN ontology of the W3C semantic sensor network incubator group

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[e] CSIRO Earth Science and Resource Engineering, Australia
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[h] Wright State University, USA
[i] Fraunhofer Gesellschaft, Germany
[j] Ericsson, Sweden
[k] University of California, Santa Barbara, USA
[l] 52° North Initiative for Geospatial Open Source Software, Münster, Germany
[m] Boeing, USA
[n] The Open University, UK
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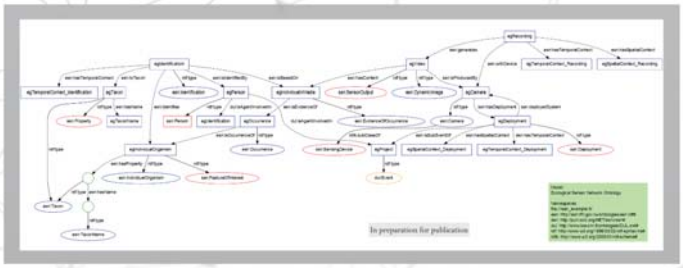
[p] Tasmanian ICT Centre, CSIRO, Australia

RDF triple

?subject —?predicate→ ?object

Create a generic graph data model for ecological sensor network using camera trap as an example



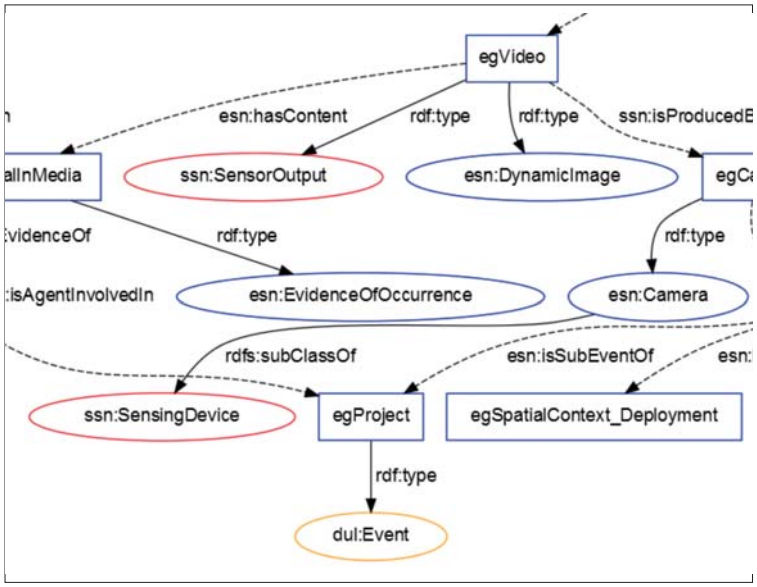
But...
how to make things connected together in the web?

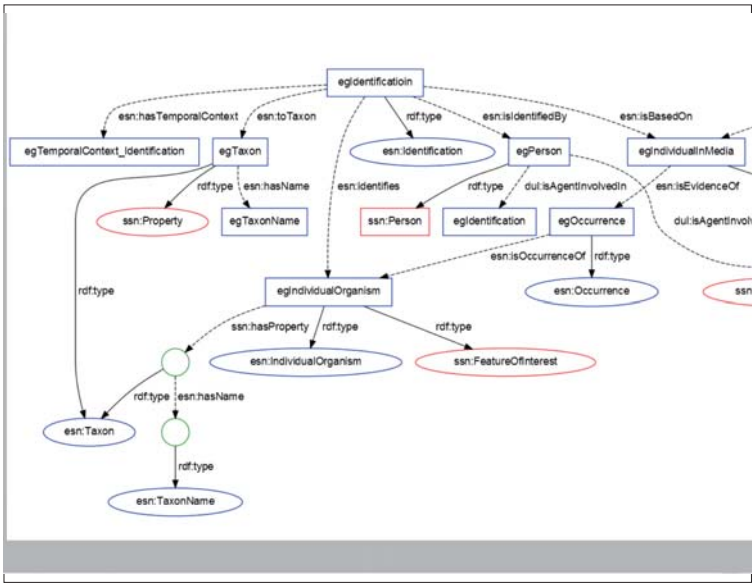
Reuse ontologies
(terms in vocabularies)

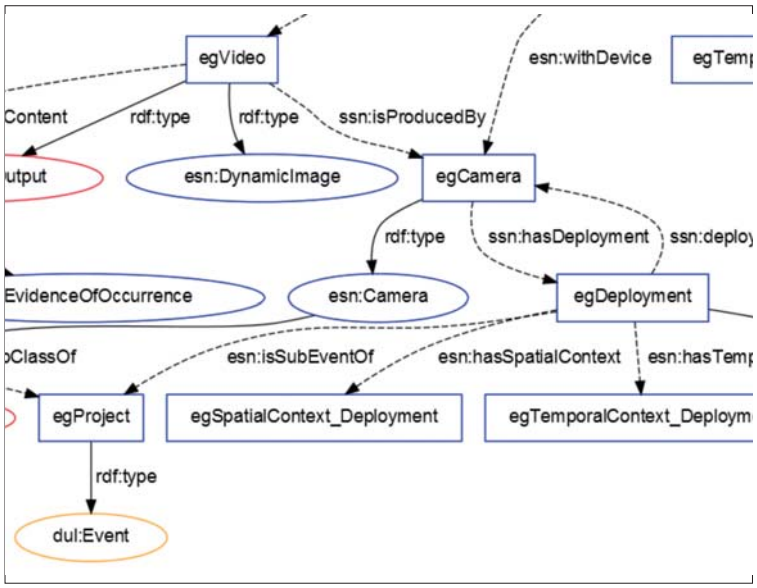
DC, FOAF, DUL, SSN,...

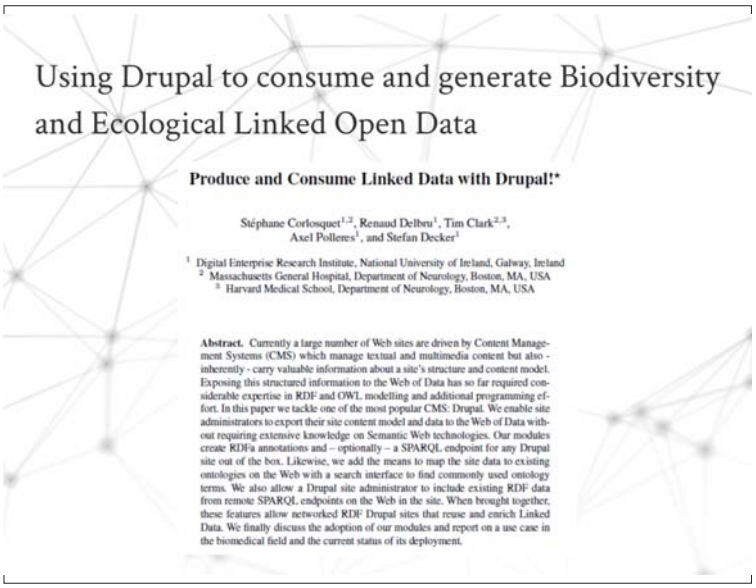
Model:
Ecological Sensor Network Ontology

Namespaces:
file:///esn_example.ttl
esn: http://esn.tfri.gov.tw/ontologies/esn.rdf#
ssn: http://purl.oclc.org/NET/ssnx/ssn#
dul: http://www.loa-cnr.it/ontologies/DUL.owl#
rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
rdfs: http://www.w3.org/2000/01/rdf-schema#









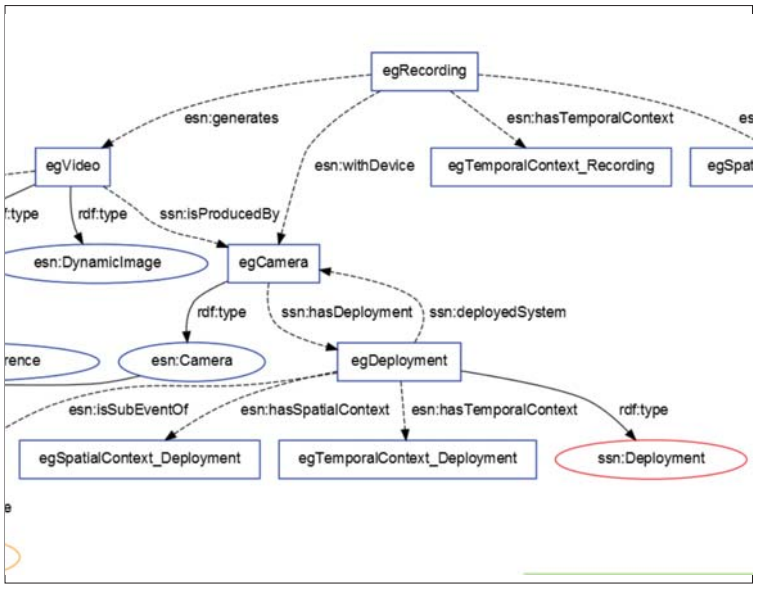
Using Drupal to consume and generate Biodiversity and Ecological Linked Open Data

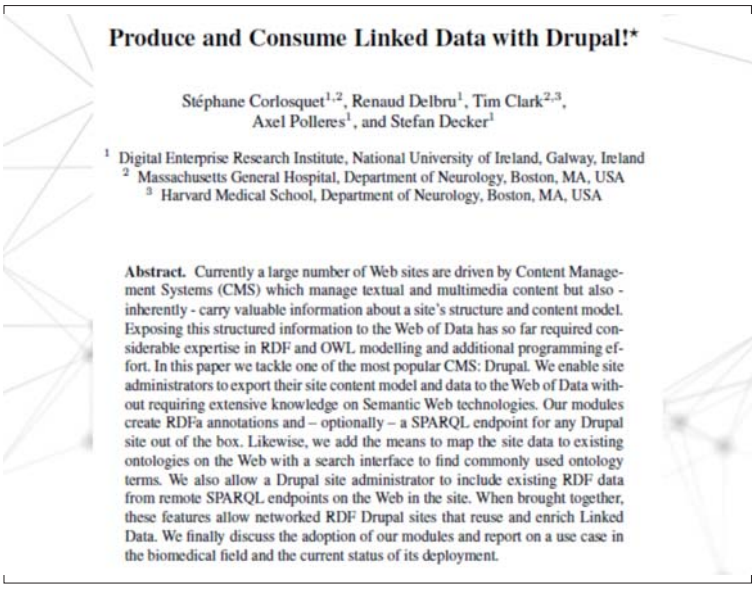
Produce and Consume Linked Data with Drupal!*

Stéphane Corlosquet[1,2], Renaud Delbru[1], Tim Clark[2,3], Axel Polleres[1], and Stefan Decker[1]

[1] Digital Enterprise Research Institute, National University of Ireland, Galway, Ireland
[2] Massachusetts General Hospital, Department of Neurology, Boston, MA, USA
[3] Harvard Medical School, Department of Neurology, Boston, MA, USA

Abstract. Currently a large number of Web sites are driven by Content Management Systems (CMS) which manage textual and multimedia content but also - inherently - carry valuable information about a site's structure and content model. Exposing this structured information to the Web of Data has so far required considerable expertise in RDF and OWL modelling and additional programming effort. In this paper we tackle one of the most popular CMS: Drupal. We enable site administrators to export their site content model and data to the Web of Data without requiring extensive knowledge on Semantic Web technologies. Our modules create RDFa annotations and – optionally – a SPARQL endpoint for any Drupal site out of the box. Likewise, we add the means to map the site data to existing ontologies on the Web with a search interface to find commonly used ontology terms. We also allow a Drupal site administrator to include existing RDF data from remote SPARQL endpoints on the Web in the site. When brought together, these features allow networked RDF Drupal sites that reuse and enrich Linked Data. We finally discuss the adoption of our modules and report on a use case in the biomedical field and the current status of its deployment.





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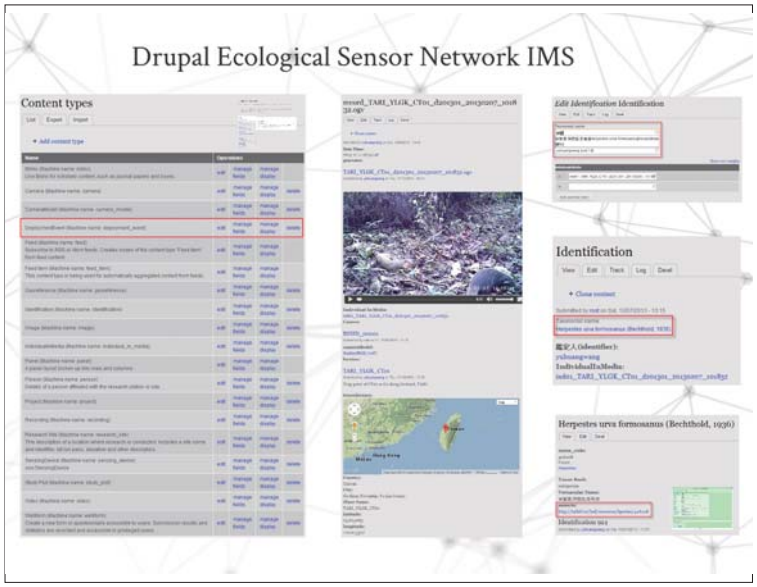
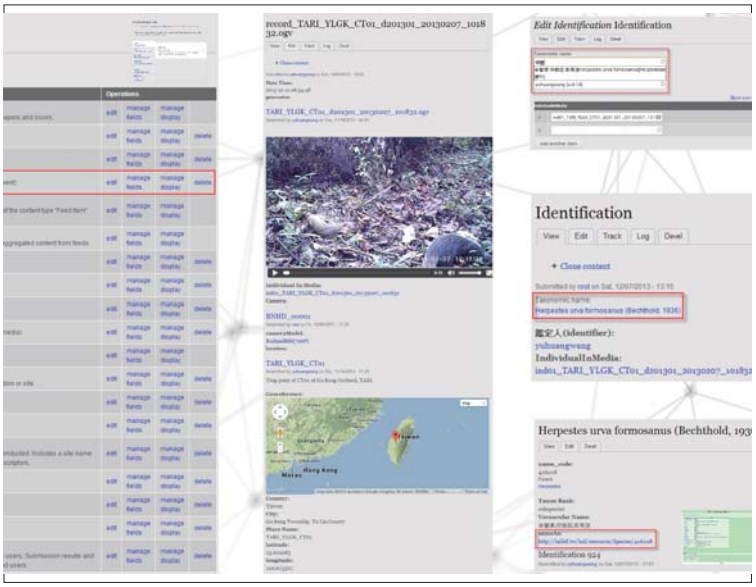
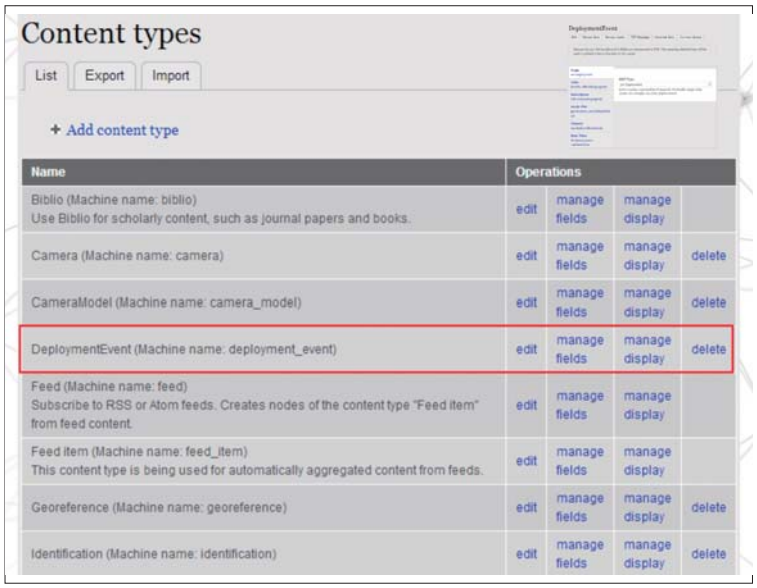
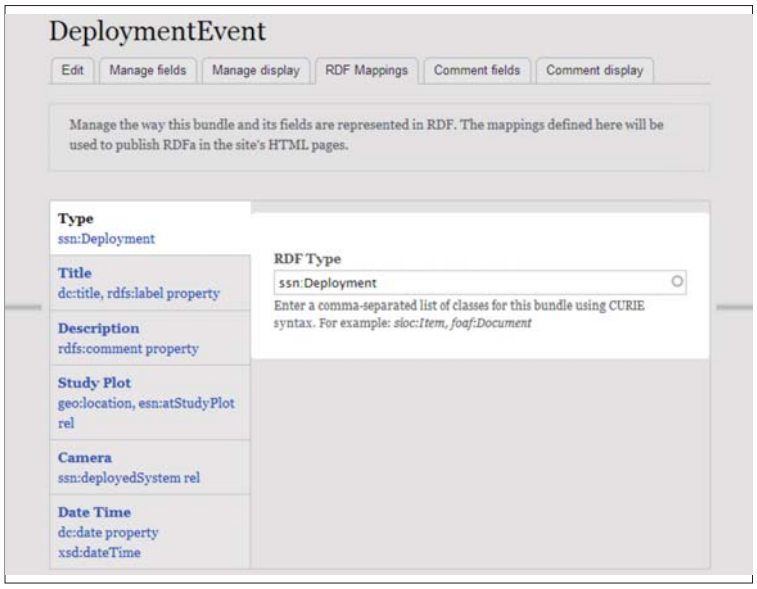
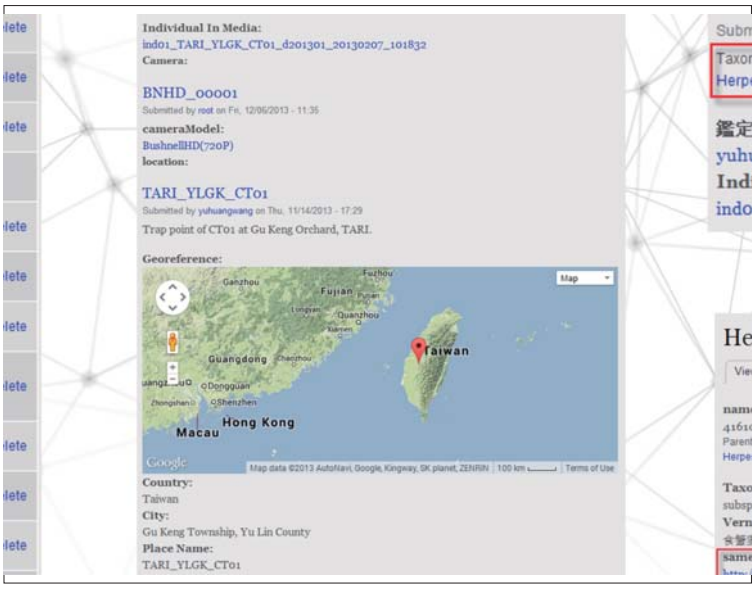

Drupal Ecological Sensor Network IMS
Content types
Identification
Herpestes urva formosanus (Bechthold, 1936)

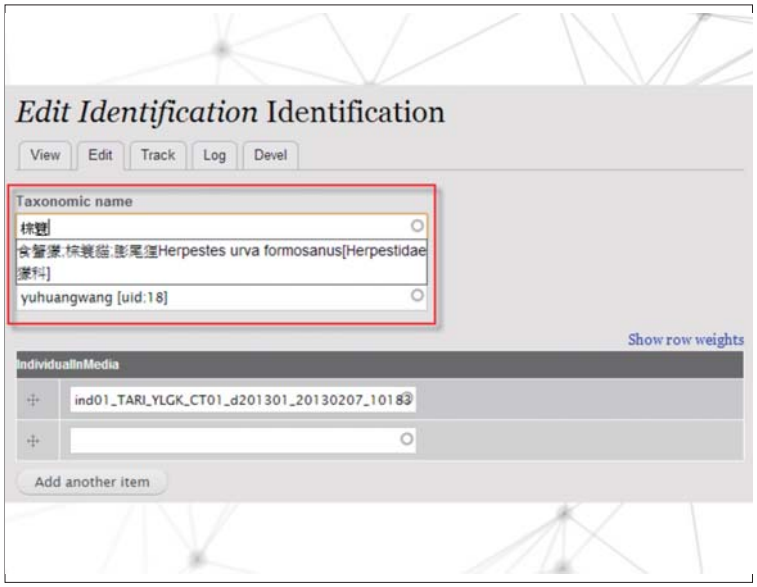

Identification
Herpestes urva formosanus (Bechthold, 1936)


Content types
List
Export
Import
+ Add content type
Name
Operations
Biblio (Machine name: biblio)
Use Biblio for scholarly content, such as journal papers and books.
Camera (Machine name: camera)
CameraModel (Machine name: camera_model)
DeploymentEvent (Machine name: deployment_event)
Feed (Machine name: feed)
Subscribe to RSS or Atom feeds. Creates nodes of the content type "Feed item" from feed content.
Feed item (Machine name: feed_item)
This content type is being used for automatically aggregated content from feeds.
Georeference (Machine name: georeference)
Identification (Machine name: identification)
edit
manage fields
manage display
delete


record_TARI_YLGK_CT01_d201301_20130207_101832.ogv
View
Edit
Track
Log
Devel
+ Clone content
Date Time:
2013-12-11 06:34:48
genreates:
TARI_YLGK_CT01_d201301_20130207_101832.ogv

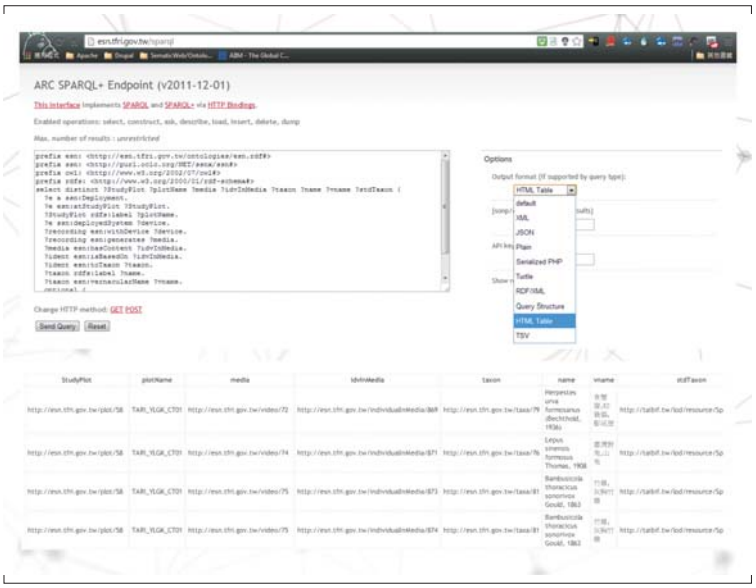

DeploymentEvent
Edit
Manage fields
Manage display
RDF Mappings
Comment fields
Comment display
Manage the way this bundle and its fields are represented in RDF. The mappings defined here will be used to publish RDFa in the site's HTML pages.
Type
ssn:Deployment
Title
dc:title, rdfs:label property
Description
rdfs:comment property
Study Plot
geo:location, esn:atStudyPlot rel
Camera
ssn:deployedSystem rel
Date Time
dc:date property
xsd:dateTime
RDF Type
ssn:Deployment
Enter a comma-separated list of classes for this bundle using CURIE syntax. For example: sioc:Item, foaf:Document

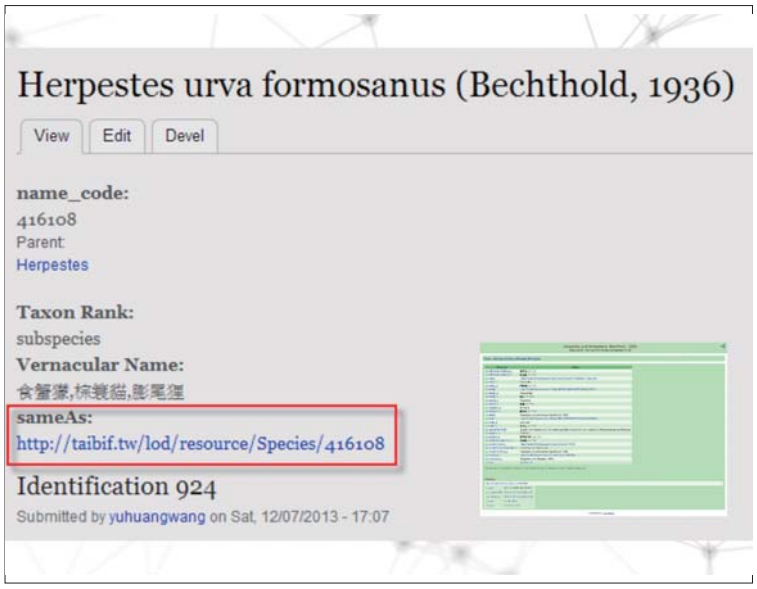

Individual In Media:
ind01_TARI_YLGK_CT01_d201301_20130207_101832
Camera:
BNHD_00001
cameraModel:
BushnellHD(720P)
location:
TARI_YLGK_CT01
Trap point of CT01 at Gu Keng Orchard, TARI.
Georeference:
Taiwan
Hong Kong
Macau
Country:
Taiwan
City:
Gu Keng Township, Yu Lin County
Place Name:
TARI_YLGK_CT01

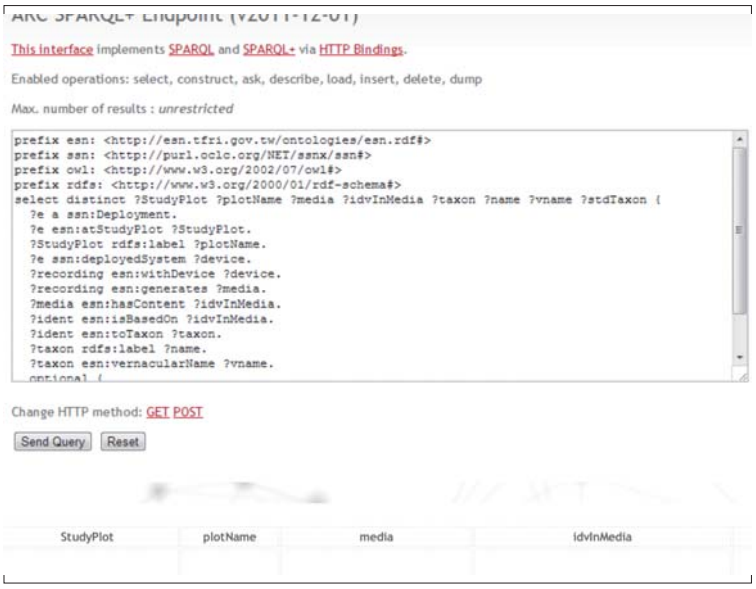

Edit Identification Identification
View
Edit
Track
Log
Devel
Taxonomic name
棕鼬
食蟹獴,棕鼬貓,豎尾狸Herpestes urva formosanus[Herpestidae獴科]
yuhuangwang [uid:18]
Show row weights
IndividualInMedia
ind01_TARI_YLGK_CT01_d201301_20130207_10183
Add another item


Herpestes urva formosanus (Bechthold, 1936)
Property
Value

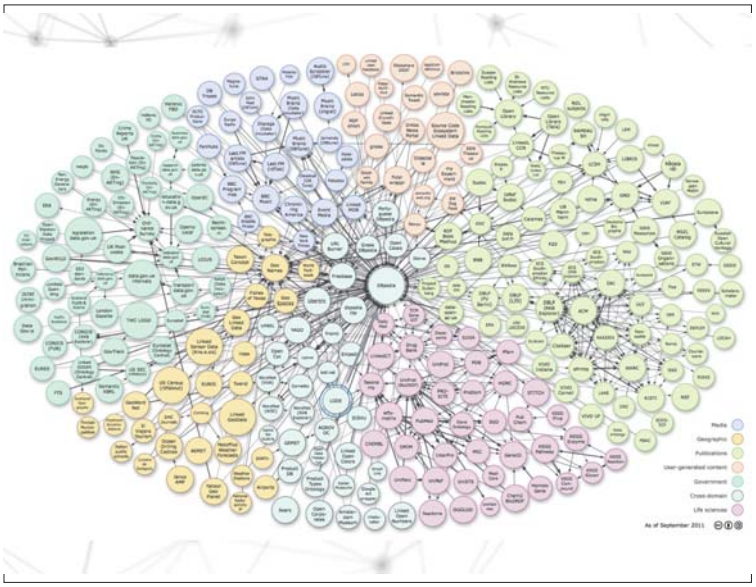

Identification
View
Edit
Track
Log
Devel
+ Clone content
Submitted by root on Sat, 12/07/2013 - 13:15
Taxonomic name:
Herpestes urva formosanus (Bechthold, 1936)
鑑定人(identifier):
yuhuangwang
IndividualInMedia:
ind01_TARI_YLGK_CT01_d201301_20130207_101832


ARC SPARQL+ Endpoint (v2011-12-01)
This interface implements SPARQL and SPARQL+ via HTTP Bindings.
Enabled operations: select, construct, ask, describe, load, insert, delete, dump
Max. number of results : unrestricted
Change HTTP method: GET POST
Send Query
Reset

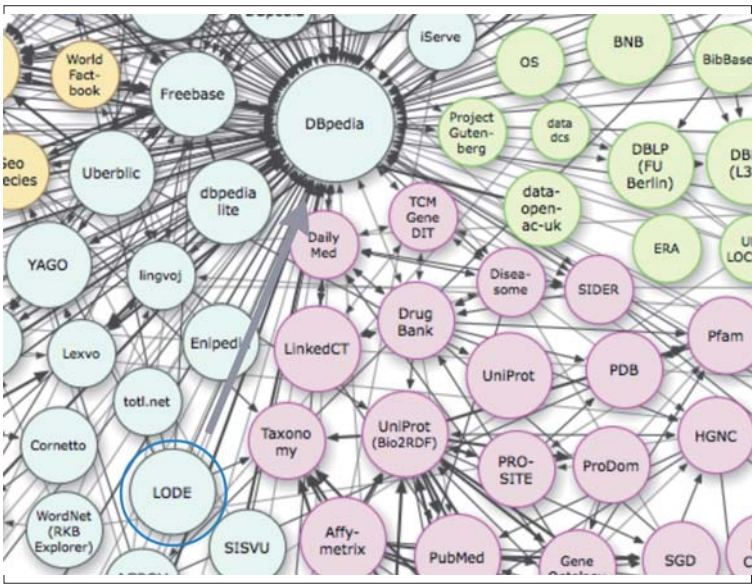

Herpestes urva formosanus (Bechthold, 1936)
View
Edit
Devel
name_code:
416108
Parent:
Herpestes
Taxon Rank:
subspecies
Vernacular Name:
食蟹獴,棕鼬貓,豎尾狸
sameAs:
http://taibif.tw/lod/resource/Species/416108
Identification 924
Submitted by yuhuangwang on Sat, 12/07/2013 - 17:07


This interface implements SPARQL and SPARQL+ via HTTP Bindings.
Enabled operations: select, construct, ask, describe, load, insert, delete, dump
Max. number of results : unrestricted
prefix esn: <http://esn.tfri.gov.tw/ontologies/esn.rdf#>
prefix ssn: <http://purl.oclc.org/NET/ssnx/ssn#>
prefix owl: <http://www.w3.org/2002/07/owl#>
prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
select distinct ?StudyPlot ?plotName ?media ?idvInMedia ?taxon ?name ?vname ?stdTaxon {
?e a ssn:Deployment.
?e esn:atStudyPlot ?StudyPlot.
?StudyPlot rdfs:label ?plotName.
?e ssn:deployedSystem ?device.
?recording esn:withDevice ?device.
?recording esn:generates ?media.
?media esn:hasContent ?idvInMedia.
?ident esn:isBasedOn ?idvInMedia.
?ident esn:toTaxon ?taxon.
?taxon rdfs:label ?name.
?taxon esn:vernacularName ?vname.
Change HTTP method: GET POST
Send Query
Reset
StudyPlot
plotName
media
idvInMedia

StudyPlot	plotName	media
http://esn.tfri.gov.tw/plot/58	TARI_YLGK_CT01	http://esn.tfri.gov.tw/video/72
http://esn.tfri.gov.tw/plot/58	TARI_YLGK_CT01	http://esn.tfri.gov.tw/video/74
http://esn.tfri.gov.tw/plot/58	TARI_YLGK_CT01	http://esn.tfri.gov.tw/video/75
http://esn.tfri.gov.tw/plot/58	TARI_YLGK_CT01	http://esn.tfri.gov.tw/video/75



	idvInMedia	taxon	
72	http://esn.tfri.gov.tw/individualInMedia/869	http://esn.tfri.gov.tw/taxa/79	He urv for (Be 19
74	http://esn.tfri.gov.tw/individualInMedia/871	http://esn.tfri.gov.tw/taxa/76	Le sin for Th
75	http://esn.tfri.gov.tw/individualInMedia/873	http://esn.tfri.gov.tw/taxa/81	Ba the sor Go
75	http://esn.tfri.gov.tw/individualInMedia/874	http://esn.tfri.gov.tw/taxa/81	Ba the sor Go



taxon	name	vname	stdTaxon
http://esn.tfri.gov.tw/taxa/79	Herpestes urva formosanus (Bechthold, 1936)	食蟹獴,棕簑貓,膨尾狸	http://taibif.tw/lod/resource/Sp
http://esn.tfri.gov.tw/taxa/76	Lepus sinensis formosus Thomas, 1908	臺灣野兔,山兔	http://taibif.tw/lod/resource/Sp
http://esn.tfri.gov.tw/taxa/81	Bambusicola thoracicus sonorivox Gould, 1863	竹雞,灰胸竹雞	http://taibif.tw/lod/resource/Sp
http://esn.tfri.gov.tw/taxa/81	Bambusicola thoracicus sonorivox Gould, 1863	竹雞,灰胸竹雞	http://taibif.tw/lod/resource/Sp