

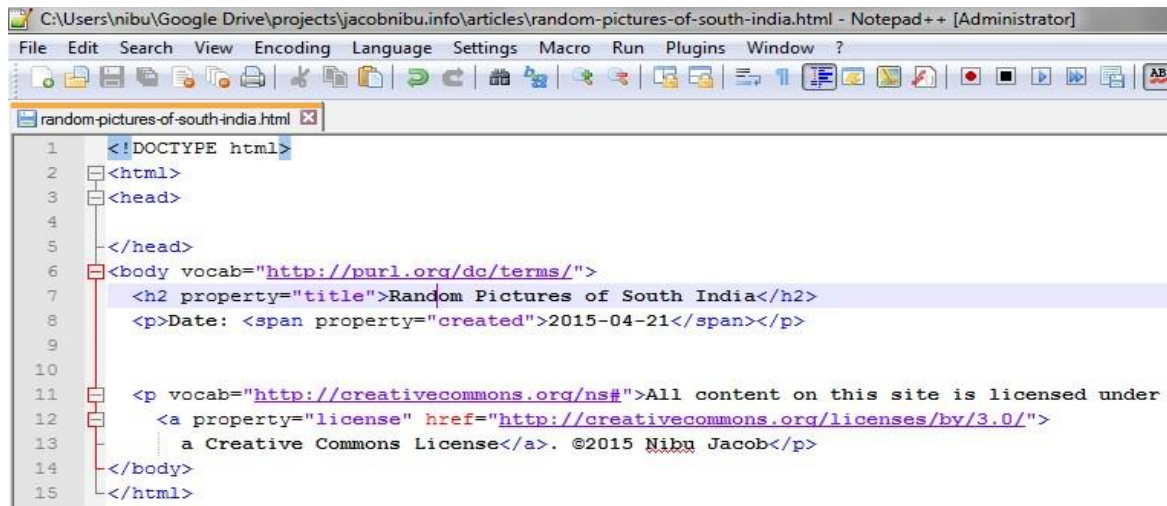
# Creating and Deploying Linked Open Data

**Task:** Create an example of Linked Open Data: two or more datasets, adding connections to other datasets (e.g., Dbpedia, Freebase) using owl:sameAs or rdfs:seeAlso

## Implementation

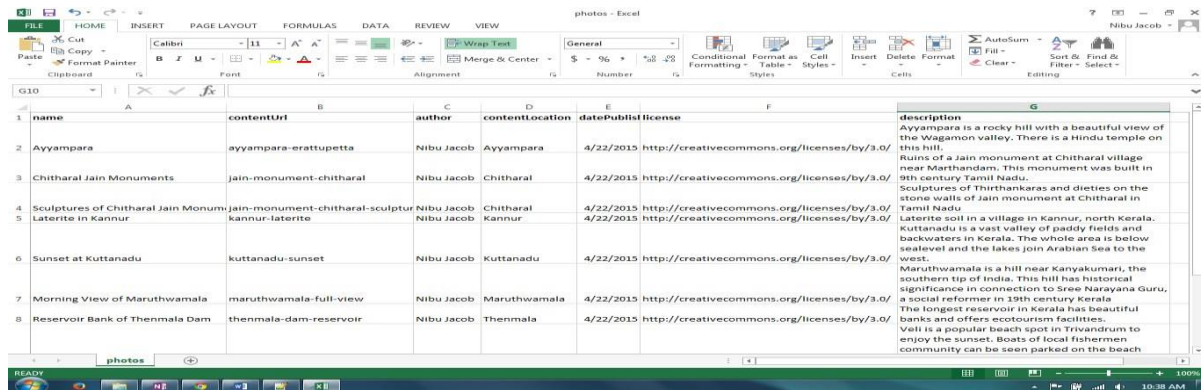
As per W3 best-practices [1], two datasets uniquely collected and created by me were selected for this assignment. One dataset consists of 14 photographs taken by me of interesting places in South India. This data could be connected to relevant geographical and historical data (the second dataset) which in turn could be connected to resources in existing public datasets using owl:sameAs or rdfs:seeAlso links.

In order to make an open data that is both machine-readable and human-readable, RDFa was chosen as the RDF format to use for this assignment. An HTML5 page containing RDFa code was created in Notepad++ following the examples given by RDFa primer [2]. The basic HTML structure with document metadata (using DC terms) and license information was coded:



```
1 <!DOCTYPE html>
2 <html>
3 <head>
4
5 </head>
6 <body vocab="http://purl.org/dc/terms/">
7 <h2 property="title">Random Pictures of South India</h2>
8 <p>Date: <span property="created">2015-04-21</span></p>
9
10
11 <p vocab="http://creativecommons.org/ns#">All content on this site is licensed under
12 <a property="license" href="http://creativecommons.org/licenses/by/3.0/">
13 a Creative Commons License</a>. ©2015 Nibu Jacob</p>
14 </body>
15 </html>
```

For photographs, the ImageObject schema provided by Schema.org was selected as vocabulary to be used [3]. A CSV file containing selected properties of this schema along with their values was created using Excel (this would be the second dataset):



	A	B	C	D	E	F	G
1	name	contentUri	author	contentLocation	datePublished	license	description
2	Ayyampara	ayyampara-erattupetta	Nibu Jacob	Ayyampara	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Ayyampara is a rocky hill with a beautiful view of the Wagamon valley. There is a Hindu temple on this hill.
3	Chitharal Jain Monuments	jain-monument-chitharal	Nibu Jacob	Chitharal	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Ruins of a Jain monument at Chitharal village near Marthandam. This monument was built in 9th century Tamil Nadu.
4	Sculptures of Chitharal Jain Monum	jain-monument-chitharal-sculptur	Nibu Jacob	Chitharal	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Sculptures of Thirthankaras and dieties on the stone walls of Jain monument at Chitharal in Tamil Nadu
5	Laterite in Kannur	kannur-laterite	Nibu Jacob	Kannur	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Laterite soil in a village in Kannur, north Kerala.
6	Sunset at Kuttanadu	kuttanadu-sunset	Nibu Jacob	Kuttanadu	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Kuttanadu is a vast valley of paddy fields and backwaters in Kerala. The whole area is below sealevel and the lakes join Arabian Sea to the west.
7	Morning View of Maruthwamala	maruthwamala-full-view	Nibu Jacob	Maruthwamala	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Maruthwamala is a hill near Kanyakumari, the southern tip of India. This hill has historical significance in connection to Sree Narayana Guru, a social reformer in 19th century Kerala.
8	Reservoir Bank of Thenmala Dam	thenmala-dam-reservoir	Nibu Jacob	Thenmala	4/22/2015	http://creativecommons.org/licenses/by/3.0/	The longest reservoir in Kerala has beautiful banks and offers ecotourism facilities. Velli is a popular beach spot in Trivandrum to enjoy the sunset. Boats of local fishermen community can be seen parked on the beach

This CSV dataset was converted into RDF data using RDF Refine extension [4] of OpenRefine (Google Refine 2.5) [5] [6]. Only 4 out of 8 contentLocation values could be reconciled to DBpedia URIs using Google Refine:

Google refine photos csv Permalink Open... Export Help

Facet / Filter Undo / Redo 2 Extensions: Freebase RDF

Refresh Reset All Remove All Show as: rows records Show: 5 10 25 50 rows « first < previous 1 - 8 next > last »

All	name	contentUri	author	contentLocation	datePublished	license	description
☆	1. Ayyampara	ayyampara-erattupetta	Nibu Jacob	Ayyampara <input checked="" type="checkbox"/> Create new topic Search for match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Ayyampara is a rocky hill with a beautiful view of the Wagamon valley. There is a Hindu temple on this hill.
☆	2. Chitharal Jain Monuments	jain-monument-chitharal	Nibu Jacob	Chitharal <input checked="" type="checkbox"/> Create new topic Search for match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Remains of a Jain monument at Chitharal village near Marthandam. This monument was built in 9th century Tamil Nadu.
☆	3. Sculptures of Chitharal Jain Monument	jain-monument-chitharal-sculptures	Nibu Jacob	Chitharal <input checked="" type="checkbox"/> Create new topic Search for match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Sculptures of Thirthankaras and deities on the stone walls of Jain monument at Chitharal in Tamil Nadu.
☆	4. Laterite in Kannur	kannur-laterite	Nibu Jacob	Kannur Choose new match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Laterite soil in a village in Kannur, north Kerala.
☆	5. Sunset at Kuttanadu	kuttanadu-sunset	Nibu Jacob	Kuttanadu Choose new match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Kuttanadu is a vast valley of paddy fields and backwaters in Kerala. The whole area is below sea level and the lakes join Arabian Sea to the west.
☆	6. Morning View of Maruthwamala	maruthwamala-full-view	Nibu Jacob	Maruthwamala <input checked="" type="checkbox"/> Create new topic Search for match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Maruthwamala is a hill near Kanyakumari, the southern tip of India. This hill has historical significance in connection to Sree Narayana Guru, a social reformer in 19th century Kerala.
☆	7. Reservoir Bank of Thenmala Dam	thenmala-dam-reservoir	Nibu Jacob	Thenmala Choose new match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	The longest reservoir in Kerala has beautiful banks and offers ecotourism facilities.
☆	8. Veli Beach in Trivandrum	veli-trivandrum	Nibu Jacob	Trivandrum Choose new match	4/22/2015	http://creativecommons.org/licenses/by/3.0/	Veli is a popular beach spot in Trivandrum to enjoy the sunset. Boats of local fishermen community can be seen parked on the beach during the daytime.

This RDF data was then incorporated into the HTML5 page using RDFa:

```
*C:\Users\nibu\Google Drive\projects\jacobnibu.info\photos\random-pictures-of-south-india.html - Notepad++ [Administrator]
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
random-pictures-of-south-india.html
1 <!DOCTYPE html>
2 <html>
3 <head>
4
5 </head>
6 <body vocab="http://purl.org/dc/terms/">
7 <h2 property="title">Random Pictures of South India</h2>
8 <p>Date: <span property="created">2015-04-21</span></p>
9
10 <div vocab="http://schema.org/" typeof="ImageObject">
11 <h2 property="name">Ayyampara</h2>
12 
13 By <span property="author">Nibu Jacob</span>
14 Photographed in
15 <span property="contentLocation">Ayyampara</span>
16 Date uploaded:
17 <meta property="datePublished" content="2015-04-21">Apr 21, 2015
18 <span property="description"></span>
19 </div>
```

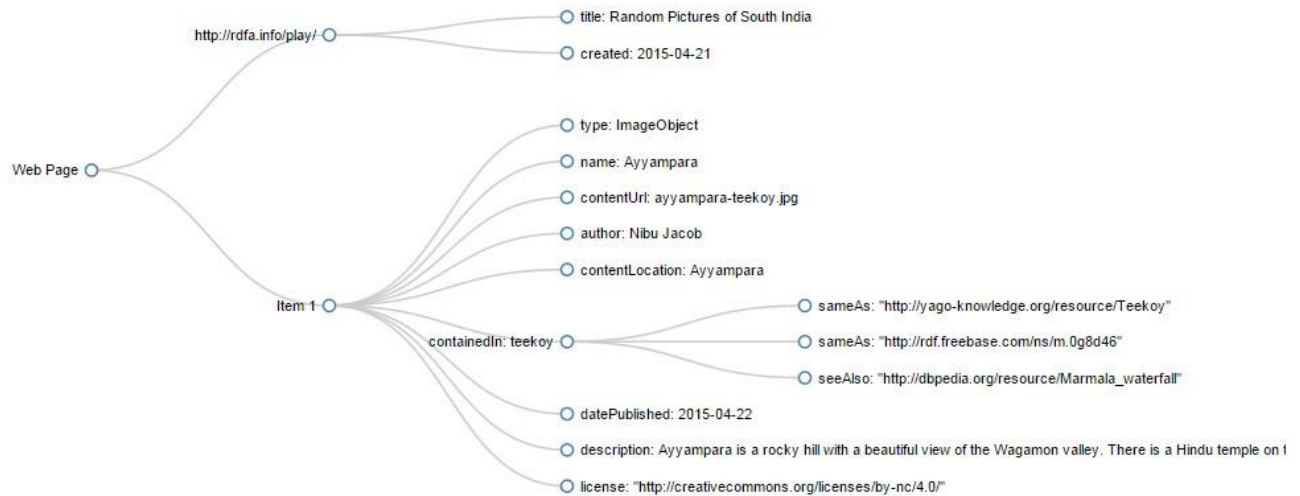
Terms in 'Description' column of the CSV data file were explored in DBpedia to find corresponding and related resource URIs. For the four contentLocation values that have no corresponding DBpedia URIs, connections to existing resources were explored. The search service of Sindice was useful for this [7].

To find existing sameAs links for the resources in the page, the search service at sameAs.org was used [8]. The dataset was linked to existing open datasets using owl:sameAs and rdfs:seeAlso properties.

Since multiple vocabularies (dc, schema, owl, rdfs) are used in the same document, the vocab attribute in body tag was replaced by a prefix attribute and predefined prefixes were used wherever possible [9].

The license information was updated using customized HTML code from Creative Commons site [10].

A part of the RDF data contained in the HTML5 page is displayed below using RDFa Play [11]:



For the data to get unique URIs, all photographs were placed in a folder named “photos” in a personal server “jacobnibu.info” and the HTML page was placed in the same folder to make the URIs dereferenceable. The human-readable data URI is <http://jacobnibu.info/photos/>

## References

1. <http://www.w3.org/TR/ld-bp/>
2. <http://www.w3.org/TR/xhtml-rdfa-primer/>
3. <http://schema.org/ImageObject>
4. <http://refine.deri.ie/>
5. <http://openrefine.org/>
6. <https://www.youtube.com/watch?v=XdpzmGxA33U>
7. <http://sindice.com/>
8. <http://sameas.org/>
9. <http://www.w3.org/2011/rdfa-context/rdfa-1.1>
10. <http://creativecommons.org/choose/>
11. <http://rdfa.info/play/>