

# DBpedia Mobile: A Location-Enabled Linked Data Browser

Christian Becker  
Freie Universität Berlin  
Germany  
chris@beckr.org

Christian Bizer  
Freie Universität Berlin  
Germany  
chris@bizer.de

## ABSTRACT

In this demonstration, we present DBpedia Mobile, a location-centric DBpedia client application for mobile devices consisting of a map view and a Fresnel-based Linked Data browser. The DBpedia project extracts structured information from Wikipedia and publishes this information as Linked Data on the Web. The DBpedia dataset contains information about 2.18 million things, including almost 300,000 geographic locations. DBpedia is interlinked with various other location-related datasets. Based on the current GPS position of a mobile device, DBpedia Mobile renders a map indicating nearby locations from the DBpedia dataset. Starting from this map, users can explore background information about locations and can navigate into interlinked datasets. DBpedia Mobile demonstrates that the DBpedia dataset can serve as a useful starting point to explore the Geospatial Semantic Web using a mobile device.

## Categories and Subject Descriptors

H.3.3 [Information Search and Retrieval]: Information filtering; H.5.4 [Hypertext/Hypermedia]: Navigation

## Keywords

Semantic Web, Linked Data, Geospatial Web, DBpedia, Location Based Applications

## 1. INTRODUCTION

Mobile phones feature increasingly powerful hardware, software and data connectivity, and more and more phones are shipped with built-in GPS receivers, whose positioning capabilities are exposed to third party applications. In parallel, the Semantic Web is populated with an increasing amount of location-related data.

A Semantic Web data source which provides information that could be useful for a tourist exploring a city is DBpedia [1]. The DBpedia dataset<sup>1</sup> has been extracted from Wikipedia. For currently more than 2.18 million “things”, it features labels and short abstracts in 14 different languages, 489,000 links to images and 2,715,000 links to external web pages. The DBpedia dataset contains information about almost 300,000 locations. DBpedia data about

<sup>1</sup><http://dbpedia.org/>



Figure 1: DBpedia Mobile’s map view of resources in the user’s proximity.

these locations is interlinked with various other location-related datasets, such as the GeoNames, US Census, CIA Factbook, and EuroStat datasets. Altogether there are around 185,000 external RDF links into other RDF datasets on the Web, making DBpedia an important interlinking-hub. The DBpedia resources are classified within three different classification hierarchies. These classifications provide for the filtering of locations according to their type, which is especially important on mobile devices with limited screen space in order to prevent maps from overpopulating.

## 2. THE APPLICATION

DBpedia Mobile allows users to access information about DBpedia resources located in their physical vicinity, from where they can explore links to other resources on the Semantic Web. DBpedia Mobile is accessed using a mobile phone’s web browser; a supplemental launcher application may be used to initialize DBpedia Mobile with the user’s current location as retrieved from a built-in or externally connected GPS receiver.

DBpedia Mobile’s initial view is an area map that indicates the user’s position and nearby DBpedia resources with appropriate labels and icons. The icons are mapped to selected YAGO categories [3]. Figure 1 shows DBpedia Mobile’s map view running under Opera Mobile 8 on a GPS-equipped Windows Mobile 6 handset. The map view can be panned by dragging it on the touch screen, or zoomed using the provided controls. In a settings pane, the display may be limited to specific resource types such as *Museums* or *Train Stations*. Also, the preferred language for labels and abstracts may be selected from the 14 languages supported



Figure 2: A Fresnel-generated *summary view* of a resource that includes a review obtained from Revyu.

by DBpedia. Clicking on a resource brings up a Fresnel [2]-based Linked Data browser displaying a *summary view* of the selected item. This view includes a short text describing the resource and optionally an image, a link to the resource's `foaf:homepage` and reviews from the Revyu<sup>2</sup> rating site if existent. Figure 2 shows an exemplary *summary view* containing a review obtained from Revyu.

Links at the bottom of the abstract allow the user to switch to a *photo view* with depictions of the resource and to a *full details view* of all properties available for the resource. These views incorporate information from other Linked Data sources. For example, geographic resources are enriched with information from GeoNames<sup>3</sup> and photos are provided by flickr<sup>TM</sup> wrapp<sup>4</sup>. Figure 3 shows a DBpedia resource's *full details view* that incorporates linked data from GeoNames. If the displayed data contains RDF links into other datasets, the user may click them to obtain a *full details view* of the referenced resource. In this manner, the user can navigate from the DBpedia dataset into other interlinked datasets. For instance, he could traverse GeoNames' `parentFeature` link hierarchy to find out more about the city, state and country in which a resource is located.

### 3. TECHNICAL BACKGROUND

DBpedia Mobile is realized as a client-server application with searches, data retrieval and storage as well as formatting activities performed on the server side. This architecture provides the application with high bandwidth, processing and storage resources, allowing search requests as well as the Fresnel-based view generation to touch on large amounts of data.

The client application is written in JavaScript and can be accessed with web browsers that feature adequate Document Object Model (DOM) Level 1 and 2 support to host the underlying Google Maps API, such as Opera Mobile 8. It is designed for displays with at least QVGA (320 × 240 pixels) resolution. The supplemental GPS launcher application is currently available for Windows Mobile 6. The map view is built from RDF triples obtained by sending the currently visible area as well as language

<sup>2</sup><http://revyu.com>

<sup>3</sup><http://www.geonames.org>

<sup>4</sup><http://www4.wiwiwiss.fu-berlin.de/flickrwrapp/>

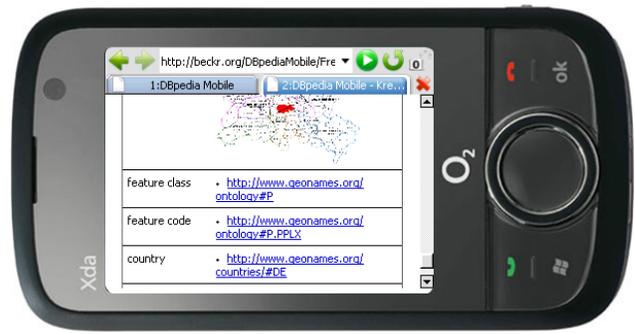


Figure 3: Interlinked data from GeoNames displayed in the *full details view*.

and filter settings to the server, where they are rewritten as a SPARQL query and issued to a Virtuoso server that hosts DBpedia's geocoordinates, article label and YAGO classification datasets. The Linked Data browser is implemented as a Java Servlet that generates XHTML views for given resource URIs and display purposes (*summary*, *photo* or *full details view*). It uses the SIMILE fresnel engine and the Saxon XSLT processor. The underlying data is obtained by dereferencing the resource's URI and by following known predicates (`owl:sameAs`, `rdfs:seeAlso`, `p:hasPhotoCollection`) found in that data. Review data is retrieved by issuing a SPARQL CONSTRUCT query against Revyu's public SPARQL endpoint.

### 4. CONCLUSIONS AND FUTURE WORK

We have introduced a mobile, location-centric DBpedia client that features a Linked Data browser and generates suitable data views using Fresnel. We have shown that the DBpedia dataset is well-suited for use as a starting point to explore the Geospatial Semantic Web.

As future work, we would like to include resources from other Linked Data sources such as GeoNames into the map display and extend DBpedia Mobile to support the publication of Linked Data. For instance, it could be interesting to enable users to tag photos, which they have taken with the phone's camera, with DBpedia URIs before publishing them on the Web.

More information about DBpedia Mobile is available from <http://wiki.dbpedia.org/DBpediaMobile>.

### 5. REFERENCES

- [1] S. Auer, C. Bizer, J. Lehmann, G. Kobilarov, R. Cyganiak, and Z. Ives. DBpedia: A nucleus for a web of open data. In *Proceedings of the 6th International Semantic Web Conference and 2nd Asian Semantic Web Conference (ISWC/ASWC2007)*, volume 4825 of *LNCS*, pages 715–728, Springer, 2007.
- [2] E. Pietriga, C. Bizer, D. Karger, and R. Lee. Fresnel: A browser-independent presentation vocabulary for RDF. In *International Semantic Web Conference (ISWC2006)*, volume 4273 of *LNCS*, pages 158–171, Springer, 2006.
- [3] F. M. Suchanek, G. Kasneci, and G. Weikum. Yago: A core of semantic knowledge. In *WWW '07: Proceedings of the 16th international conference on World Wide Web*, pages 697–706, ACM, 2007.