

<p>REPUBLIQUE DU SENEGAL ----- MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE</p>  <p>----- UNITÉ DE FORMATION ET DE RECHERCHE DE SCIENCES APPLIQUÉES ET DE TECHNOLOGIE (UFR SAT) ----- LABORATOIRE D'ANALYSE NUMERIQUE ET D'INFORMATIQUE (LANI)</p>		
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## Ph D Thesis Proposal

**Subject : Access mobile for web of data**

This Ph D thesis will be performed within the MoReWAIS project. MoReWAIS proposes to explore the specificities (advantages and constraints) of mobile knowledge sharing. The mobile application targeted in MoReWAIS must allow communities and their users to enrich and access more easily the knowledge base using the user's context with its richness (e.g. location, other users close-by) and addressing its limitations (e.g. intermittent access, limited resources).

It concerns the WIMMICS team from INRIA and the LANI team from UGB.

The PhD thesis will be supervised by Pr Moussa LO, Full Professor in Computer science.

### **Scientific context**

Within the project “social and semantic web platform for sharing knowledge about communities”, we have designed and developed a knowledge platform on top of Semantic MediaWiki using social and semantic web technologies and allowing to communities to share their cultural knowledge (Diallo et al., 2014, Diallo et al. 2015).

The platform allows Senegalese communities to share and co-construct their sociocultural knowledge by annotating socio cultural domain ontology. This platform has two objectives:

- (1) to provide a user-friendly framework for communities to collaborate and update data
- (2) and to provide tools enabling the querying and visualization of these data.

But these solutions must take into account local realities, especially regarding access to ICTs. Internet access is not always guaranteed in Senegal but one notes, however, the proliferation of mobile phones. So, it seems interesting to study how to develop and use mobile services to enhance access to social semantic web applications in general and to our platform in particular.

But there remains a need to design and make available highly usable approaches to allow anyone from his mobile to access or contribute to this data even with very limited Web access.

## **Thesis Objectives and Methodologies**

The thesis proposes to explore the specificities (advantages and constraints) of mobile knowledge sharing. The mobile application targeted must allow communities and their users to enrich and access more easily the knowledge base using the user's context with its richness (e.g. location, other users close-by) and addressing its limitations (e.g. intermittent access, limited resources)

We will design and develop algorithms, methods and tools for mobile devices allowing users to:

1. co-construct locally and on the road the Semantic Web of Data RDF triple stores representing the sociocultural shared knowledge.
2. Access and visualize in context relevant data from the knowledge platform

Specifically the work is divided into three parts :

1. This will start by a complete State of the art on “Mobile access to Web of Data” and Downscaled Web Initiatives”. This first dedicated phase will focus on identifying challenges and solutions in ensuring a coherent access in an unreliable environment and with limited resources and constrained interaction means. One direction is to evaluate the potential interest of having data strongly tied to geolocation and to social actors and structures to facilitate selection and anticipate needs. The student should detail the different approaches to consume data with mobile particularly mobile using android system. Another important aspect is to take account the very limited Web access.
2. In this step, new algorithms, methods and tools for mobile devices will be designed and developed to support the mobile access in read-write mode to a domain-specific RDF store. One direction is to take into account the user profile and context. Using user profile should

reduce the time consuming resources which are limited for mobile. Context can be used for rendering by taking account the user position (geolocation) and materials characteristics.

3. The last step is to apply algorithms and methods developed in the WestAfricaPedia platform where the main challenge is to deal with limited Web access. Thus in the previous step, this aspect should be take account in algorithms and methods proposed.

## References

- Seneviratne O., Patton E.W., Miao D. , Shih F., Li W. , Kagal L. and Castillo C. (2014) “MoLDing the Web of Data An Architecture for Mobile Linked Data Application Development”. @ISWC2014.
- Costabello L., Gandon F. (2014) “Context-Aware Presentation of Linked Data on Mobile” International Journal On Semantic Web and Information Systems (IJSWIS), IGI Global, 2014, 10 (4).
- Becker C. and Bizer C. “DBpedia Mobile:A Location-Aware Semantic Web Client” 1st Workshop about Linked Data on the Web (LDOW2008), Beijing, China, April 2008
- Ruotsalo T., Haav K., Stoyanov A., Roche S., Fani E., Deliai R. (2013) “SMARTMUSEUM: A Mobile Recommender System for the Web of Data” Journal of Web semantics, vol. 20, 2013.
- Van Woensel W., Casteleyn S., Paret E., De Troyer O. (2011) "Mobile Querying of Online Semantic Web Data for Context-Aware Applications" IEEE Internet Computing Special Issue (Semantics in Location-Based Services), Vol. 15, N° 6, pp. 32-39, Eds. Sergio Ilarri, Arantza Illarramendi, Eduardo Mena, Amit Sheth, ISBN-ISSN: 1089-7801
- Pappachan P., Yus R., Das K.P., Mehrota S., Finin T., Joshi A. (2015) “Building a Mobile Applications Knowledge base for Linked Data Cloud” [MoDeST@ISWC2015](#), pp. 14-25.
- W3C Mobile Web initiative, [www.w3.org/Mobile/](http://www.w3.org/Mobile/)
- Downscaling the Semantic Web initiative, <http://worldwidesemanticweb.org/>
- Papa Fary Diallo, Olivier Corby, Isabelle Mirbel, Moussa Lo, and Seydina Moussa Ndiaye (2015). HuTO: une Ontologie Temporelle Narrative pour les Applications du Web Sémantique. In Proc. 26e Journées francophones d'Ingénierie des Connaissances, Rennes, France, July 2015
- Papa Fary Diallo, Olivier Corby, Moussa Lo, Isabelle Mirbel, and Seydina M. Ndiaye (2014). Sociocultural Ontology: Upper-level and Domain Ontologies. In Proc. JFO - 5èmes Journées Francophones sur les Ontologies, Hammamet, Tunisia, November 2014.

## Candidate profile

The Ph D candidate must have a Master degree in Computer Science with solid know-how in semantic web technologies. Knowledge in mobile development will be a plus.