Development and Preservation of Yorùbá Cultural Identity: An Ontology-Based Approach

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Abstract

Yoruba cultural identity is the primordial conception and perception of belonging to the Yorùbá worldview as a group, a nationality, an ethnic entity, a religious world, a political class within spatial locality. The cultural identity is threatened with civilization. As society grows and becomes more civilized, cultural values and identity nosedive, a problem begging to be reversed. Ontology annotation is a semantic web engineering method of sharing the concepts of a domain in explicit and machine-readable format. Packaging our cultural values in a way that will foster machine use is a problem which this research presents ontology based approach as a perceived solution. Few scholars' efforts towards development of Yorùbá language are discussed. A sample presentation of processes involved in ontology development and the relationship between it and Yorùbá studies are mapped out. The paper proposes that these methods will perform an important role in re-presenting the values in our cultural identity in such a way that it becomes utilizable with modern technological tools and in a way foster the development and preservation of our cultural identity towards long-term ends and achievements.

Keywords: *Yorùbá studies, cultural identity, ontological annotation, computational linguistics*

Introduction

Culture and identity are two distinct terms, though they are inseparable and entrenched. The fusion of these terms reflects the totality of traditions, customs, norms and values of a particular race, which easily identifies and presents that society as an entity distinct from others. Yorùbá society is rich with so many cultural heritages, reflected in their life and humanistic values. However, as society grows and becomes more civilized, these values and identity unfortunately gradually nosedive into inconsequence. The unprecedented result has spurred so many concerned groups and individuals into action, with a view to rescue and reverse this trend. Despite that so many rescue efforts are being staged, the feat of employing modern information and technology resources as a platform to develop and preserve the dying cultural identity has not been so much achieved. The aim of this research is to lend the needed support to the "rescue mission" through ontology development. This paper highlights the individual and collective efforts towards the development and preservation of the sinking Yorùbá cultural identity. It outlines one of the available ICT-based resources that could be employed to propagate our cultural identity

which is ontology. A sample process of developing ontology based on Yorùbá studies as a concept is designed and presented to show that much is yet to be done. The challenges are outlined, and the recommendations for future development are proposed with the strong belief that if they are taken, our fading cultural identity could still be brilliantly polished to a high sheen.

Efforts toward the Development and Preservation of Yorùbá Cultural Identity

Efforts at developing Yorùbá language started since early 1800s by the early missionary society, and it continues till when the standard Yorùbá orthography was finally written in 1974. The two volumes of the Yorùbá metalanguage by Bámgbóṣé (1965) and Awóbùlúyì (1988) remain in use till today. However, the activities of some bodies, and few individuals are highlighted in the following sections as samples of developmental process in preservation of cultural identity.

Yorùbá Studies Association of Nigeria [Ẹgbé Onímọ̀ Èdè Yorùbá]

This association was formed consisting of the scholars and promoters of Yorùbá language, literature and culture located in Southwestern Nigerian universities and colleges of education. These academics, through the *"Yorùbá" - Journal of the Yorùbá Studies Association*" have been promoting Yorùbá cultural identity. Added to this is the annual conference where these scholars rub minds to fashion out systematic ideas and proffer solutions to developmental challenges. Other Yorùbá departments in the Southwestern universities also have their respective journals to complement publishing efforts of scholars in the interest of promoting the Yorùbá cultural identity. Many of these academics also belong to the West African Linguistic Society and they publish scholarly research reports on Yorùbá language developments in the *Journal of West African Languages Society*.

Association of Yorùbá Language and Culture Teachers [Ẹgbẹ́ Akọ́mọ̀lédè àti Àṣà Yorùbá]

This association shares the same objective with the Ẹgbẹ́ Onímọ̀ Ìjìnlẹ̀ Yorùbá: promotion of Yoruba heritage. The association consists mainly of teachers in secondary schools and lecturers in polytechnics and colleges of education in the Southwestern. They also hold conferences annually across Southwestern states in August every year. They have *Yorùbá Gbode*, a journal where scholarly research articles are also published. This group has also worked together with the Yorùbá Studies Association of Nigeria during the review of Yorùbá metalanguage I and II. They also formulated the curriculum which the National Educa-

tional Research Development Council (NERDC) approved for teaching of Yorùbá in high schools.

Individual Academic Scholars

In addition to the collective efforts of these two bodies, other individuals like Babalola, Olabimtan, Olatunji, Oyelaran, Abimbola, Isola, Yai, Olutoye Olajubu and many others who have made a great effort in the development and promotion of Yorùbá language, culture and identity. Their efforts are acknowledged and commended. Below are other scholars who worked on development of Yorùbá language in addition to others not mentioned here.

Ayọ̀ Bamgbose

This scholar based his research on Yorùbá language while he taught at the University of Ibadan and wrote a lot of books on grammar, literature and stylistics in Yorùbá. These are some of the book titles to his credit: *A Grammar of Yorùbá* (1966), *A Short Yorùbá Grammar* (1967). *The Yorùbá Verb Phrases* (1972), *The Novels of D.O. Fagunwa (*1974), *Fonọ́lọ́jì àti Gírámà Yorùbá* (1990). He was one of the members of the Committee on Yorùbá Orthography in 1966 and 1969. He edited Yorùbá Metalanguage II. He has delivered many lectures across universities in Nigeria and abroad.

Oládélé Awóbùlúyì

He got his training in the University of British Columbia, Canada in 1967. His lifetime research has been on Yorùbá grammar. He wrote *Essentials of Yorùbá Grammar* in 1978, *Èkọ́ Ìṣẹ̀dá Orọ̀ Yorùbá* in 2008, *Ẹ̀kọ́ Gírámà Èdè Yorùbá* in 2013. He edited Yorùbá Metalanguage Vol. I. He presented many lecture series in conferences, university open lectures and several academic fora, some of which include "Linguistics and Nation Building" in Ibadan, "Yoruba must not die out" in Ife (2014), "Language Policies in Africa" in New Orleans, USA, in 2012. He is the current chairman of the Yorùbá Cross Border Language Commission.

Kola Owolabi

This professor of linguistics based in University of Ibadan wrote *Ìjìnlẹ̀* Ìtúpalẹ̀ Èdè Yorùbá – Fonọ́lọ́jì *àti Fónẹ́tîkì* in 1989, the primary text which all tertiary institutions teaching core Yorùbá phonology cannot do without. He founded the Mother Language Day celebration in Nigeria when he inaugurated the maiden edition in February 13, 2008 in Ibadan, with the lecture titled *"O tó gẹ́ẹ́ – Ogunìlò èdè Yorùbá ní ipòkípò àti àyèkáyè ti di jíjà wàyí.* And since then the mother language day celebration has been widely accepted by the Yoruba Teachers Association of Nigeria (*Ẹgbẹ́ Akọ́mọ́lédè àti Àṣà Yorùbá*). He is the founding director of the Babs Fafunwa Centre for Yorùbá Language Engineering, where activities for creating, compiling and computation of Yorùbá terms for use in commercial,

legislative and mass communications business; and project director for the ongoing English–Yorùbá Bilingual Dictionary project.

Lawrence O. Adéwọlé

An erudite scholar trained in Linguistics at the University of Edinburgh, teaching in O.A.U. Ife, he is the author of *A Bilingualized Dictionary of Yoruba Monosyllabic Words* and many academic works. He founded a blog, "Yorùbá for academic purposes (yorubaforacademicpurpose.blogspot.com), where people can post diary entries about their personal experiences, hobbies, academic research reports and other write-ups intended to showcase one's research in progress and share knowledge on the global arena.

The Mass Media

The two branches of mass media, press and broadcasting, have done a great job in the development and promotion of Yorùbá identity. The press, right from 1859 to 1952, has been printing Yorùbá poetry, drama and other literary works including Yorùbá creative writings. The periodicals, like, *Ìwé Ìròyìn Yorùbá*, *Gbohùngbohùn*, and *Ìṣọ̀kan*, have done a great deal of job in the past. Up till now, *Aláròyé* and other Yorùbá newspapers keep featuring columns in which Yorùbá cultural identity is propagated. Radio and TV stations in Yorùbáland dedicate a good percentage of their programs to different cultural concepts.

It must be noted that our highlights have just scratched few of many individuals, associations and corporate bodies who have been participating in one way or the other in promoting our common cultural identity, contrary to some Yorùbá elites and politicians poised to relegate it to the background.

Computational Linguistics to Modernize and Preserve Yorùbá Identity

Employment of computers in processing human language and its activities is a modern practice. However, it has not been so common in developing countries like ours. The beauty in form and practice of Yorùbá cultural identity has not been presented in the format that makes it easily accessible for processing in knowledge sharing systems and reuse across various domain-specific applications. Ontology is a means to an end in documentation and preservation of data for semantic web exploration. It is a branch of computational linguistics which is an interdisciplinary field of computer science and linguistics. However, computational linguistics is concerned with the interaction between computers and human language. It is an attempt to solve linguistics problems with computational approach. The development in ICT portends many challenges to linguists to shift more attention to how these technological tools and advancements may be explored to improve and modify our "local content" and help in abating linguistic challenges. Other fields of computational linguistics apart from ontology building are natural language generation (NLG), natural

language processing (NLP), machine translation (MT), automatic text generation, artificial intelligent system (AIS) and expert system (ES). Our contribution is positioned in the ontology development branch of computational linguistics. It is also related to semantics as a branch of linguistics.

What is ontology and why do we need at least one?

Like other human terms and definitions, ontology differs depending on where the inquirer determines to draw the line. The word is in a branch of philosophy known as metaphysics, which deals with the nature of reality of what exists. It is derived from Greek *onto,* meaning "being" and *logos,* meaning "science." So traditionally, ontology is the "science or study of being." Lawson T. (2004:1). There are two senses to the study of the term.

1. Something that exists; an entity or a thing
2. What it is to be or to exist; what all existing things have in common.

So ontology has to do with the study of what exists, that is the entities or things, what to exist and what all these existing things have in common. In other words, ontology amounts to the study of anything and everything; for everything is a part of being and what is involved in its existence.

Ontology is a concept in information science. According to Mizoguchi and Ikeda (1996), philosophers refer to ontology "as a theory" which can answer question such as "what is in existence" Therefore, ontology is a shared understanding of some domain of interest (Ushold & Gruinger, 1996). Gruber (1993) also defines it as "explicit" formal specifications of the terms in domain and relations among them. So, an ontology defines a common vocabulary for researchers who need to share information in a domain. It includes machine-interpretable definitions of basic concepts in the domain and relations among them. For modelling knowledge-based systems, a rich background knowledge is essential. And there is increased need for formal computation and viable description of the domains of operation of those systems. Though "commonsense" that is taken for granted, but there is need to characterize its features.

For example, Penman upper model (Manner et al 1985) is an ontology constructed for a computational system for automatically generating natural-language texts, meant to serve as a mediator between domain knowledge that was to be expressed in natural language generation (NLG) and the system. Semantic knowledge captures regularities of language expression. For example, a medical doctor has in his domain knowledge the diagnosis of the symptoms of fever, headache, cough, cold and tiredness as malaria. But in the semantic knowledge of the intelligent system needed for bilingual English-Yorùbá medical automation, the native intuition as to whether literal or symbolic meaning of the symptoms mentioned above needed to be captured. "Tiredness" could refer to the symptoms of malaria mentioned above and it could also refer to some psychological malady of someone who has been behaving abnormally or has

failed to do what is right which Yorùbá will say *ó rẹ́ ẹ́*, meaning literally "You are tired," but in the deep sense indicates "You are sick upstairs." Capturing these intuitional regularities is the job of ontology in the medical domain.

Noy and McGuinness (2001) summarize why someone will need ontology in these five reasons as: To share common understanding of the structure of information among people or software agent, to enable reuse of domain knowledge, to make domain assumptions explicit, to separate domain knowledge from operational knowledge, to analyze domain knowledge

Sharing common understanding of the structure of information among people or software agents is one of the more common goals in developing ontologies (Musen 1992; Gruber 1993). For example, suppose several different websites require information related to activities in Yorùbá studies, these websites could share and publish the above underlying ontology of the terms in the concept from which they all can use, then computer agents can extract and aggregate this information, then this aggregated information can be used to answer user queries or as input data to other applications. For example, in our ongoing research we propose to develop ontology for Yorùbá food concept. This work presents appropriate combinations of food classes in daily meals. This ontology can then be used as a basis for some applications in a suite of restaurant-managing tools: One application could create suggestions for the menu of the day or answer queries of waiters and customers. Another application could be developed for web-shopping agents who will enable users to shop for these foods while at home and it will be delivered as "Jumia" delivers anything. Other uses of ontology are listed below:

Linguistic ontology

Linguistic ontology falls under domain ontology. In domain ontology, terminologies are first extracted from available corpora. These domain terms, both simple and complex, are semantically interpreted and arranged in a hierarchical fashion, then the appropriate string and conceptual relations among them are mapped. This is done with the goal of reducing or eliminating the conceptual and terminological confusion among the members of virtual community users, especially when these users may need to share electronic document and information of various kinds. Take the word *ìran* in Yorùbá, which could mean "generation" or "scene." Ontology finds solution to semantic interpretation of issues like this by defining the intrinsic properties of the term, stating and conceptualizing the different senses which it can be inferred at the logical reasoning so that the appropriate meaning will be rooted to the domain of discourse (DOD) when shared in electronic documents. An example of such ontology is Wordnet, which uses psycholinguistic theories of human memory to organize English nouns, verbs and adjectives into synsets, each representing one underlying lexical concept exploring different relations to link these synsets.

Essence of ontology to Yoruba cultural life

Let us generate from all the areas of study in Yorùbá what can be called "Yorùbá dataset" (i.e. a grammar, dictionary or corpus generated from the areas of specialization in Yorùbá study). This dataset will need to be developed for applications and knowledge-based systems. Following the practical steps below as outlined by Noy, et al (2000).

1. Defining the classes in the concept,
2. Arranging the classes in a taxonomic (subclass–superclass),
3. Defining slots and describing allowed values for these slots,
4. Filling in the values for slots and instances.

We can define and model the three classes of the concept "Yorùbá Studies" and present it in the taxonomic representation in Fig. 1 below as:

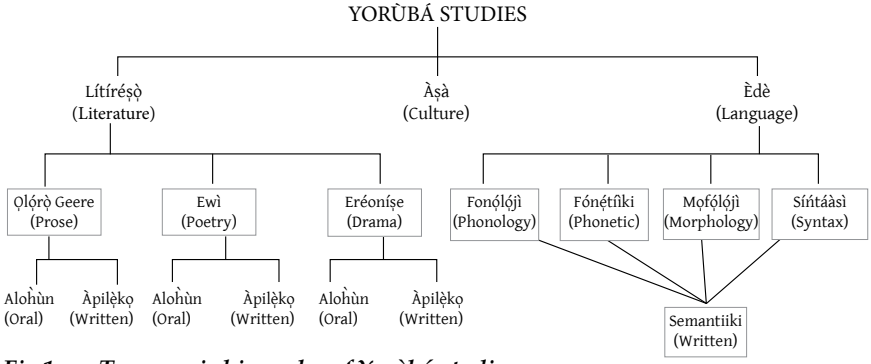

Fig 1: Taxonomic hierarchy of Yorùbá studies

The next step is to define slots and describe the allowed values for these slots with axioms that specify the intrinsic property that determine their relations. Just for simplicity at this preliminary stage, we can isolate only the first part of Yoruba studies *lítírésọ̀* and sketch it out diagrammatically in Fig. 2 below:

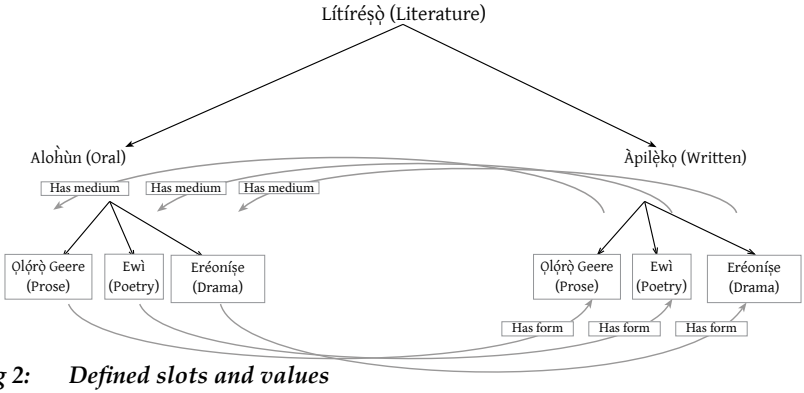

Fig 2: Defined slots and values

We take the properties of these classes and subclasses as *slots* and the filled value for the *slots* as *instances* using protégé 4.0 an enhanced version of OWL (web ontology language) as our editing tool we can have the model in its mid-way facet as shown in Fig. 3 below:

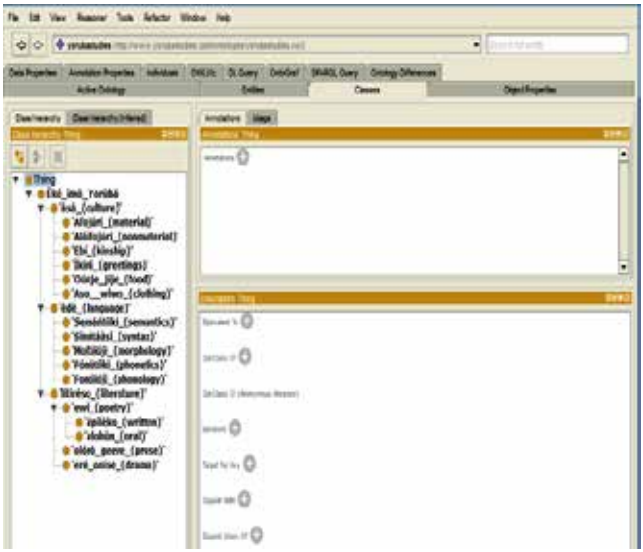

Fig 3: Yoruba studies ontology

Challenges and Solution Proposal

Funding: The renowned scholar, Tunde Adegbola, identifies funding as a major problem hindering the development of ICT-related projects in Africa when compared to other parts of the world (Adegbola, 2009). Individuals, groups, governmental and nongovernmental agencies, are encouraged to join in the development of Yorùbá cultural identity with the use of ICT resources such as demonstrated in this chapter, through funding. This is crucial as it will increase easy processing of native-language corpus data and effective gathering of hardware and software tools for increased efficiency.

Resource toolkits: Language resource toolkits are materials needed in processing data. Some of these resources used to develop ontologies are OWL (ontology web language), Protégé, a modified version of highly successful the DARPA, and so on, are only implemented in languages like English. They are not designed giving concentration to the peculiarities of African languages, including Yorùbá. If we must develop our own ontologies, which are inevitably needed to

put our values and culture into the limelight, then we must interact thoroughly in our research with the original owners of these resources.

Ontology activities are multifaceted: As stated earlier, ontology deals with concepts and the relationship between the elements in them. Imagine the enormous number of concepts involved in each aspect of Yoruba language, literature, culture, music, religion, food, and so on. Processing each of these concepts involves so much of tasks and efforts, and they equally demand different tools, approaches and architecture. No single individual can do it all alone, hence the need to train new ones to get involved in the developmental task and procedure. This again still requires funding. If we must showcase the richness in cultural identity, urgent funding is required from both government and corporate individuals.

Heterogeneity of Yorùbá corpus data: A proverb says *Gbogbo èdè la gbọ́, a ò gbọ́ Yorùbá bọ̀rọ̀* ("All languages are easy to understand, but Yorùbá is not easily understood"). This single proverb can demand so much semantic underpinnings applicable in different situations and events. If we would design a conceptual ontology on the elements and the sub-components of these elements, so much would have been undergone. Yorùbá is rich in meaning and full of interpretation controversies. However, with concerted effort such as those addressed by this work and others, it is eminently achievable.

Peculiar technical issues in linguistic ontology: Yorùbá is a tone language. It requires diacritic symbols and signs to be well-documented in written form. These diacritic are not incorporated in the linguistic ontology tools available, hence the need to go extra mile. Yorùbá orthography is principle-based and close to the phonetic realization of the sound. The programming languages available do not implement with these peculiarities. Despite these challenges, persistent effort will surely triumph with time.

Recommendations

- Government should make substantial funds available for tertiary institutions, group and individuals interested in engaging in this kind of research, a practice in other parts of the world that has led to the development of those resource toolkits that we tap into.
- There should be collaborative research activities between humanities and science, especially computer science, so that we can do as the Yorùbá proverb says: "*Bí a bá pa ìtọ̀ pọ̀, á hó yaya*" (If we combine urine, it will foam).
- NGOs should rise (in the case of those who have started) to complement government efforts, initiate or push government agencies (in case of those whose eyes are not open to this fact) so as to move the preservation of cultural identity forward.
- Each university, especially in Southwest Nigeria should set up

Yorùbá-language engineering units where the students can start their training. Courses should also be required in computer science departments and the ICT resources available in the host university should be well explored by the Yorùbá department so that more teachers and students will be exposed to how computer can help in developing our local and indigenous values.

- The Federal Ministry of Education under NERDC should take more proactive measures in setting up Yorùbá language engineering units such as that established in the University of Ibadan with the focus of acquiring more ICT resources in developing and preserving our Yorùbá cultural identity.

Conclusion

We have highlighted the earlier and ongoing activities toward the development and presentation of cultural identity. Ontology development as a branch of computational linguistics has been isolated as a way of achieving the earlier stated goals. Basic facts about ontology and a sample application to the concept of Yorùbá studies have been demonstrated. The challenges and recommendation for future development have been considered. However, we urge that we all should join hands in achieving the common objectives so that in future, we will not go and buy this cultural identity from outsiders when they might have usurped and modernized these things, just like we presently go to buy our own petroleum products and resources from them now.

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