

Refugee Ontology v1: Ontology of Refugee Home Return

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Abstract

Refugeehood is a multidimensional phenomenon and a complex challenge facing the world today. To equip policy-makers and civil organizations with knowledge tools that can improve their plans, programs, and evaluation, we develop an ontology of refugees' home return. Home return is a sub-field of refugee studies and one of the most elusive. Modeling this sub-field, using the OntoClean method, helps us create a coherent whole, accounting for the complex relations between the various factors that construct home return. In addition, the ontology rigorously defines and (re)constructs the concepts from the literature on home return, providing clarity and rigor for scholars of refugee studies. We conclude with discussion of future plans to develop an online application that makes this ontology friendly for normal users.

Keywords

Refugee, Home Return, OntoClean, Ontology

1. Introduction

The last decade has witnessed one of the biggest refugee waves in the world since the Second World War. Conflicts in the Middle East formed a basic reason for this big flow of refugees, which has been known since 2015 as the refugee crisis, especially in the European Union [1]. As the label (refugee crisis) indicates, the huge influx of refugees from the Global South has created one of the worst political and social crises that the EU has faced; far-right parties have soared up and social and political strives have increased [2, 3]. The EU is not the only region that has to deal with the complex problem of refugees. Turkey, for example, hosts the highest number of refugees in the world ¹ and, similar to the EU, refugees became a divisive issue among political parties and societal groups [4].

The reasons why refugees strain societies and states politically and socially are outside the scope of this ontology. This ontology deals with how states, Non-Governmental Organizations

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¹IOM: https://www.migrationdataportal.org/international-data?i=refug_host&t=2021

(NGOs), and other organizations can effectively tackle refugee-related issues, especially home return. We aim to build an ontology that enhances the governance system of refugees as the final goal; however, we start by modeling an ontology of refugees' home return as a sub-topic.

The literature on refugees (as enforced displaced people) is rich with hundreds of academic articles. This literature provides us with theoretical frameworks of concepts, measurements, causal relations, correlations, and empirical evidence about the multifaceted situation of refugees. Practically, however, even the most advanced democracies in the world cannot so far deal effectively with the challenges kindled by refugees' influx, let alone NGOs. How can the literature on refugee studies be used in a way benefiting governance? How can complex concepts and their relations be reached by policy-makers to optimize their agenda, plans, and evaluations?

Ontology engineering can bring two benefits to this research:

- Logical rigor. It can bring rigor to the various concepts and theories by utilizing the formal foundation for all of modern mathematics: set theory and logic [5].
- Knowledge organization and semantic search. The ontology can be used with Natural Language Processing technology to organize the literature according to formal models and to perform "semantic search," which has shown significant advantages in combating other emergencies such as Covid-19 crisis [6].

Ontology of Refugee Home Return (Refugee Ontology, henceforth) aims primarily at bridging the gap between practitioners and the academic literature on refugee studies. In the future, this goal materializes by developing an application - based on the ontology - by which policy-makers can utilize knowledge produced in the literature. More specifically, Refugee Ontology aims at achieving the following long-term goals:

- Modeling the literature on refugee studies to enable researchers to have a formal model of the concepts that are used and the relations between them.
- Enabling policy-makers (and NGOs) to understand and use the concepts applied in the literature, their relations, and their variations. Hence, policy-makers can decide how to plan their policies based on scientific arguments and evidence. Furthermore, policy-makers can discern and evaluate different arguments or causal relations between concepts and design their plans according to what they think fits better.
- Enabling policy-makers to upload real data to the ontology in order to (a) test relations between various concepts/factors and (b) measure their programs' impact. This will be also useful for academics as they can test related conditions according to huge data.

To achieve these goals: we conducted a systematic literature review on refugee studies by manually searching in Google Scholar, tracing citations, and using keywords such as repatriation, home return, and refugees; we built a conceptual model that embraces the whole concepts and their relations we found in the literature; we modeled the ontology using the OntoClean method; we utilized the Protégé ontology editor from Stanford University to develop the ontology formally, using OWL language; and we finally suggested a plan for an application that is friendly for normal users (See Online Resources).

This paper presents only one portion of refugee studies, which is refugees' home return. We choose this part of the literature for a basic reason. Based on our discussion with many experts on refugee studies, they expressed their doubts that a very complex and elusive field of knowledge as refugee studies, especially home return, can be modeled formally. Home return is the most complex and elusive sub-field of refugee studies [7]. For example, while we know certainly that language learning increases refugee integration in a host country, there is no single factor that can account certainly for refugee home return [8]. Hence, modeling home return is a challenge that we take. Finally, we could not find any similar and well-documented ontology in Google Scholar, BioPortal, and Ontohub repositories; thus, this might be the first ontology of this specific topic.

2. Refugees' Home Return

The literature on refugees' home return swirls around a basic question: under which conditions a refugee seeks to go back to her original home *voluntarily*, or, similarly, when a refugee *actually* returns to home. The literature on this topic is complex. Therefore, drawing on our survey of the literature, we classify it into three sets of factors determining refugees' desired/actual home return. The first set includes the myriad conditions of refugees' lives in the host country; the second includes conditions of refugees' – original – home; and the third accounts for refugee individuality, her identity and agency.

2.1. Host Country Factors

The host country is the country where a refugee settles, legally or not, having the status of refugeehood or as an asylum seeker. Complex factors in the host impact refugees' desire to return home; however, the most important factors are integration and transnationalism.

Integration refers to refugees' success in engaging in the host country economically, socially, and culturally (according to the European Union).² Economically, integration refers to success that refugees make in terms of having a job and being independent (from receiving aids). Studies do not reach a consensus on how integration impacts refugees' home return: while some studies have argued that a well-integrated refugee, economically, is less likely to return home because she is satisfied with her economic well-being in the host country, other studies have argued the opposite [9]. The logic behind these arguments is simple. When a refugee is successfully integrated in the job market, she lacks any incentives to repatriate where she might be less well-being; on the other hand, a successful refugee alludes to a strong and independent person who can be also successful in her home. The same logic can be extended to other fields of integration, such as cultural (embracing the host's values and speaking its language) and social integration (having friends, for example). Hence, successful integration, as a whole, may imply less likelihood of home return [10] or higher desire of home return [11].

Transnationalism refers to activities conducted by refugees in the host country by linking the host and home together [12]. Remittance is an activity of sending money - by refugees - from the host to home. This is a typical example of transnational activity. Buying home-related

²<https://www.consilium.europa.eu/en/meetings/international-summit/2015/11/11-12/>

food from supermarkets run by refugees in the host country and cooking traditional meals are other examples. Similar, teaching children native languages and playing traditional music are also transnational activities. Contrary to integration, transnationalism has a straightforward relation with home return; refugees are believed to desire home return more when they are engaged in transnational activities [12].

2.2. Home Country Factors

Home is not fixed. The place refugees had fled is not the same place they will go back to. Therefore, the literature has drawn a nuanced picture of home to which refugees are more likely to return. First of all, safety is a necessary, but not sufficient, condition of home return. No refugee returns if she fears any type of – at least – physical threat [13]. All the other factors, to ignite home return, should be built upon this condition. These factors can be lumped under one label: *reintegration*.

Reintegration in home refers to the ability of a would-be returnee or an actual returnee to rebuild her life at the social, political, and economic levels in home, effectively. Political reintegration, to start with, is the backbone of the wide phenomenon of home return. Refugeehood is not an individual phenomenon in its nature; i.e., someone does not become a refugee based on individual properties, but only based on properties of the collective to which she belongs [14]. Someone will not be granted a refugee status if her country is not suffering from a collective problem, such as war, systematic persecution, and economic regression. Hence, home return is a political project similar to creating a new social contract [15]. The concept of political reintegration grasps exactly this dimension of home return; it is the ability of a (would-be) returnee to be an active political agent in her home. This requires a certain degree of democracy.

Social reintegration is another important condition. It refers to the social network a (would-be) returnee has in her home [16]. A refugee who lacks an effective and welcoming social network cannot repatriate as her home will be another exile.

Finally, economic reintegration refers to the ability of a (would-be) returnee to be active in her home's market. Some refugees may lack the necessary skills to engage in their home economically as the necessary skills for integration in host countries may differ from those for the home [17]. Political, economic, or social integration is a necessary condition for voluntary return, but not sufficient.

2.3. Individual Factors

As we discuss voluntary home return, then the individual is the basic actor. In the literature, two concepts are discussed at the individual level: agency and identity.

Agency refers to the possible array provided to a person to *do* and to *be* in a social system [18, 19]. For example, having a job, expressing identity, and practicing values form an array of capabilities that an agent can achieve. Recently, the literature has begun to pay serious attention to refugee agency; that is, refugee is not seen as passive or agentless even if she is generally vulnerable [20]. We assume that agency is a positive factor for home return.

Identity, on the other hand, is a continuous process, marked by a constant negotiation between host country's values and home's values, between the past and the present, between

cognitive and emotional dimensions. Home return is mainly ignited by the need for belonging and identification [21, 22]. Identity is a complex concept. Being inspired by [23] and for drawing a nuanced picture, we model identity across three concepts: attachment, belonging, and placemaking.

Attachment refers to refugee's strong emotions anchored in a place. In other words, parts of the individual identity are formed by or manifested in a certain place. If this place is the home, a refugee is more ignited to return. Belonging is a concept related to groups; i.e., to which group a refugee belongs. If a refugee has a strong belonging to a local group in her home, then she has strong incentives to repatriate. Placemaking or home-making entails that home is not only a physical place but also an abstract, immaterial space; it is a space where individuals can belong, and more importantly, can *make* this belonging by composing material and immaterial capitals together [24]. Therefore, understanding how a refugee forms her belonging, attachment, and homemaking will help define whether this refugee is less or more likely to be a would-be returnee.

3. The Ontology

In this section, by using the OntoClean method, we build a referential ontology, which is a “theoretical” ontology serving as a reference to the applicable or practical ontology, which we will discuss later.

3.1. Referential Ontology

We adopt the OntoClean method [25, 26] to build our ontology. The notions of this method are complex, so We will explain them as we walk through the ontology.

The first class we discuss is Refugee. We define Refugee Class broadly as a class of individuals living legally or not in a different country from their original and who had left their original home place/country involuntarily due to systematic problems. These two conditions (living in a different country from home and being involuntarily displaced) are necessary and sufficient to be a refugee. They define the criteria of *membership* of the Refugee class according to the OntoClean. In OntoClean, however, we are not interested only in identifying the membership criteria. We are interested more in *identity*. Identity is the criterion of sameness [25] that is *carried* (+I) or *supplied* (+O) by a property (being a refugee), which addresses the question: Is this person the *same* refugee in time t1 and t2, or is *this* (the) refugee Ahmad, Ali, George, Rim, etc.? Hence, identity is informative about a unique instance of the class, whereas membership criteria deal with the question of: Is X a refugee? The property of being a refugee does precisely carry an identity criterion that makes every instance of the Refugee class identified as such (so, we say this refugee Person1 is different from that refugee Person2 and both of them are refugees; that is, every person is evaluated separately and individually from her group or from other persons to be a refugee or not). In other words, every refugee is unique. This identity criterion is not essential, however. A refugee can cease to be a refugee; she can become a refugee again after losing her status; she can concede her status as a refugee; and the like. We call this identity criterion anti-rigid according to OntoClean (~R). Being a refugee also depends (+D) on the existence of other classes, home country and host country, at least. Finally, since a refugee

is a person, then being a refugee carries unifying criteria (+U); i.e., a refugee is a *whole*, as an ocean, a car, etc. are wholes; we can tell which part belongs to this refugee-whole and differs from the rest of the world (e.g., Person1's arm, Person2's story that qualifies her to be a refugee). As a result, being a refugee carries an identity criterion (+I), carries a unifying criterion (+U), is dependent on other classes (+D), and is anti-rigid (\sim R). Intuitively, Refugee is subsumed by the class of Person which *supplies* (+O) an identity criterion (i.e., holds its own identity) to the Refugee class, carries a unifying criterion (+U), is independent from any other class to be as such (-D), and is rigid (i.e., being a person is an essential property, +R).

This type of conceptualizing the class of Refugee becomes important when we compare it to the class of Refugee Group. Refugee Group is a class whose instances are groups of refugees, such as Syrian refugees, who live or had lived in certain host places. Refugee Group's membership criterion is clear: any collective that had involuntarily left its home and sought refuge in another country. This class, differently from Refugee, does not *carry* (+I) an identity criterion but *supplies* one (+O). Additionally, and necessarily, being a refugee group is a rigid type of property (+R) as no refugee group can cease being so at any time. Our understanding of Refugee Group assumes that a group is not the sum of its members and contrary to the individual (a refugee), a group is eternal, and its existence is material (as we observe real people) and/or immaterial (as we conceive of specific perceptions of the world based on our experience with some certain groups even if these groups materially exist no more).³ For example, the Syrian Refugee Group in Germany may cease to exist materially (all of them go to a third state), but the group will continue to exist as a part of the German memory, Syrian memory, and the international refugeehood system. A Syrian, 100 years from now, may create her decision to emigrate to Germany based on the memory she inherited from her parents or formed from films about the Syrian Refugee Group that once, materially, existed in Germany. A refugee can cease to be so as she repatriates, whereas a group cannot. Refugee Group, additionally, is dependent on the existence of a home place, a host place, a memory system, and people who will remember, etc. (+D). Refugee Group lacks a unifying criterion, contrary to Refugee, and we choose to characterize it as anti-unifying criterion (\sim U). This means that necessarily not all the instances of the Refugee Group are wholes (Water and Amount of Matter have an anti-unifying criterion, whereas Car carries a unifying criterion +U). This decision is based on the way we define Refugee Group; it can exist immaterially. Even when no material person is there in a specific certain country and when its members increase or decrease, it is still the same group of refugees.

The other class is Place. We choose Place, not country, to account for where Refugee and Refugee Group live or had lived because someone does not really live in Germany only but in myriad locations: Germany as a county, Germany as a unifying system of law, a city having specific municipal characteristics, a neighborhood having welcoming or hostile attitudes, etc. A similar argument can be made about home place. Place, therefore, helps simplify this complexity. The class Place has two sub-classes, Host Place and Home Place. Both of them *carry* identity criterion (+I); carry non-rigid characteristic (-R) as a place may cease to be so (e.g., a city is

³Indeed, it seems that the material and immaterial existences of a group are different things and cannot be lumped together, according to some formal ontologies. However, we argue, this is an advantage of the OntoClean methodology, which enables us to lump them together.

merged with another, a neighborhood is abolished during a war); are not dependent on any other class (-D); and carry unifying criterion (+U), as every instance of Home/Host Place is a whole (we can distinguish between their parts from the rest of the world).

The class of Integration has three sub-classes, Cultural, Social, and Economic Integration, whose instances are processes or activities conducted by Refugee and (sometimes) Refugee Group in Host Place. This class, and its subclasses, do carry an identity criterion (+I) as the process of attending language lessons or the activity of working is discernible from each other in terms of time and location of occurrence and the nature of the action. Although we can count the processes/activities of integration, these classes do not carry a unifying criterion (\sim U); we cannot distinguish between the parts of one activity and the parts of another (activity/process in this sense is seen as similar to water or amount of matter in their ontological status). Since each activity/process is conditioned on the existence of Host Place and Refugee, at least, then these classes are dependent (+D). Finally, no property that defines the activities and processes of integration are rigid; i.e., they are not essential as an activity can simply imply, in X situation, cultural integration but, in \tilde{X} situation, discrimination (it is anti-rigid \sim R).

Symmetrically to Integration, the class of Reintegration includes all instances that carry the properties of being reintegrated in Home Place by Refugee or Refugee Group. It has three sub-classes, Economic Well Being (job, income, etc.), Political Process (peace, democracy, human rights, etc.), and Social Capital (social network, trust, etc.). Similar to Integration, Reintegration and its sub-classes carry properties that are: +I \sim U +D \sim R.

Refugee Agency is another class. It refers to the instances that hold the property of having/lacking agency or capacity. We model this class and its two sub-classes (High Agency and Low Agency) as such: +I (each instance of the class is well distinguished from others, e.g., Holding Ph.D.); \sim U (we cannot tell the parts of Refugee Agency as distinct from the rest of the world as they overlap and are boundary-less⁴); +D (as being agentic requires a set of enabling environments such as Integration system); \sim R (once a refugee is agentic, tomorrow she might not be if the context changes).

Refugee Identity is a critical and difficult-to-model class. As we explained in the previous section, Identity is a process; therefore, it is more precise to write identity-ing as a verb not a noun. Refugee Identity includes the instances that are processes of making identities of Refugee and Refugee Group, which are grouped into three sub-classes: Attachment (or attaching), Belonging, and Place Making. Similar to Refugee Agency, we model the Refugee Identity class and its sub-classes as anti-rigid (\sim R) because no identity is essential; dependent (+D) as it is contingent on Place at least; and anti-unifying criterion (\sim U) as it is impossible to distinguish parts of a certain identity from the rest of the world because identity is fluid and lacks the unifying principle (we model identity as similar to water not to ocean). However, Refugee Identity differs from Refugee Agency in lacking identity criterion (-I). This is because Refugee Identity's instances are not distinguished from each other and they lack the sameness criterion: Person1, ironically enough, is not the same in a different time *when we measure identity by identity*. We do not mean here that Person1 will have a different DNA (here, we do not measure sameness by DNA), but we mean Person1 will not necessarily have the same types of elements

⁴For example, being educated is not associated with agency as many other factors intervene to make a refugee agentic or not. Logically speaking, we cannot assign education, among other factors, as a part of agency.

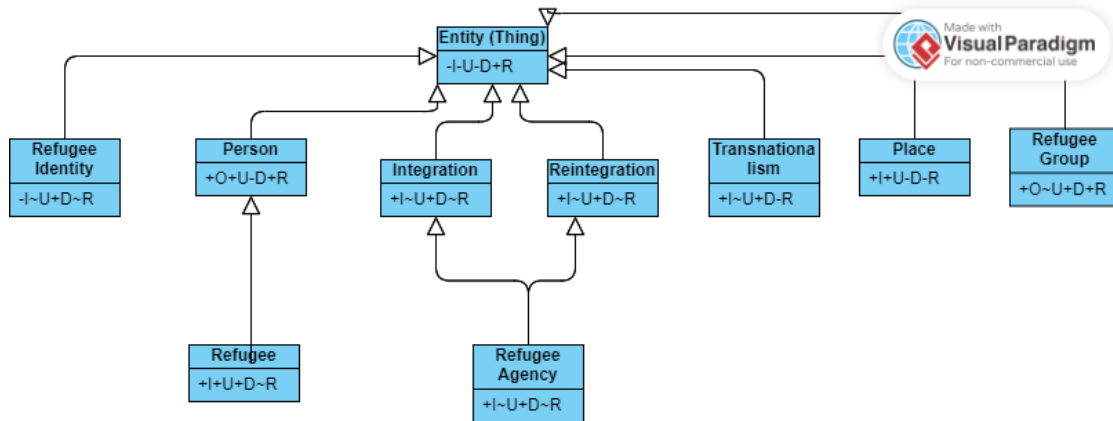


Figure 1: The Ontology of Home Return Concepts according to the OntoClean Method

of Attachment, Belonging, and Home Making; Person1 will not necessarily identify herself in the same way in two different points of time.

The final class is Transnationalism. All properties held by the instances of this class are +I ~U +D and non-rigid (-R) instead of being anti-rigid (as the case of (Re)Integration because *some* Transnational activities are essentially so (e.g., remittance) whenever they occur, whereas *some* activities are not).

We see that, firstly, according to our modeling, Refugee Group and Refugee are totally different classes;⁵ it is not that Refugee is subsumed by Refugee Group as “methodological individualism” may push us to assume. This result is theoretically satisfying. Refugee as an individual and Refugee Group, as a group, are different entities; their integration measurement and processes are different and their identities are not the same. However, discussing these differences goes beyond the scope of this paper [15, 8].

Secondly, Refugee Agency is subsumed by Integration and Reintegration as all of these classes are processes/activities⁶ that make a refugee agentic or not. Refugee Agency is not assumed by Transnationalism (although it can be logically) because a refugee may be enforced to practice Transnational activities (e.g., she must send remittance to her family). This modeling shows that refugee agency is fostered by integration, and since agency is a positive condition for home return, integration becomes so, while the literature has a contradicted opinion on integration as positively or negatively related to home return.

Thirdly, neither Refugee Agency nor Refugee Identity is subsumed (and cannot be, logically) by Refugee because +U must subsume +U (while Refugee Agency and Identity hold ~U). This theoretically makes sense because Identity and Agency are different in type from Refugee and we say, even intuitively, that Refugee *holds* Identity/Agency not *implies*. Agency and Identity are located in a different realm of Refugee. Figure 1 shows the taxonomy we suggest.

⁵Refugee Group cannot subsume Refugee because ~U must assume +U; and Refugee cannot subsume Refugee Group because ~R must not subsume +R.

⁶but not events, as events are distinctive, counted individuals on the temporal dimension while processes are “masses” that are uncounted, extending indefinitely in time (for more discussion, see [27])

3.2. Practical Ontology

We applied a few modifications to the referential ontology by making Refugee Agency a class not subsumed by any other class. In addition, we added three sub-classes to the class Refugee: Nationalized (a refugee who is to be granted the host country nationality),⁷ Stayee (a refugee who resides in the host place), and WouldBeReturnee (who desires to repatriate).

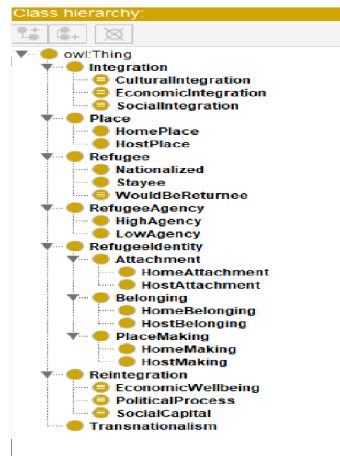


Figure 2: The Ontology Classes in Protégé

Besides that, the sub-classes of Reintegration and Integration are defined by nominal values. For example, EconomicWellBeing (sub-class of Reintegration) is defined by having three nominal values: HighEconWellBeingInHome, MediumEconWellBeingInHome, and LowEconWellBeingInhome. Although this is a simplification, it can help us model the reality of refugees easier without losing significant adequacy.

Finally, and more importantly, we modeled the most important sub-class, WouldBeReturnee by accounting for the conditions (i.e., properties in Protégé language) that when a refugee holds, she would be classified as WouldBeReturnee. They are

complex and designed based on the literature review we have made (Figure 3).

Simply put, a refugee is to return when she has strong agency associated with transnational activities, social capital in her home, good economic conditions in her home, or with good political process in the home. A refugee is also classified as would-be returnee when she has an identity related to home in terms of being attached to the place of home (HomeAttachment), people in home (HomeBelonging), or in terms of activities that create or sustain her home as identity-building relations (HomeMaking).

In this vein, it is noteworthy that the referential ontology and applying the OntoClean method help us simplify the axioms (conditions) of WouldBeReturnee because: (1) we know from the referential ontology that Integration subsumes RefugeeAgency, so every instance of RefugeeAgency is also so of Integration and removing the class of Integration will not reduce our predictability of WouldBeReturnee; and (2) according to the literature, Integration has ambivalent relations with home return, but – as we conclude from the logical modeling of the ontology – Integration that ignites agency (RefugeeAgency) is associated with home return (because agency is associated with home return as we assumed). As a result, we can omit the class of Integration from the axioms since RefugeeAgency is included without losing adequacy.⁸

We also used SPARQL to run selective queries that show automatically refugees who are

⁷although researchers may criticize that a nationalized person is a refugee no more. This is right legally; however, sociologically this is not decisive as it appears.

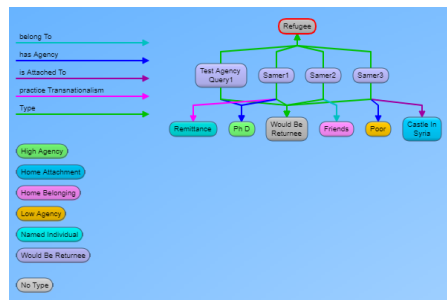
⁸This is similar to Family Resemblance method; we define a class according to its sufficient conditions only.

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equivalent To +
● Refugee
and (((hasAgency some HighAgency)
and (practiceTransnationalism some Transnationalism)) or ((hasAgency some HighAgency)
and (hasExpectedLevelOfReintegration value GoodSocialCapitalInHome)) or ((hasAgency some HighAgency)
and (hasExpectedLevelOfReintegration value HighEconWellbeingInHome)) or ((hasAgency some HighAgency)
and (hasExpectedLevelOfReintegration value StablePoliticalProcess)) or (belongTo some HomeBelonging) or (isAttachedTo some HomeAttachment) or (makePlaceOf some
HomeMaking))
Classes | Object properties | Data properties | Annotation properties | Datatypes | Individuals | WouldBeReturnee — http://www.semanticweb.org/s

```

Figure 3: The Conditions/Axioms of Would-be Returnee



(a) Query by Gruff: Would-be Returnee, all instances and all properties



(b) Query by the Application (under development): Would-be Returnee, all instances and all properties

Figure 4: The same query by Gruff and the application

classified as would-be returnees according to various properties owned by them. Figure 4 (a) below shows visualized Gruff query of all instances that are would-be returnees with their properties that make them as such.

Finally, we aim, in the future, to build an online application for normal users. The application basically enables users to navigate visually and textually the complex networks of concepts (classes), to conduct queries on certain concepts and their assigned or inferred instances, and to insert refugees' data into the application database. The screenshot of the initial application – under development (Figure 4(b)) – shows the same query that is made by Gruff (Figure 4(a)), where we see clearly the instances of `WouldBeReturnee` and their associated properties. Users can navigate the properties of those instances, and accordingly, know why they are classified as would-be returnees. Moreover, users and academicians can evaluate by themselves the conditions (of `WouldBeReturnee`) in terms of their predictability as they test them using real data. As an example, we see that the instance `Samer3` has low agency but is attached to home by being attached to an old castle in Syria. `Samer3` is a would-be returnee, which implies that attachment to home is a sufficient condition to home return; a refugee would return if she is attached to home regardless of her agency status. When the application has more instances, policy-makers and academicians can evaluate the various axioms/conditions of `WouldBeReturnee`, and hence, the axioms may change accordingly.

4. Conclusion

This paper models a sub-field of refugee studies, which is refugees' home return. We started by building a referential ontology, using the OntoClean method, which enabled us to design a conceptual whole that is logically rigorous and coherent. Then we used Protégé to model the ontology in OWL and tested many inferences by using SPARQL queries. Finally, we suggested an application that can do queries and represent the relations between concepts in a friendly way for normal users.

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A. Online Resources

The ontology is downloadable from: <https://github.com/khederTa/RefugeeOntologyV1>

You can also find the - under development - online application in: <https://github.com/khederTa/Refugee-Ontology-Web-App>