



A Web-Based Communication Tool for Arabic-Speaking Newcomers to Canada

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Outline

1. Introduction: Objectives, Motivations and Challenges
2. Web-based Communication Tool
3. Dynamic Multilingual Ontology
4. Conclusion and Future Work

1. Introduction

Facilitate the communication in
the two official languages of the
host country (En/Fr)

Better share and transmit their
opinions, ideas and thoughts



Encourage community
engagement

Accelerate newcomers
integration, self-reliance and
contribution to society

Improve the communication
skills in the target language

1. Introduction

1. Dealing with different types of newcomers (education level, socioeconomic background, disability...) and decide on the tool's features accordingly
2. Development of the tool features
 - Manual (tedious for large number of items) vs automatic (response time, and quality of data)?
3. Fit the communication tool into the daily interactions of newcomers
 - Tool's usability and understanding
4. Tool's evaluation

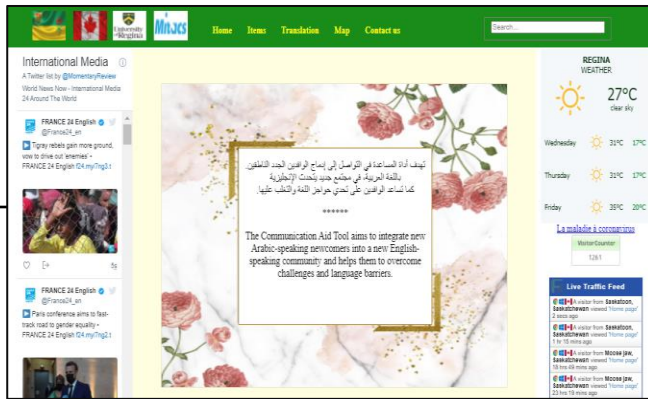


End-users

2. Web-based communication tool

Presentation layer

Dynamic GUI



Feedback and rating survey

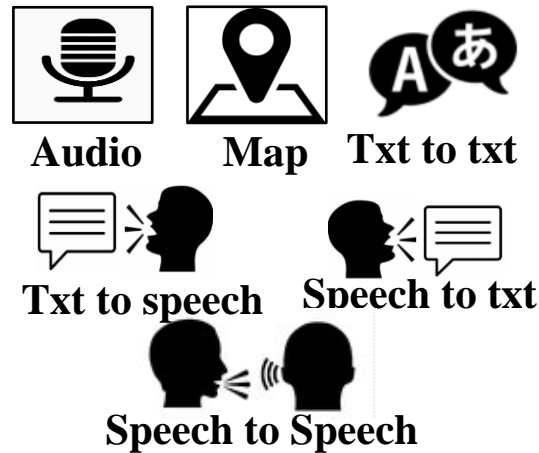
**** Help us to improve our tool ****
**** ساعدنا على تحسين أدواتنا ****
**** Aidez-nous à améliorer notre outil ****

What is your overall satisfaction with our tool?
 ما هو رضاك العام عن أدواتنا?
 Quelle est votre satisfaction globale avec notre outil?

Very satisfied
 Satisfied
 Not sure
 Dissatisfied
 Very dissatisfied

Application layer

Dynamic APIs



Data management

Organize, manage, and maintain data

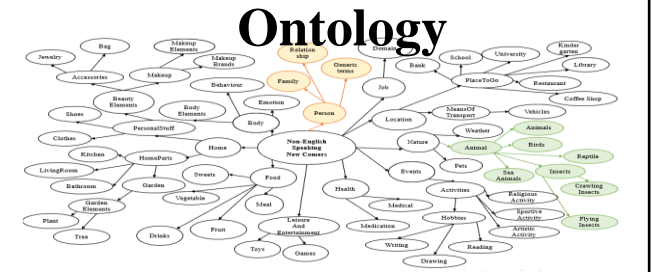
Data layer

Arabic Wikipedia articles

NLP processing

Extraction and annotation of items

Dynamic Multilingual Ontology



2. Web-based communication tool

Objective section

Home Items Translation Map Contact us

Search...

International Media ⓘ
A Twitter list by @MomentaryReview
World News Now - International Media
24 Around The World

FRANCE 24 English @France24_en
Tigray rebels gain more ground, vow to drive out 'enemies' •
FRANCE 24 English f24.my/7ng3.t

FRANCE 24 English @France24_en
Paris conference aims to fast-track road to gender equality •
FRANCE 24 English f24.my/7ng2.t

تهدف أداة المساعدة في التواصل إلى إدماج الوافدين الجدد الناطقين باللغة العربية، في مجتمع جديد يتحدث الإنجليزية كما تساعد الوافدين على تحدي حواجز اللغة والتغلب عليها.

The Communication Aid Tool aims to integrate new Arabic-speaking newcomers into a new English-speaking community and helps them to overcome challenges and language barriers.

REGINA WEATHER
27°C clear sky
Wednesday 31°C 17°C
Thursday 31°C 17°C
Friday 35°C 20°C

[La maladie à coronavirus](#)

Visitor Counter
1261

Live Traffic Feed
A visitor from Saskatoon, Saskatchewan viewed 'Home page' 2 secs ago
A visitor from Saskatoon, Saskatchewan viewed 'Home page' 1 hr 15 mins ago
A visitor from Moose Jaw, Saskatchewan viewed 'Home page' 18 hrs 49 mins ago
A visitor from Moose Jaw, Saskatchewan viewed 'Home page' 23 hrs 19 mins ago

2. Web-based communication tool

Item section

Example of items from the 1st level of the multilingual ontology

			
Household Goods	Household Consumables	Shopping	Recreation
بضائع منزلية	مستهلكات منزلية	التسوق	أنشطة ترفيهية
Articles ménagers	Consommables Ménagers	Shopping	Loisirs

2. Web-based communication tool

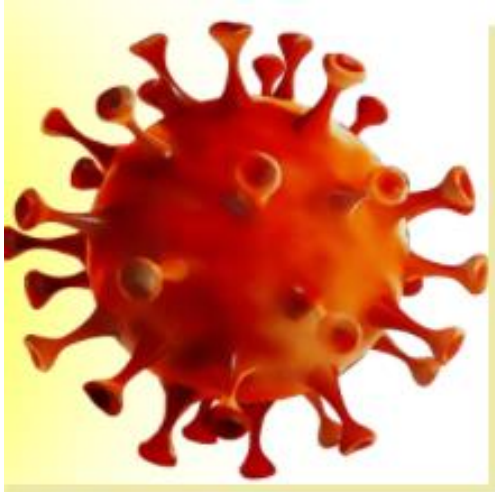
Example of an item



All the buttons are associated with an audio message corresponding to the language

2. Web-based communication tool

Covid-19 item



Coronavirus disease

1. Display information about covid-19

The screenshot shows a web page with a light yellow background. At the top left, there is a small icon of a virus labeled 'virus' and a cartoon illustration of a person holding their head in pain. Below these are three lines of text: 'Coronavirus is dangerous and can make you get sick', 'فيروس كورونا خطير ويمكن أن يجعلك مريض', and 'Le coronavirus est dangereux et peut vous rendre malade'. To the right is a graph with an orange header 'أوقف الانتشار' (Stop the spread) and 'بدائل لتسطيح المنحنى' (Alternatives to flatten the curve). The graph shows a green area under a curve that starts high and then tapers off, with a horizontal dashed line representing the 'قدرة نظام الرعاية الصحية' (Healthcare system capacity). Below the graph is a cartoon illustration of people practicing social distancing and wearing masks, with a speech bubble saying 'لن نأخذ السفر' (We won't take the trip) and another saying 'أعمل من المنزل' (I work from home). Below the cartoon is the text 'استجابة جماعية قوية (أفضل سيناريو)' (Strong collective response (best scenario)). At the bottom, there are two green buttons: '« Back main items' on the left and 'Next »' on the right.





Learn more about COVID-19 in Saskatchewan (Daily case numbers): [Click here](#)

2. Click on “Next” to display tips, symptoms, etc.

2. Web-based communication tool

Covid-19 item

Symptoms ** الأعراض ** Symptômes

 <p>Coronavirus can cause cough and sore throat يمكن أن يسبب فيروس كورونا السعال والتهاب الحلق</p>	 <p>Coronavirus can cause headache and runny nose يمكن أن يسبب فيروس كورونا الصداع وسيلان الأنف</p>
 <p>Coronavirus can cause fever يمكن أن يسبب فيروس كورونا الحمى</p>	 <p>Some people may develop trouble breathing قد يعاني بعض الأشخاص من صعوبة في التنفس</p>


Le coronavirus peut causer de la toux et des maux de gorge

Le coronavirus peut causer des maux de tête et un écoulement nasal

Le coronavirus peut causer de la fièvre

Certaines personnes peuvent avoir des difficultés à respirer

Guidance ** إرشادات ** Conseils




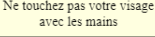
In case you have symptoms or tested positive to covid-19, you should stay at home. Also, you should stay at home if someone you live with or someone in your extended household has symptoms. You should isolate yourself if you have been in close contact with someone who has tested positive. Isolation will help to control the spread of the virus to friends, the wider community, and the most vulnerable.

في حال ظهور أعراض أو نتيجة إيجابية لكوفيد-19 ، يجب عليك البقاء في المنزل. أيضًا ، يجب عليك البقاء في المنزل إذا ظهرت الأعراض على شخص تعيش معه أو أحد أفراد أسرته الممتدة. يجب أن تعزل نفسك إذا كنت على اتصال وثيق بشخص أثبتت إصابته بالفيروس. سيساعد العزل في السيطرة على انتشار الفيروس للأصدقاء والمجتمع الأوسع والأكثر ضعفًا.

En cas de symptômes ou de résultat positif du COVID-19, vous devez rester chez vous. De plus, vous devriez rester à la maison si une personne avec qui vous vivez avec ou un membre de votre famille élargie développe des symptômes. Vous devez vous isoler si vous avez été en contact direct avec une personne testée positive pour le virus. L'isolement aidera à contrôler la propagation du virus aux amis et à la communauté plus large et plus vulnérable.

Symptoms - الأعراض - Symptômes **Tips - نصائح - Conseils** **Questions - الأسئلة - الشكوى**

Tips ** نصائح ** Conseils

 <p>Cough into the crook of your arm أسعل في ثنية ذراعك</p>	 <p>Social distancing can stop spreading the disease التباعد الاجتماعي يحد من انتشار المرض</p>	 <p>No hug and no shake hands with other people لا عناق ولا مصافحة مع الآخرين</p>
 <p>Toussez dans le creux de votre bras</p>	 <p>La distanciation sociale peut arrêter la propagation de la maladie</p>	 <p>Pas de câlin et pas de serrer la main avec d'autres personnes</p>
 <p>Do not touch your face with hands لا تلمس وجهك بيديك</p>	 <p>Wash your hands often with soap and warm water اغسل يديك كثيرًا بالصابون والماء الدافئ</p>	 <p>Wearing the mask is mandatory ارتداء القناع إلزامي</p>
 <p>Ne touchez pas votre visage avec les mains</p>	 <p>Lavez souvent vos mains avec du savon et de l'eau tiède</p>	 <p>Le port du masque est obligatoire</p>

Tips for a vulnerable person ** نصائح لشخص ضعيف ** Conseils pour une personne vulnérable

<p>1 Keep 2 meters (3 steps) away from you and another person حافظ على 2 متر (3 خطوات) بعيدًا عنك وعن شخص آخر Gardez 2 mètres (3 étapes) loin de vous et une autre personne</p>	
<p>2 Use a separate washroom from the rest of the household Utiliser une toilette séparée du reste de la maison</p>	
<p>3 Clean all surfaces every day with an effective cleaner against viruses and bacteria Nettoyez toutes les surfaces tous les jours avec un nettoyant efficace contre les virus et les bactéries</p>	
<p>4 Store personal waste within disposable garbage bags Ranger les déchets personnels dans des sacs à ordures jetables</p>	

3. Symptoms with audio messages

4. Tips with audio messages

2. Web-based communication tool

Text to text translation

The screenshot shows a web-based translation tool interface. At the top left, there is a green button labeled « Translation Section ». Below it, a text input field contains the English text "hello thank you for following me!". To the left of this field, the text "Original text" has an arrow pointing to the input. Below the input field, there are two dropdown menus: "From :" with "en" selected, and "To :" with "ar" selected. To the left of these dropdowns, the text "Original language" has an arrow pointing to the "From" dropdown, and "Target language" has an arrow pointing to the "To" dropdown. Below the dropdowns is a green "Translate" button. To the right of the input field, the text "Current Arabic Lg translation:" is displayed above a text box containing "marhabana shukrana limuta". Below this text box is a green "Copy" button. Further down, the text "The translated text is:" is displayed above a text box containing the Arabic text "إمرحبا شكرا لمتابعتي". Below this text box is another green "Copy" button. To the right of this second text box, the text "Translated text" has an arrow pointing to it. At the bottom of the interface, the text "End of translation, thank you for using our tool !" is displayed.

2. Web-based communication tool

Text to Speech conversion

Original text

Write your text here..

Google Bahasa Indonesia (id-ID)

Listen-استمع-Ecouter

** Write your text and click on the button Listen*

** اكتب نصك وانقر على الزر استمع*

** Écrivez votre texte et cliquez sur le bouton Écouter*

Target languages

Use case: to learn words'
pronunciation

2. Web-based communication tool

Speech recognition

Arabic speech to text translation

Recognized
Speech



مرحبا بكم اصداقائي



Saved records:

- 17/02/2021, 21:46:23 [Play](#)
[Remove](#)

مرحبا بكم اصداقائي

Recorded audio file

2. Web-based communication tool

Speech to speech translation

Choose your native language

Arabic - العربية English - الإنجليزية French - الفرنسية

Have your voice message translated

ar ▼

Target language :

en ▼




Translate

Symbol explanation

لتسجيل صوتك ، يرجى التأكد من اتباع الرموز أدناه.

In order to record your voice, please make sure that you are following the symbols below.

Afin d'enregistrer votre voix, veuillez vous assurer que vous suivez les symboles ci-dessous. ***

-  : start voice recording -- إبدأ التسجيل الصوتي -- démarrer l'enregistrement vocal
-  : stop voice recording -- وقف التسجيل الصوتي -- arrêter l'enregistrement vocal
-  : listen to translated voice -- إسْمَع للصوت المترجم -- écouter la voix traduite

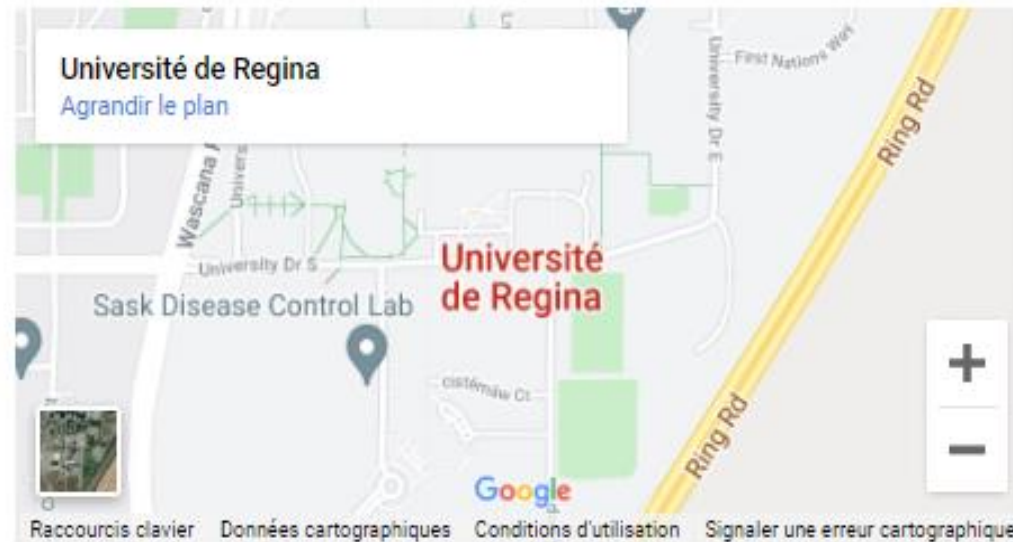
2. Web-based communication tool

Localisation section

Looking for a place? tap you query here ..

University of regina

Search



2. Web-based communication tool

Contact section

A web-based communication tool form. It features a green envelope icon in the top left corner. The form contains four input fields: 'Name...', 'Email...', 'Phone number...', and 'Subject...'. Below the fields is a green circular button with the text 'Send →'.

A graphic with a yellow background. At the top left is a blue 'Share 0' button. To its right is the text 'Share the tool link'. Below this is an illustration of hands holding a clipboard with a checklist. Underneath the illustration is the text 'Click here to start our survey!'. At the bottom, an upward-pointing arrow is positioned above the text 'View the survey'.

2. Web-based communication tool

Survey

**** Help us to improve our tool ****
**** ساعدنا على تحسين أدواتنا ****
**** Aidez-nous à améliorer notre outil ****

What is your overall satisfaction with our tool?
 ما هو رضاك العام عن أدواتنا?
Quelle est votre satisfaction globale avec notre outil?

Very satisfied
 Satisfied
 Not sure
 Dissatisfied
 Very dissatisfied

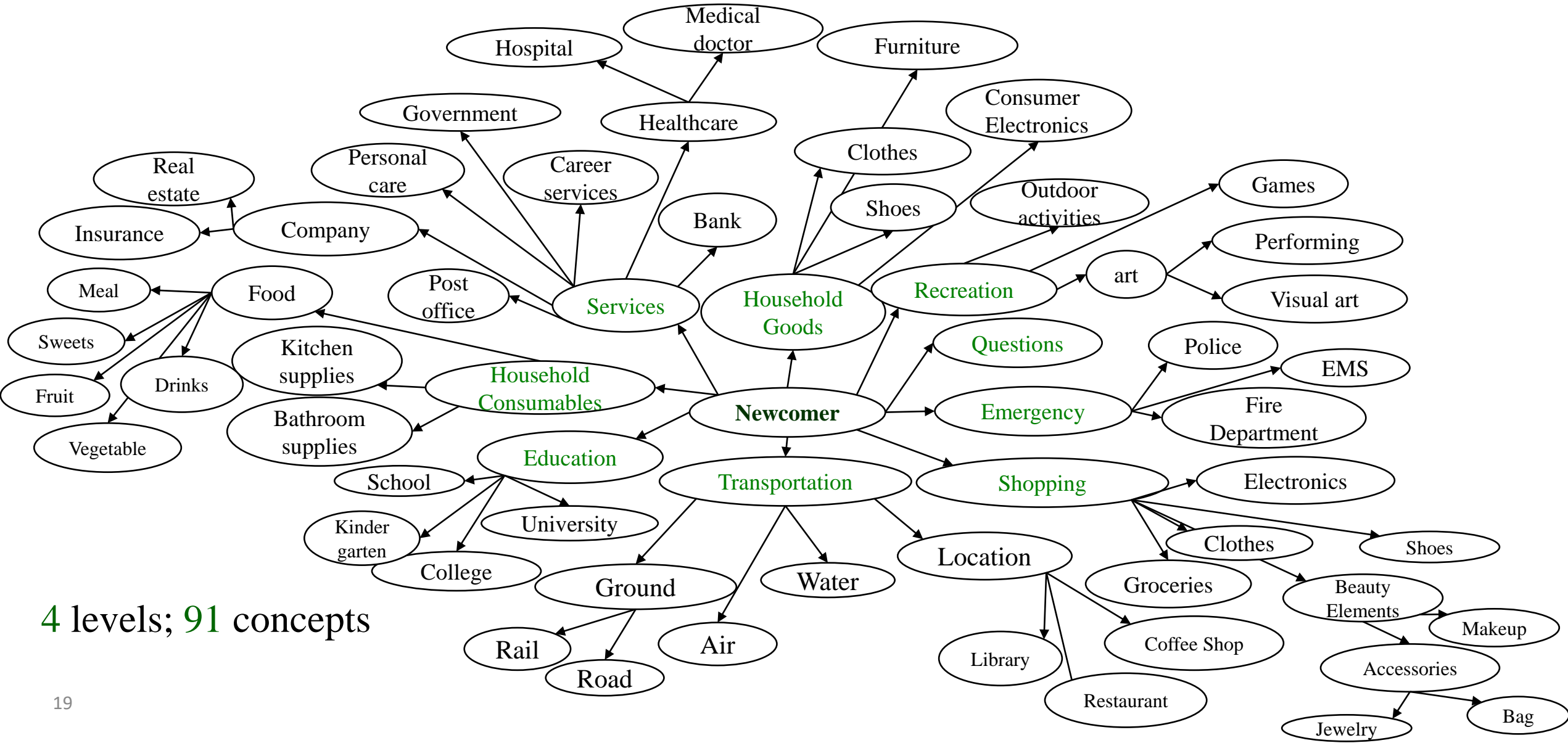
If No, please give us your feedback!
 إذا لا، يرجى إعطائنا رأيك!
Si non, SVP nous donner votre avis! 😊

Next»

Feedback visualization

New user	
Satisfaction	Very satisfied
Satisfaction Feedback	This tool helps us to communicate!
Recommendation	Yes
Recommendation Feedback	Definitely
Design and Color	Yes
Design and Color Feedback	
Sound	Not sure
Sound Feedback	doesn't work in some items!
Homepage	Yes
Homepage Feedback	It helps to get important infor!

3. Dynamic multilingual ontology



4 levels; 91 concepts

3. Dynamic multilingual ontology

Example of extracted items annotated in OWL

```
<owl:Class rdf:ID="Food">  
  <rdfs:comment>Food is a sub-concept belonging to Household Consumables</rdfs:comment>  
  <rdfs:subClassOf rdf:resource="#Household Consumables" />  
</owl:Class>
```

```
<owl:Class rdf:ID="Fruits">  
  <rdfs:comment>Fuits is a sub-concept belonging to Food</rdfs:comment>  
  <rdfs:subClassOf rdf:resource="#Food" />  
</owl:Class>
```

```
<owl:Thing rdf:about="#أناناس">      Item in Arabic  
<rdf:type rdf:resource="#Fruits"/>  Sub-concept  
<rdfs:label xml:lang="en">Pineapple</rdfs:label>  
<rdfs:label xml:lang="fr">Ananas</rdfs:label>  Translation in "En" and "Fr"  
</owl:Thing>
```

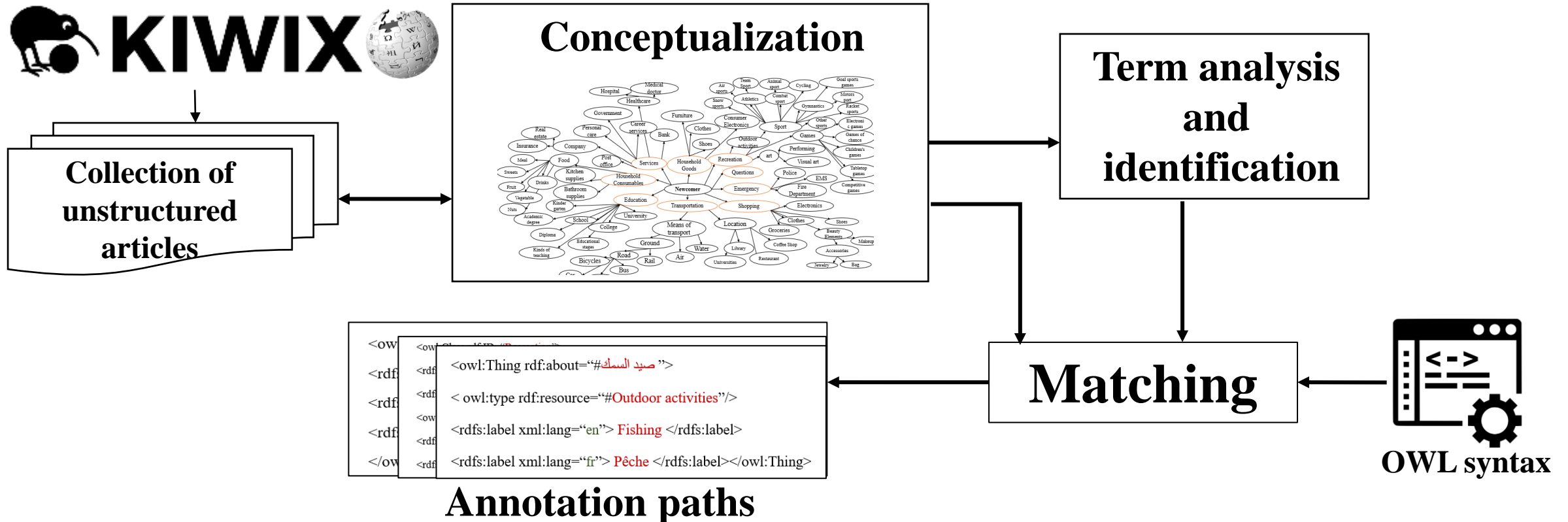
3. Dynamic multilingual ontology

Generation of a dynamic multilingual ontology comprises four steps:

1. Collection of a study corpus from Wikipedia and linguistic analysis
2. Development of an NLP module to create an ontology and learn it with Arabic items extracted from the study corpus
3. Development of an automatic translation module to generate a multilingual ontology (English and French languages)
4. Automatic generation of images related to the stored items

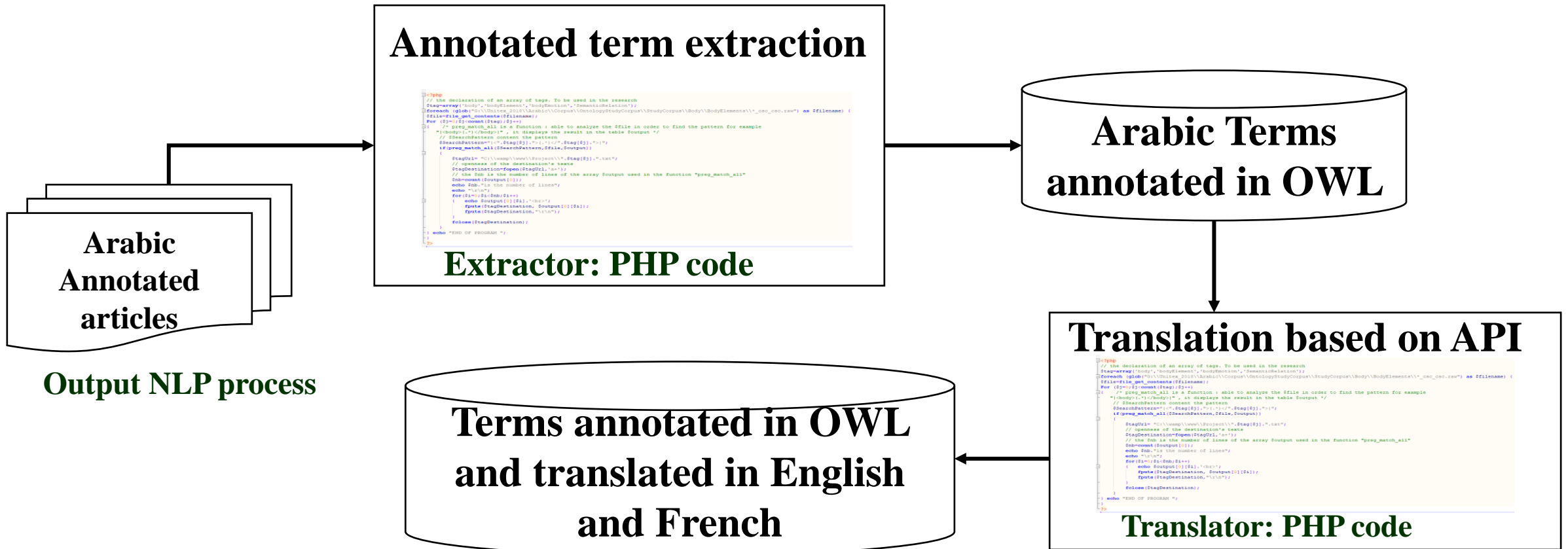
3. Dynamic multilingual ontology

Generation of the multilingual ontology



3. Dynamic multilingual ontology

Generation of the multilingual ontology



4. Conclusion and Future Work

Linguistic study using a Wikipedia corpus (conceptualization, term identification and matching both with an annotation syntax)

Proposing a dynamic and extensible Web-based communication tool for Arabic newcomers to Canada based on:

Dynamic and multilingual Ontology

NLP techniques and APIs

4. Conclusion and Future Work

- Improve the Learning English module for children newcomers
- Text to sign language translation module in three languages (Arabic, English and French) and vice versa
- Sign language to speech translation module in three languages (Arabic, English and French) and vice versa

Thank you!



- Questions?