UNIK 4710
AIR CHECK

Presented By:

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BACKGROUND

- Today Air pollution is the reasoned behind the death of more than 2 million people

- At one time China and India are praise for world wide for their economic growth but at the same time they are criticized for their high pollution level.

- Air pollution is major problem in developing countries.

   Air pollution   ----> Diseases -----> remedies

CAUSES OF AIR POLLUTION

PM: heart &lung diseases, asthma, irregular heartbeat,coughing or difficulty breathing and other respiratory problem.

Ozone: Chest pain, coughing, throat irritation, congestion, bronchitis, emphysema, and asthma.
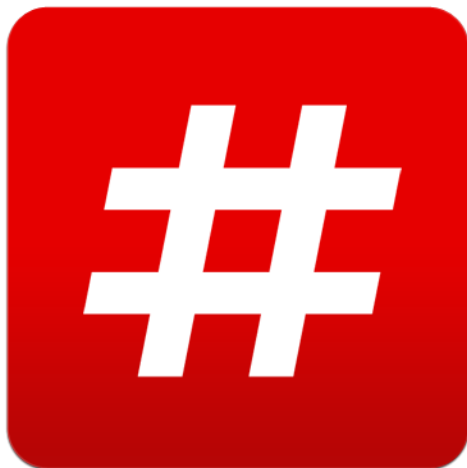
NO2: Emphysema, bronchitis, heart disease…

CO: chest pain, reduced oxygen to the heart…

SO2: Emphysema , bronchitis, heart diseases.

Pollen: Watering eyes, Conjunctivitis, Itching eyes, nose, throat and other allergy.

WHAT IF YOU HAVE AN APPS THAT CHECK THE AIR QUALITY

AIR CHECK

Air Check

- It will be an apps that provide the measurement of air quality of place where you want to go.
- Allow you to create your own air quality index. (PAQI)
- Get Alert message.
- Target group: Pregnant women and child (sensitive group)

WHAT IS PAQI?

- PAQI is Personalized Air Quality Index
- User provides their personal information that are related their health problem. (Tolerance Level)
- Provides alert message for user who are especially vulnerable to the effects of air pollution.
- Provide alert message in relation to your health status.
- Allow user to make instant decision to reschedule their outdoor activities.

Rules

If given : Destination

Health problem Information (optional)

- If the index< 50 then it has good air quality, you are safe.

- If the index >50 then it can be unhealthy for sensitive people – alert – choose another destination to check the pollution level out there.
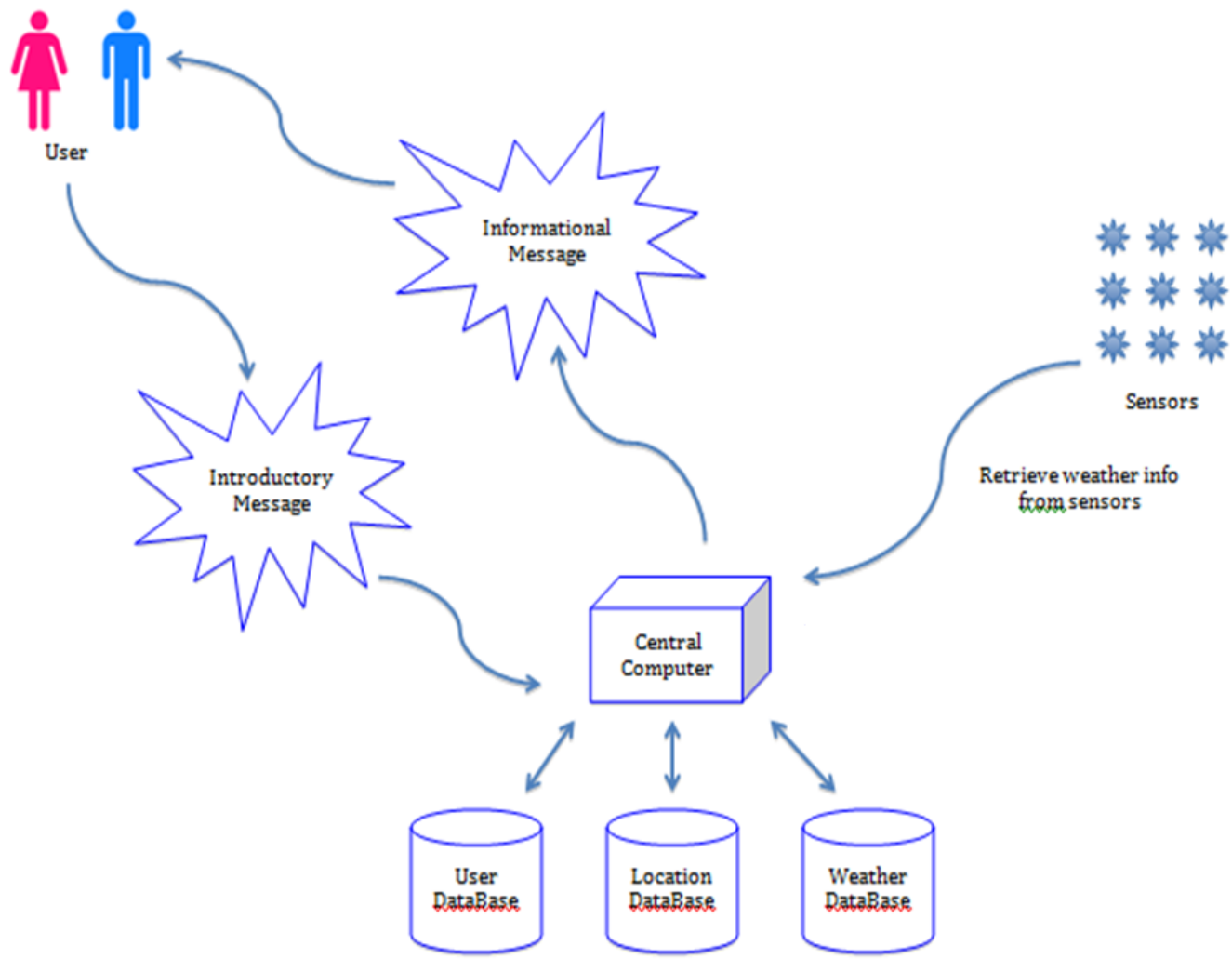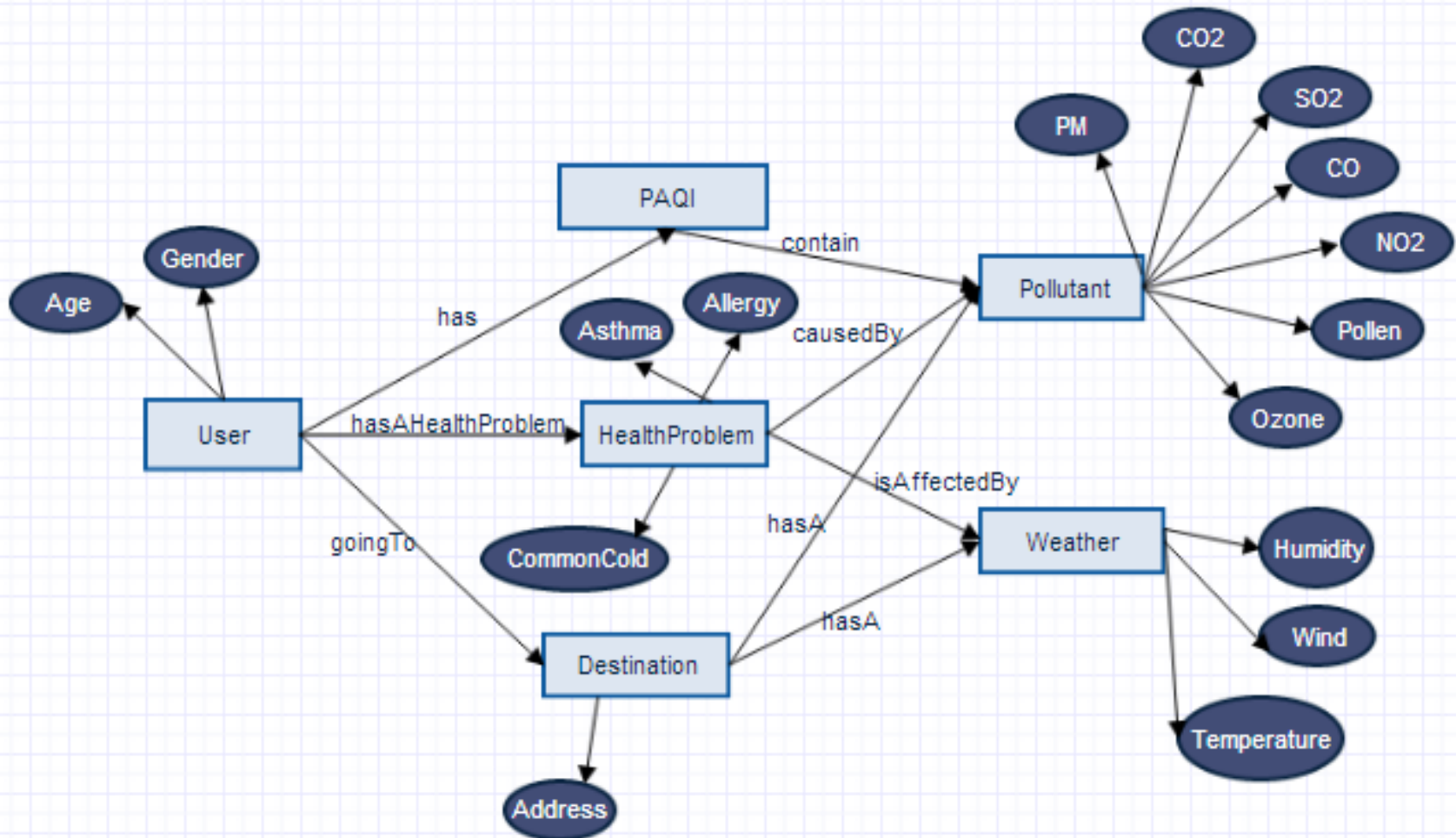
UNITS USED FOR AIR QUALITY DATA

Pollutant	Units used for air quality data
Ozone	ppm (parts per million)
Nitrogen dioxide	ppm (parts per million)
Pollen	per cubic metre of air sampled
Carbon monoxide	ppm (parts per million)
Sulfur dioxide	ppm (parts per million)
Particles	$\mu g/m^3$ (micrograms per cubic metre)

USE CASE DIAGRAM
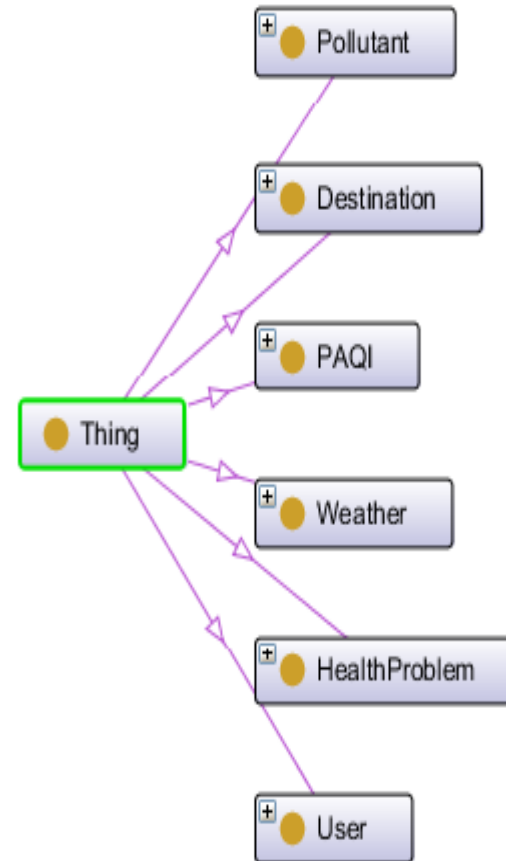
Used Protégé 4.3 for my Ontology

IDEA BEHIND MY ONTOLOGY

- Tina wants to go for a walk in St. Hanshaugan Park. But as she is suffering from Asthma, she wants to check whether this location has limited number of ozone and Particulate matter which she can tolerate.

- She uses Air Check, provide tolerant level of pollutant.

- When she checks the air quality of St. Hanshaugan Park, she can get all the data of pollutant including temperature , humidity and also get the recommendation (alert message) from apps based on her tolerance level.
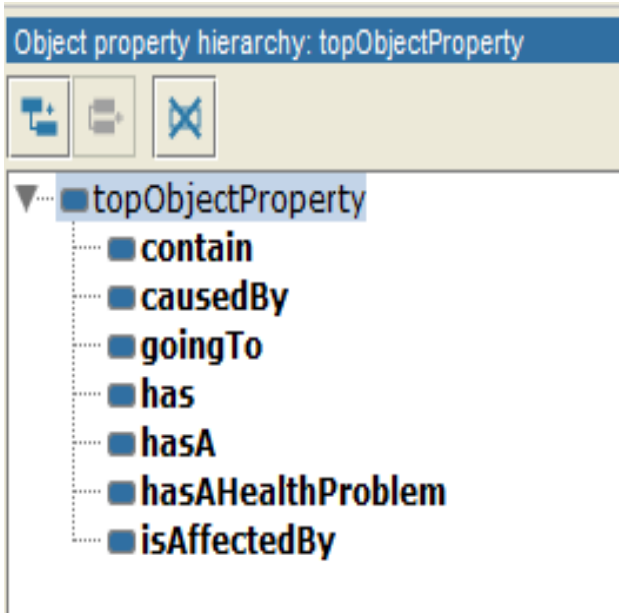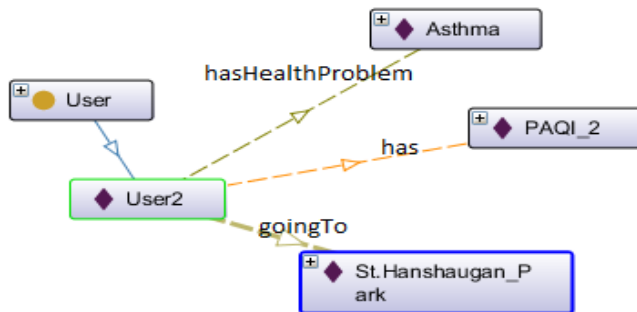
ENTITIES AND OBJECT PROPERTIES

OBJECT PROPERTY

- User *goingTo* Destination
- User *hasAHealthProblem* HealthProblem
- HealthProblem *causedBy* Pollutant
- HealthProblem *isAffectedBy* Weather
- Destination *hasA* Pollutant & Weather
- User *has* PAQI
- PAQI *contain* Pollutant

Object property hierarchy: topObjectProperty

- topObjectProperty
  - contain
  - causedBy
  - goingTo
  - has
  - hasA
  - hasAHealthProblem
  - isAffectedBy

Asthma
hasHealthProblem
User
has
PAQI_2
User2
goingTo
St.Hanshaugan_Park

DATA PROPERTY

Data property hierarchy:

- ▼ topDataProperty
  - Address
  - Age
  - AreaCode
  - CurrentValue
  - MaxStandardValue
  - MaxToleranceValue
  - NameOfHealthProblem
  - UserName
  - WeatherUpdate
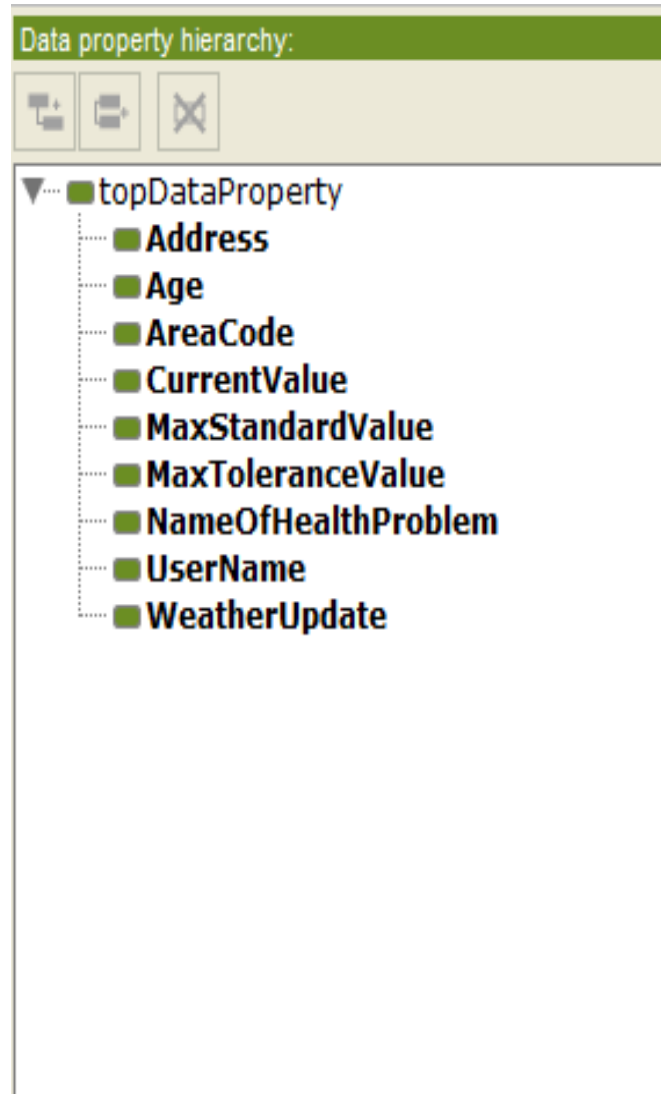
INDIVIDUAL
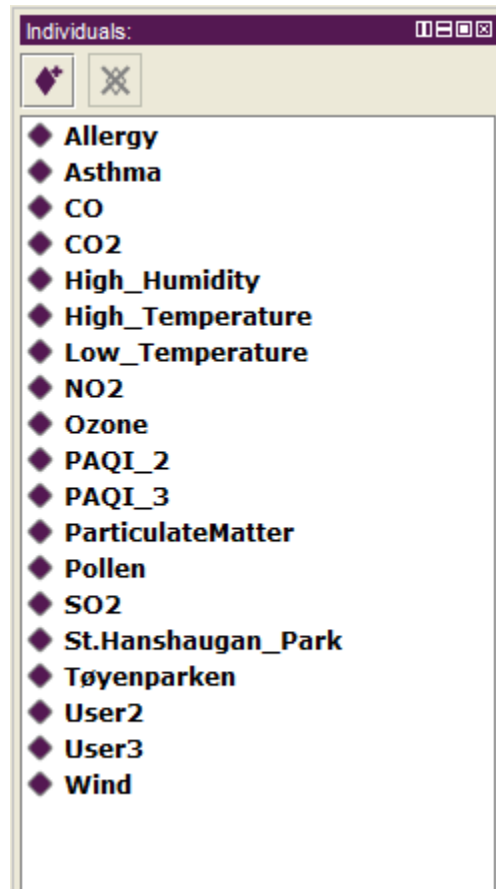
SPARQL Queries

SELECTING USER, DESTINATION AND THEIR HEALTH PROBLEM

SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX : <http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>


SELECT ?User ?Destination ?HealthProblem
        WHERE { ?User :goingTo ?Destination.
              ?User :hasAHealthProblem ?HealthProblem.}
```
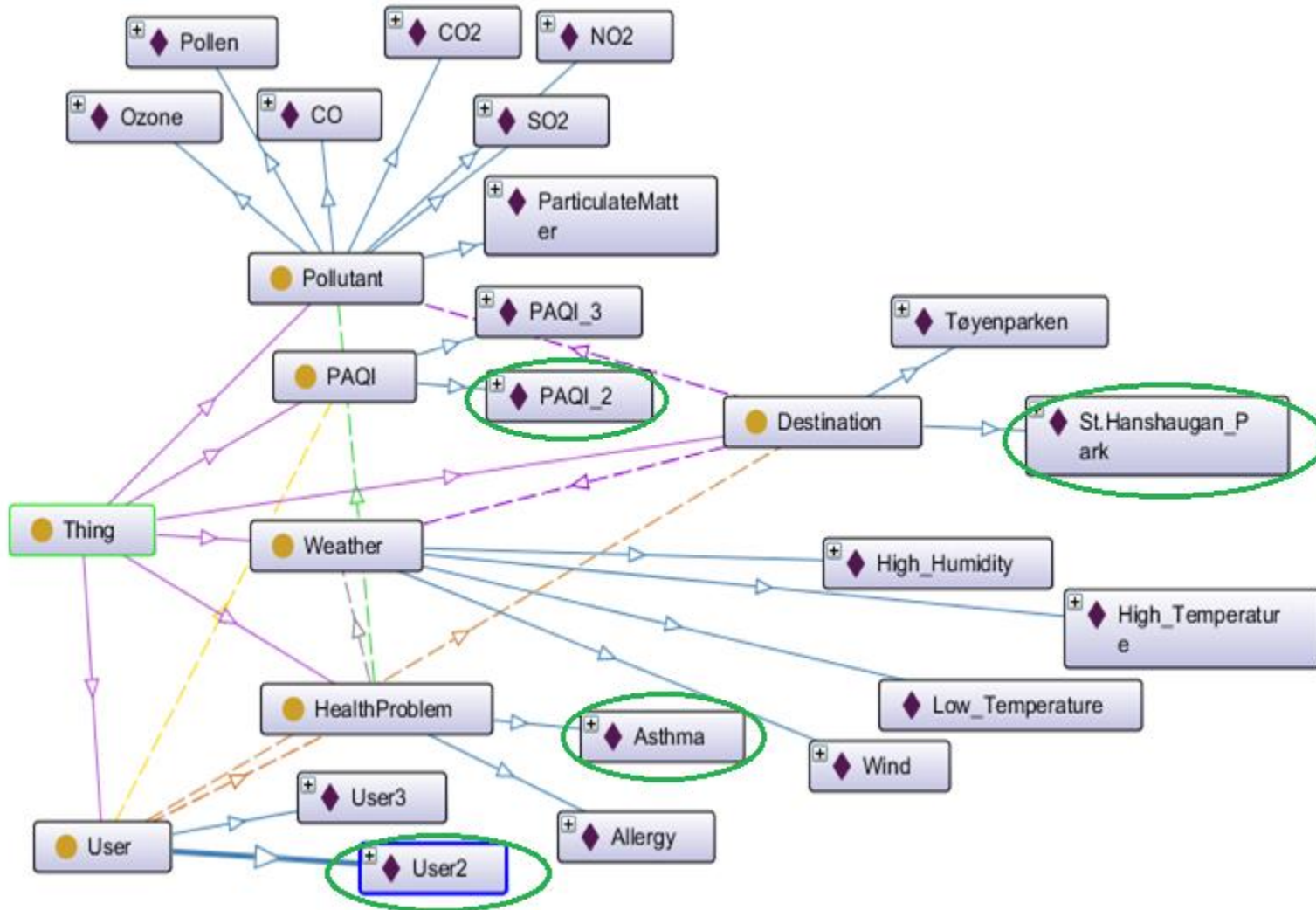
User	Destination	HealthProblem
User2	St.Hanshaugan_Park	Asthma
User3	Tøyenparken	Allergy

SELECTING USER, DESTINATION, HEALTH PROBLEM WHICH IS CAUSED BY POLLUTANT.

SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX : <http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>


SELECT ?User ?Destination ?HealthProblem ?Pollutant
        WHERE { ?User :goingTo ?Destination.
                ?User :hasAHealthProblem ?HealthProblem.
                ?HealthProblem :causedBy ?Pollutant.}
```

User	Destination	HealthProblem	Pollutant
User3	Tøyenparken	Allergy	Pollen
User2	St.Hanshaugan_Park	Asthma	ParticulateMatter
User2	St.Hanshaugan_Park	Asthma	Ozone

SELECTING USER, DESTINATION, HEALTH PROBLEM, PAQI WHICH IS CAUSED BY POLLUTANT AND WEATHER.

```
SPARQL query:
```

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX : <http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>



SELECT ?User ?Destination ?HealthProblem ?PAQI ?Pollutant ?Weather
        WHERE { ?User :goingTo ?Destination.
            ?User :hasAHealthProblem ?HealthProblem.
            ?User :has ?PAQI.
            ?HealthProblem :causedBy ?Pollutant.
            ?HealthProblem :isAffectedBy ?Weather.
            }
```

User	Destination	HealthProblem	PAQI	Pollutant	Weather
User2	St.Hanshaugan_Park	Asthma	PAQI_2	ParticulateMatter	High_Temperature
User2	St.Hanshaugan_Park	Asthma	PAQI_2	Ozone	High_Temperature
User2	St.Hanshaugan_Park	Asthma	PAQI_2	ParticulateMatter	High_Humidity
User2	St.Hanshaugan_Park	Asthma	PAQI_2	Ozone	High_Humidity

SELECTING USERNAME, DESTINATION, POLLUTANT, VALUES AND TOTAL POLLUTION.

SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX : <http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>

SELECT ?User ?Destination ?Pollutant   ?Value ?TotalPollution
        WHERE { :User2 :UserName ?User.
             :User2 :goingTo ?Destination.
            ?Destination :hasA ?Pollutant.
        ?Pollutant :CurrentValue ?Value   {
          SELECT  (max(?Value) as ?TotalPollution)
            WHERE {  ?Pollutant :CurrentValue ?Value.
                        }
                     }
               }
}
```

Taking the max value as the Total Pollution

User	Destination	Pollutant	Value	TotalPollution
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	ParticulateMatter	"58"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	Wind	"3"^^<http://www.w3.org/2001/XMLSc	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	NO2	"55"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	CO	"40"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	SO2	"43"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	Pollen	"60"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	Ozone	"66"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML
"Tina"^^<http://www.w3.org/2001/XM	St.Hanshaugan_Park	CO2	"34"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XML

Selecting Username, their health problem and PAQI with their Tolerance level and current value of pollutant.


```
SPARQL query:

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX :<http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>

SELECT ?User ?HealthProblem  ?Pollutant ?CurrentValue ?PAQI ?Tolerance
            WHERE {
                    :User2 :UserName ?User.
                    :User2 :hasAHealthProblem ?HealthProblem.
                    ?HealthProblem :causedBy ?Pollutant.
                    ?Pollutant :CurrentValue ?CurrentValue.
                    :User2 :has ?PAQI.
                    ?PAQI :contain ?Pollutant.
                     ?Pollutant :MaxToleranceValue ?Tolerance.
                     }
```

Need to compare these two value: Here
User Tolerance value for ozone is 30 and for PM
is 20 which is less than current values.

User	HealthProblem	Pollutant	CurrentValue	PAQI	Tolerance
"Tina"^^<http://www.w3.org/20	Asthma	Ozone	"66"^^<http://www.w3.org/200	PAQI_2	"30"^^<http://www.w3.org/200
"Tina"^^<http://www.w3.org/20	Asthma	ParticulateMatter	"58"^^<http://www.w3.org/200	PAQI_2	"20"^^<http://www.w3.org/200

COMPARING VALUES OF THOSE POLLUTANT THAT CAUSES HEALTH PROBLEM.

```
SPARQL query:

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX : <http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>

SELECT ?User ?HealthProblem  ?Pollutant  ?CurrentValue ?PAQI ?Tolerance ?Result
            WHERE {
                    :User2 :UserName ?User.
                    :User2 :hasAHealthProblem ?HealthProblem.
                    ?HealthProblem :causedBy ?Pollutant.
                    ?Pollutant :CurrentValue ?CurrentValue.
                    :User2 :has ?PAQI.
                    ?PAQI :contain ?Pollutant.
                    ?Pollutant :MaxToleranceValue ?Tolerance.
                    Bind(if(?Tolerance >= ?CurrentValue, 'Safe','NotSafe') As ?Result )

}
```

Comparing Current Value and Tolerance Value:
If Tolerance Value <= Current Value then it is Not Safe.

User	HealthProblem	Pollutant	CurrentValue	PAQI	Tolerance	Result
"Tina"^^<http://www.w3.or	Asthma	ParticulateMatter	"58"^^<http://www.w3.org	PAQI_2	"30"^^<http://www.w3.org	"NotSafe"
"Tina"^^<http://www.w3.or	Asthma	Ozone	"66"^^<http://www.w3.org	PAQI_2	"25"^^<http://www.w3.org	"NotSafe"

DESTINATION MAX STANDARD VALUE OF POLLUTION .

SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX :<http://www.semanticweb.org/rozina/ontologies/2014/3/untitled-ontology-24#>

SELECT ?Destination ?Pollutant ?CurrentValue ?TotalPollution ?Result
        WHERE {
                :User2 :goingTo ?Destination.
                ?Destination :hasA ?Pollutant.
                ?Pollutant :CurrentValue ?CurrentValue.
                {SELECT (max(?Value) as ?TotalPollution)
                 WHERE {  ?Pollutant :CurrentValue ?Value.}
                }

                Bind(if(?TotalPollution < 51, 'Good', 'UnHealthy')
                        As ?Result)
                }
```

Max Standard Value < =50

Total Pollution <51 then its Healthy

| Destination	Pollutant	CurrentValue	TotalPollution	Result
St.Hanshaugan_Park	ParticulateMatter	"58"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	Wind	"3"^^<http://www.w3.org/2001/XMLSc	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	NO2	"55"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	CO	"40"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	SO2	"43"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	Pollen	"60"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	Ozone	"66"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"
St.Hanshaugan_Park	CO2	"34"^^<http://www.w3.org/2001/XMLS	"66"^^<http://www.w3.org/2001/XMLS	"UnHealthy"

FUNCTIONAL DESIGN OF AIR CHECK
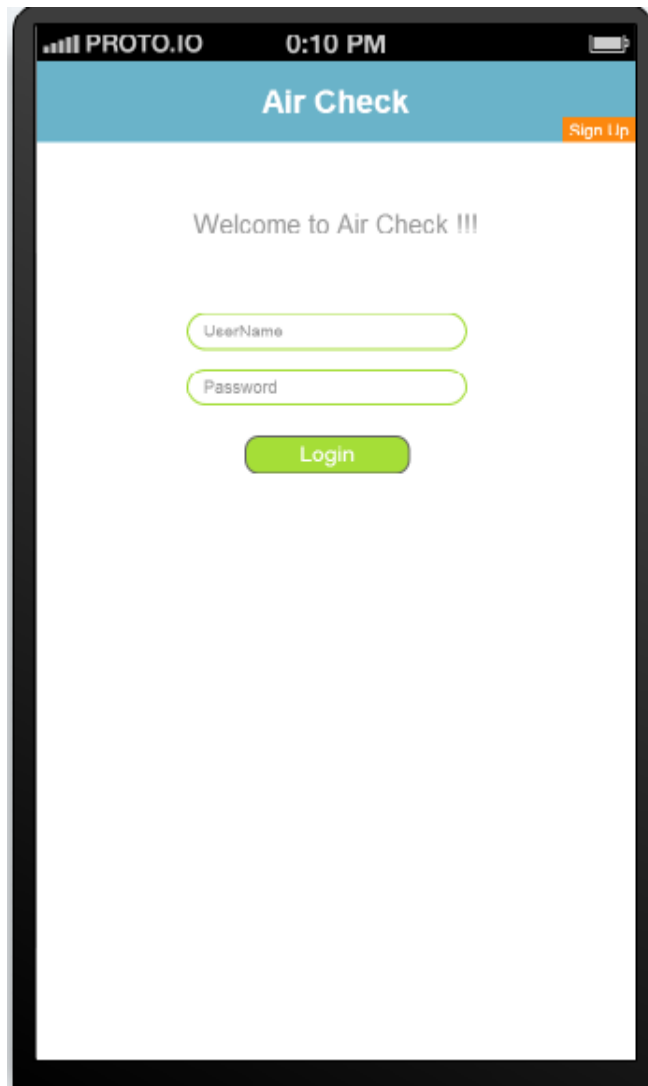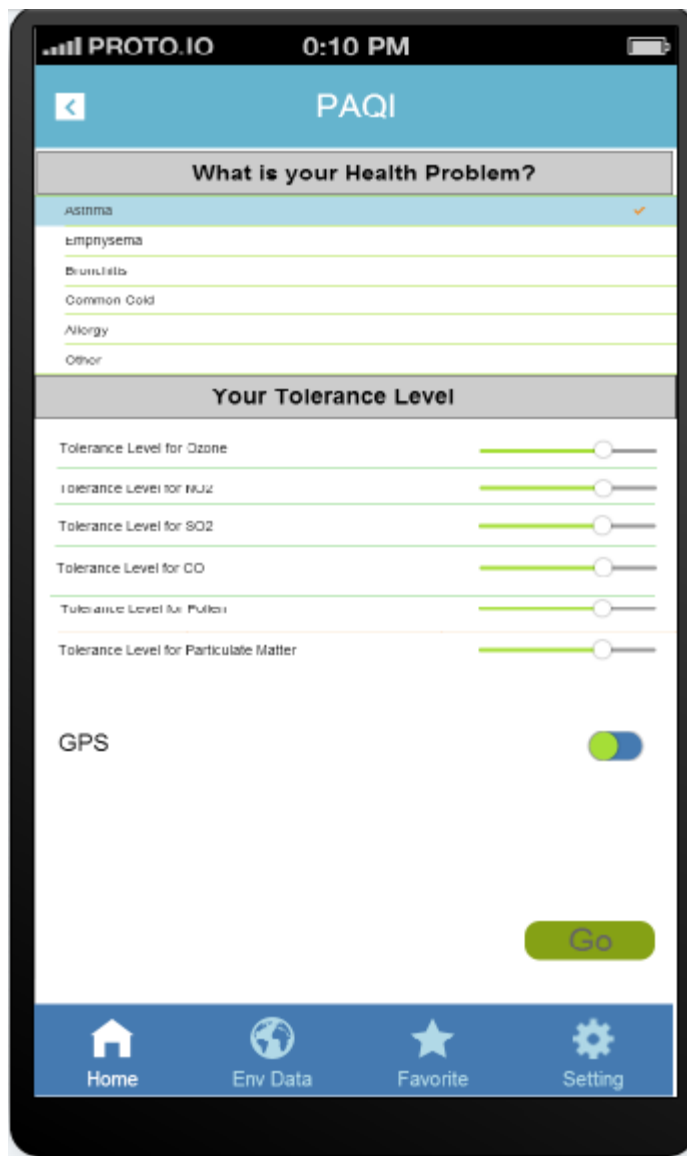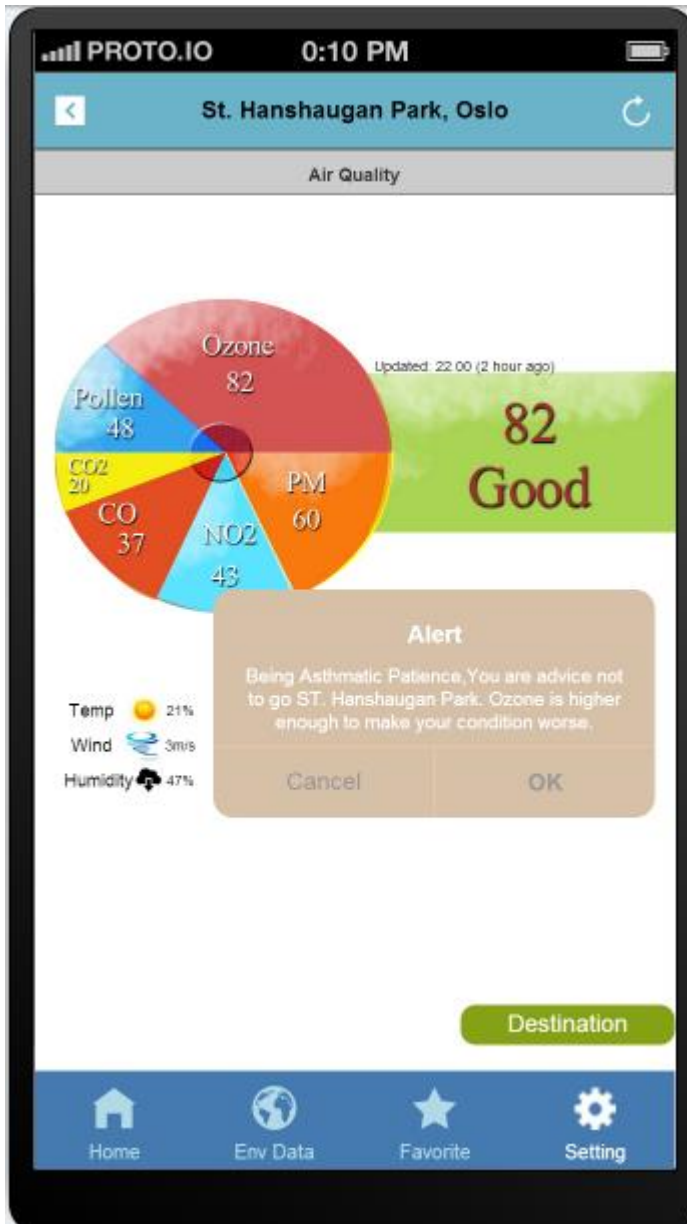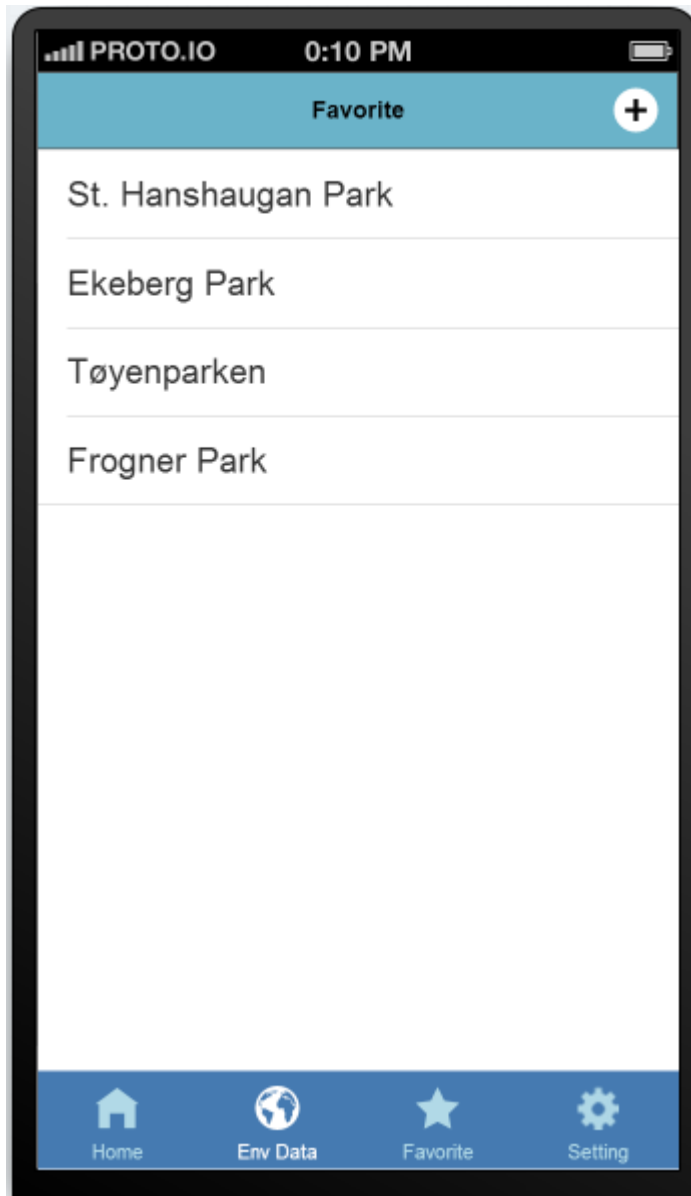
LOG IN
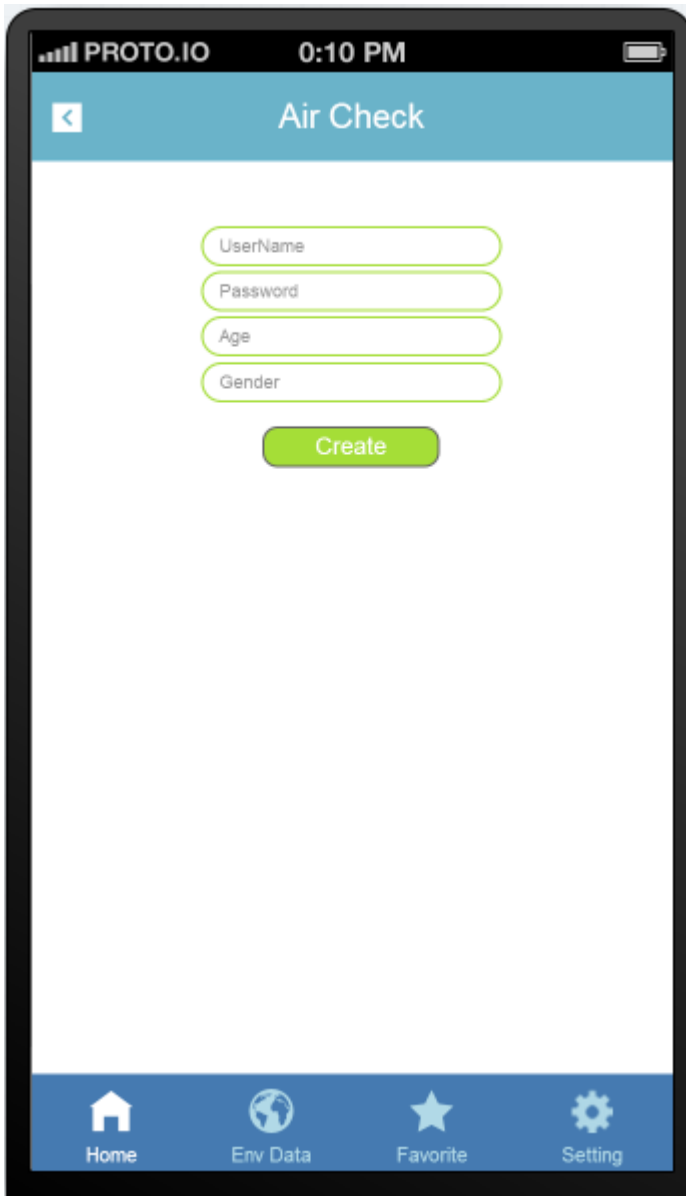
SIGN UP

DESTINATION
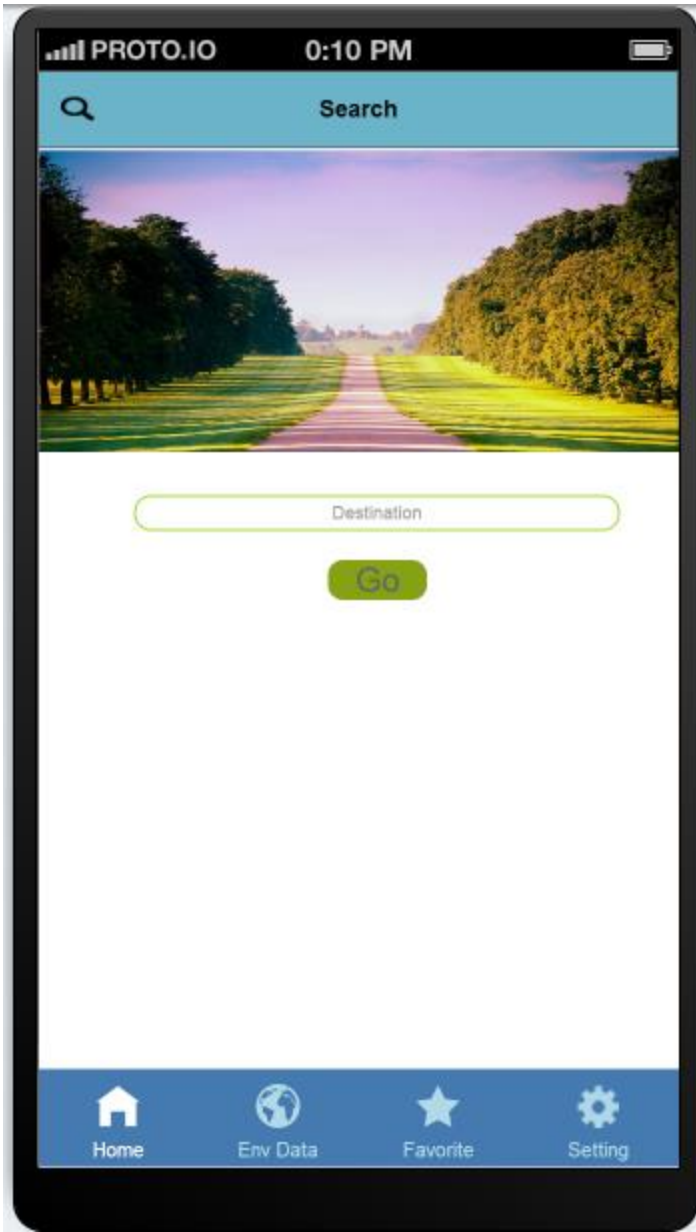
SETTING

RESULT

List of Favourite Location of User

THANK YOU