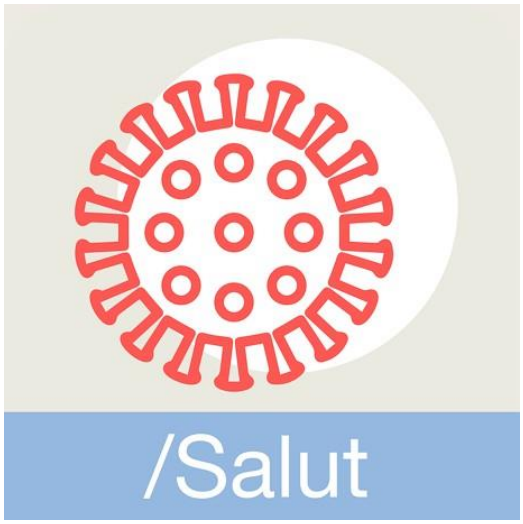
COVID19 CAT



/Salut Generalitat de Catalunya

Content

1. Introduction

The Department of Health of the Government of Catalonia has made a **Monitoring and tracing test for Coronavirus SARS CoV-2 symptoms** available to its ci4zens, in order to effec4vely monitor those with COVID-19 symptoms or those that have been in contact with someone diagnosed with the virus.

The test is available through two digital tools:

- A mobile phone app called STOP COVID19 APP (available for both Android and IOS), accessible through the different app markets.
- A web-based Chatbot called COVID19Xat, accessible through the official website of the Catalan Health Service (CatSalut). This Chatbot is different to customary Chatbot mechanisms as it is able to register the results of the interac4on with users. The reason for making the Chatbot available is to reach those users without a smartphone (as well as those with an old genera4on smartphone) or those whom do not wish to download the app but s4ll want access to the test.

From the data collected through both tools, the health system is able to monitor those cases with symptoms and, if necessary, alerts the emergency services of the most severe cases and informs primary care centres of those with mild symptoms for their monitoring.

The informa4on is also used to determine the evolu4on of the disease at the individual level and aggregate, in order to design and implement measures and strategies to beber the quality of the health services and conduct studies in rela4on to coronavirus.

2. The Goal

The need for a test capable of conduc4ng a first classifica4on of the cases of pa4ents with this pathology was first revealed at the beginning of March.

To this purpose, the objec4ves of the digital tools developed are the following:

1. Relieve the pressure of the number of calls on the telephone numbers set up for Covid-19 emergencies (061 CatSalut Respon).
2. Provide reliable informa4on and medical advice to ci4zens.
3. Be able to monitor and evaluate the symptomatology of those ci4zens who answer the test to validate the classifica4on and, in case of severe symptoms, ac4vate the emergency services.

3. Functional Requirements

3.1 Functional definition

The objec4ve of the APP STOP COVID19 CAT and the COVID19Xat is to offer the user a self-assessment test on the symptoms of COVID-19. In this way, the user provides informa4on about the symptomatology and receives advice depending on the result. In case of a possible COVID-19 case, the digital tools store the ci4zen's data in order for the health services to be able to monitor his/her progress. The health services will assess the need to re-classify, monitor, or alert the emergency services in case they're needed.

3.1.2 Data

The STOPCOVID19 and COVID19Xat tools are voluntary tools.

As it is described later on, both tools require the Personal Iden4fica4on Code (CIP), which is a code that can be found on any Individual Health Card. Alterna4vely, the user can provide their ID or Passport.

List of recorded data:

1. Iden4fica4on data: CIP, ID or Passport.
2. Contact details: telephone number and/or address and alterna4ve telephone number.
3. Health data: the user's answers about the symptomatology.
4. Loca4on data: the longitude and la4tude coordinates of the loca4on from where the user is answering the test, data obtained automa4cally with the user's prior consent (through the same APP or the browser in case of Chatbot)

3.1.4 Geolocalisation

With the objec4ve of facilita4ng healthcare in rela4on to the evolu4on of COVID-19, the use of localisa4on and iden4fica4on tools are necessary within the app and Chatbot. The geolocalisa4on tools used are the following:

- App: the app geolocates the loca4on of the user through the handset (once the user has accepted to ac4vate the localisa4on services).
- Chatbot: The chatbot geolocates the loca4on of the user through the acceptance of the geolocalisa4on op4on in the browser.

The informa4on provided by these systems is relevant in case emergency services need to be alerted and is also important for eventual test deliveries or other necessary health materials to ci4zens' homes. Geolocalisa4on also allows for the crea4on of a heat map that iden4fies the areas with a greater density of cases, so the resources available can be assigned according to the necessi4es of each area or area-specific containment measures can be adopted.

3.1.5 Data workflow

3.2 Case of usage

The Coronavirus SARS CoV-2 symptoms monitoring and tracing Test works as follows:

It outlines four ini4al ques4ons that allow the iden4fica4on of users' symptoms that indicate the need to complete the self-assessment test. The ques4ons are:

a. Do you have a fever?

b. Do you suffer from shortness of breath?

c. Do you have a persistent cough?

d. Do you have a sense of general unrest?

If the user answers NO to ALL of the ques4ons above, it will not be necessary to con4nue with the test. The person is considered to be asymptoma4c and they will be referred to the protec4on measures and health advice that can be found in the official informa4on sources.

If the user answers YES to one of the ques4ons above, it will be necessary to con4nue with the self-assessment test to iden4fy more details:

a. Age and gender

b. Illnesses or basic details that allow to iden4fy the poten4al risk of the user

c. Specific symptoms:

   i. Exact temperature

   ii. Level of discomfort (in a scale of 1 to 4)

   iii. Level of shortness of breath (in a scale of 1 to 4)

d. Current condi4on, specifying whether or not the user is experiencing difficul4es to carry out ordinary ac4vi4es (taking a shower, gemng up, ea4ng, etc.)

With the combina4on of the symptoms, the risks, the current condi4on and the age of the user, the algorithm bounded to the test establishes a classifica4on of the cases according to the following criteria:

- Level 1: Severe symptoms and associated risk: The emergency services are alerted. The emergency services contact the user for monitoring purposes and ac4vate the resources if needed.
- Level 2: Severe symptoms but no associated risk: The user is urged to stay home and to self-assess the symptoms experienced twice a day during 14 days. The case is reported to the primary care services, which will aid with the monitoring.
- Level 3: Mild symptoms and associated risk: The user is urged to stay home and to self-assess the symptoms experienced twice a day during 14 days. The case is reported to the primary care services, which will aid with the monitoring.
- Level 4: Severe symptoms and no associated risk: The user is urged to stay home and to self-assess the symptoms experienced twice a day during 14 days. The case is reported to the primary care services, which will aid with the monitoring.

4. App STOP COVID-19 CAT

The process of usage of the APP STOP COVID-19 CAT is as follows:

- Google Play
- App Store

The app is available for Android and iOS. The links to their official markets are:

- Google Play
- App Store

4.1 Functional description

We will now proceed to describe the ac4ons required in every screen.

4.1.1 Home page

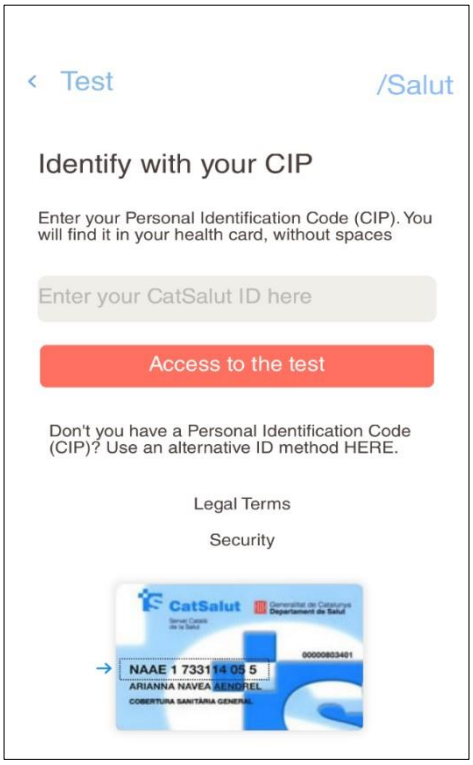
The first screen that will appear when the applica4on is installed on the device allows the user to select the language in which the self-assessment test will be conducted. The applica4on is available in 5 languages (Catalan, Spanish, English, French and Mandarin).

4.1.1 Iden4fication - Login

Once triggered, the app will show the iden4fica4on screen, where the user will have to provide their iden4fica4on number. The preferred op4on will be the CIP code (health service number), but, alterna4vely, iden4fica4on with ID or Passport is also allowed.

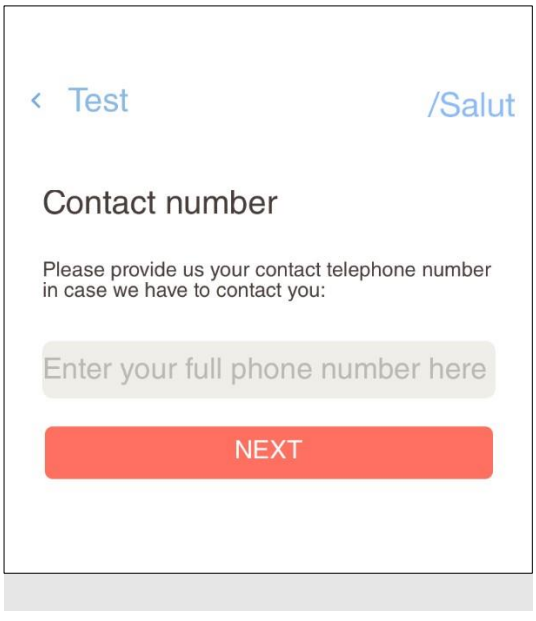
This screen also shows the legal considera4ons to take into account, such as the security requirements.

As shown on the screenshot, an image of the health card is shown, providing the user with informa4on about where to find the CIP number so that they can insert it correctly in the applica4on.



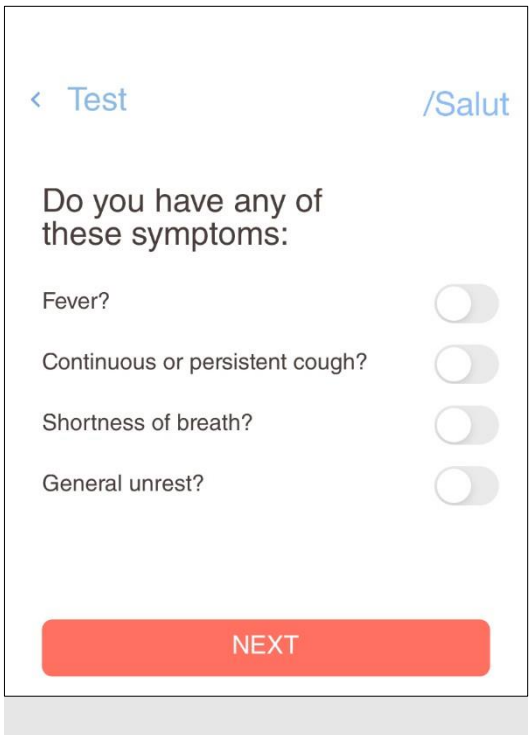
4.1.2 Contact telephone number

The user's telephone number is requested, to be able to contact the pa4ent and keep their data updated.

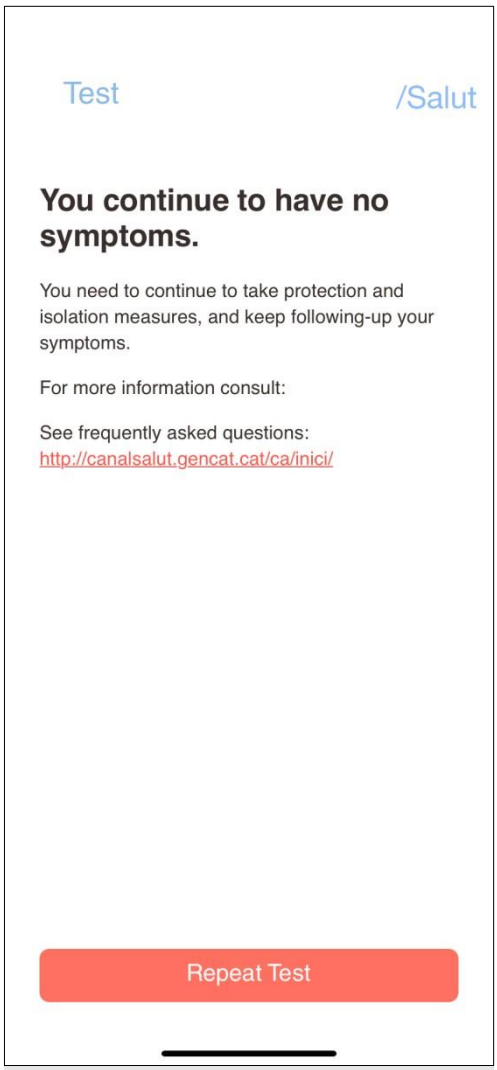


4.1.3 Symptomatology

Then the test begins. A first assessment of the symptoms of the pa4ent is conducted. The informa4on asked is:

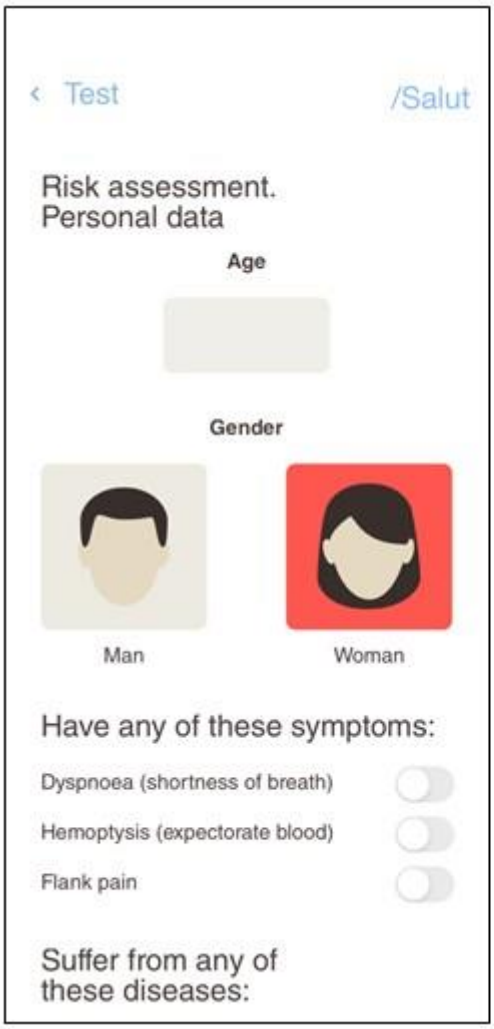


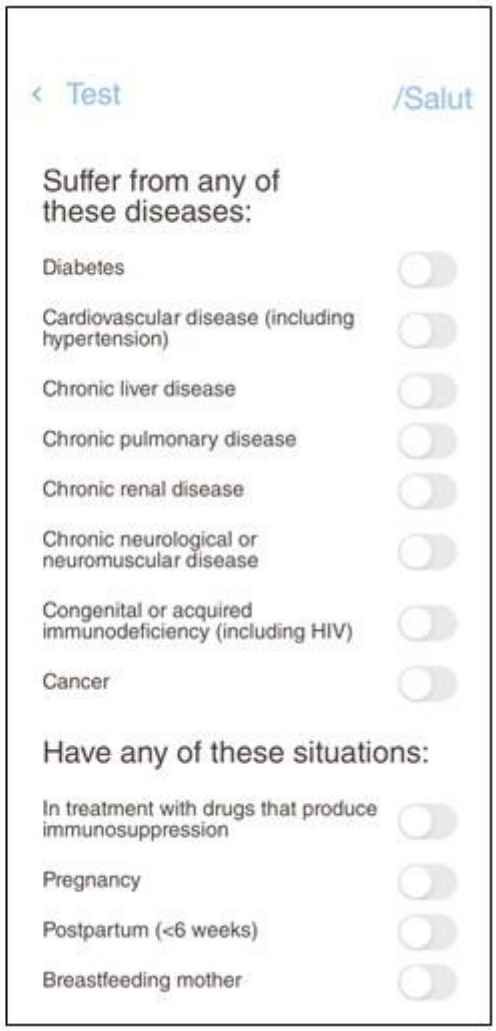
In case of a nega4ve answer to all ques4ons, the applica4on will consider it not necessary to conduct any further survey and it will urge the user to observe the precau4on measures.



4.1.4 User data and history

Anerwards, the app requests some personal data about the user (age and gender) and about their medical history.





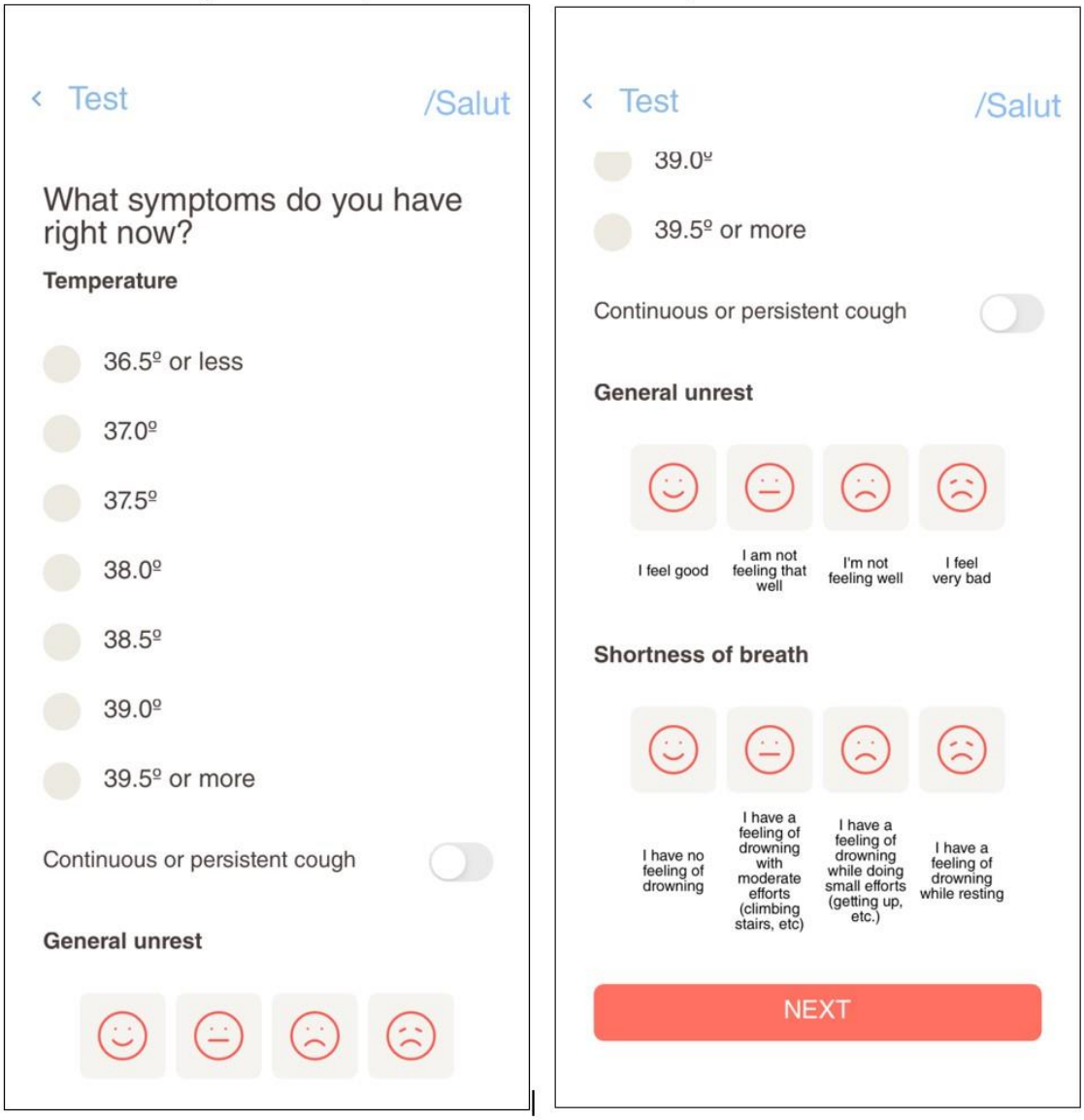
The data provided at this stage allows the algorithm used to conduct a risk analysis of the user.

4.1.5 Current health condition

The final part of the test gathers detailed informa4on to iden4fy the user's current health condi4on:

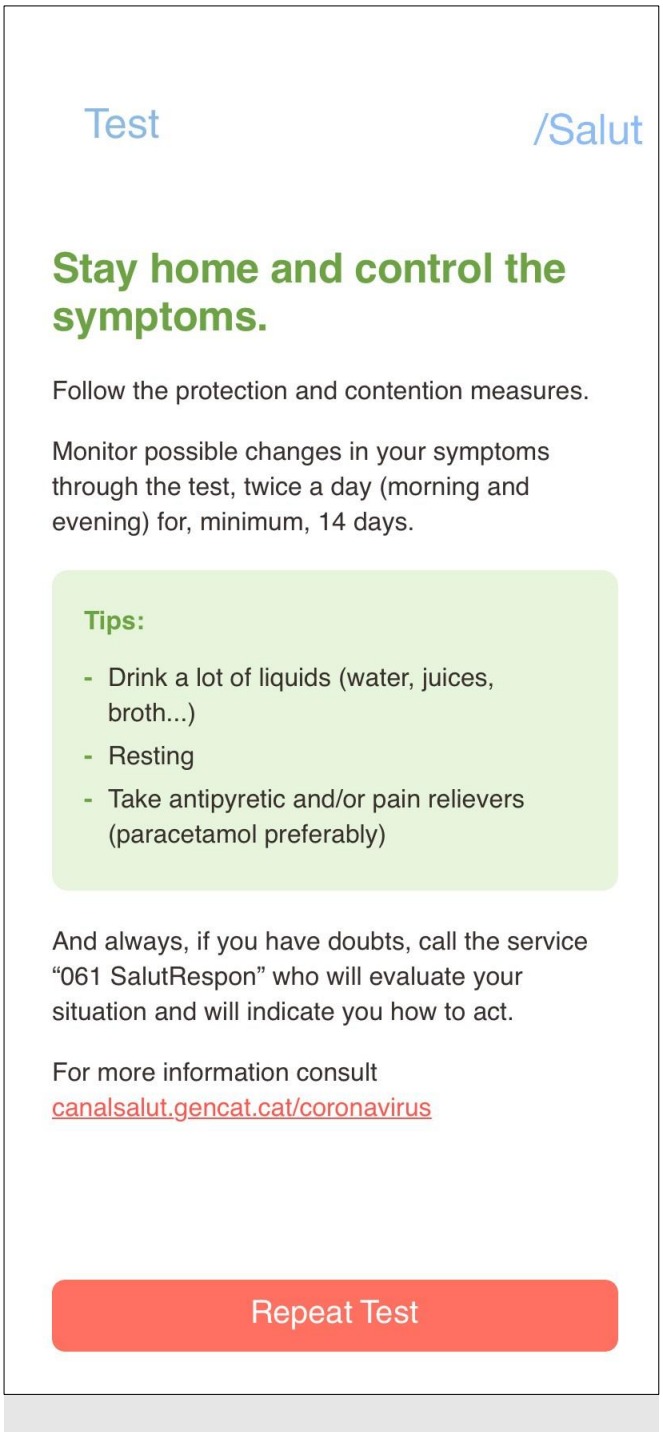
- Temperature, measured in degrees and sugges4ng the following concrete values: 36.5º or less, 37º, 35.7º, 38º, 38.5º, 39º, 39.5º or more.
- Physical condi4on assessment: on a scale of four possible situa4ons:
  - I feel good
  - I am not feeling that well
  - I'm not feeling well
  - I feel very poorly
- Shortness of breath assessment: on a scale of four possible situa4ons:

- I have no feeling of drowning
- I have a feeling of drowning when performing moderate efforts (climbing stairs, etc.)
- I have a feeling of drowning whilst performing small efforts (gemng up, etc.)
- I have a feeling of drowning whilst res4ng



4.1.6 Result

Once the app gathers the data from the user and his/her answers to the test, the user's case is assessed in accordance with a classifica4on of severity (see sec4on 3.2), and the user will be given instruc4ons as per the classifica4on of his/her symptoms.



4.2 Non-functional requirements

The non-func4onal requirements are those related to the characteris4cs that in one way or another can limit the system. They describe a restric4on on the system that limits our choice in finding a solu4on.

The non-func4onal requirements of the applica4ons are the following:

- **Applica.on compa.ble with mobile devices:** a compa4bility with iOS and Android is required, also taking into account former versions of both opera4ve systems.

- **Mul.language**: it needs to allow the configura4on of the different screens in several languages, allowing changing language when needed.
- **Hos.ng**: in suppliers of the corporate plaporm of the Health Department.
- **Increasing ability**: the increasing ability both with regards to the number of users as well as data processing should be taken into account.
- **Extensibility**: a solu4on to add new func4ons should be considered.

4.3 APP architecture

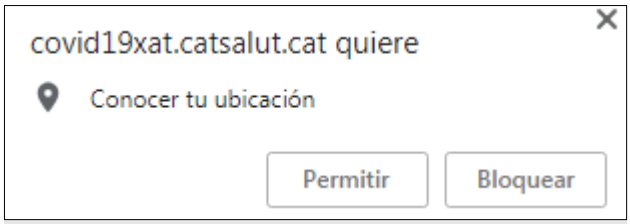
Pending developers information

5.Chatbot – COVID19Xat

We will now proceed to describe the usage process for the chatbot.

5.1 Functional description

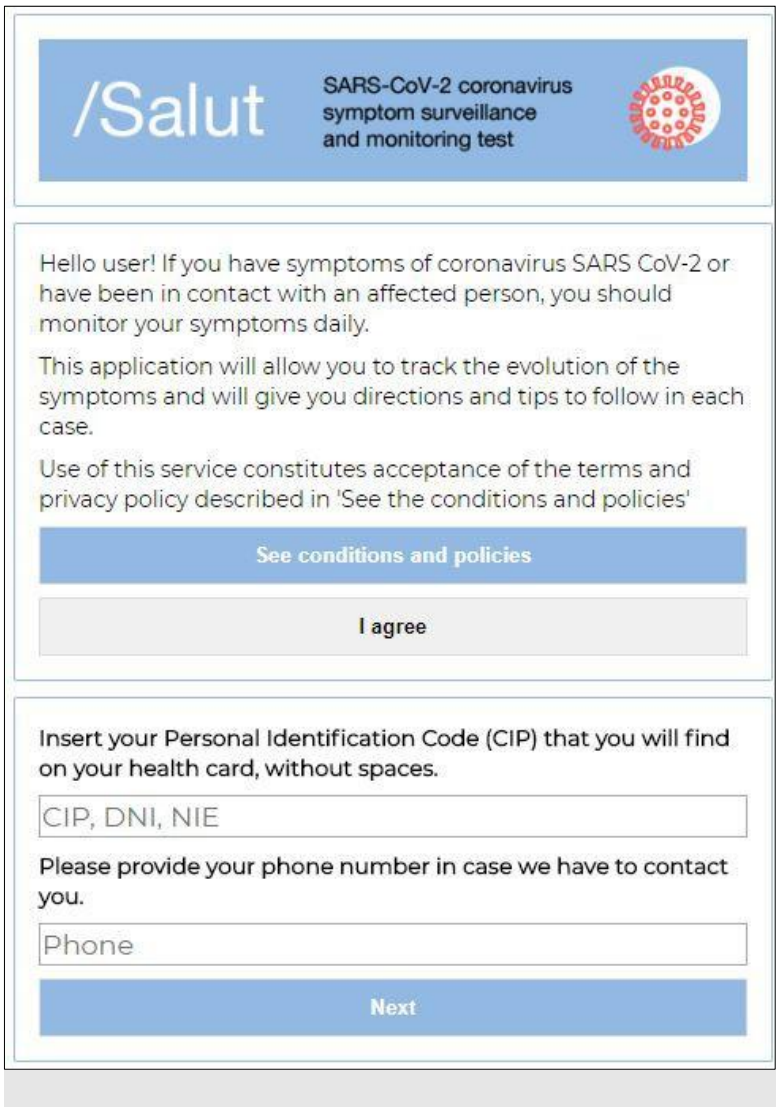
Access to the chatbot is done through the official website of the Catalan Health Service (CatSalut) or by following the link covid19xat.catsalut.cat. Once the user accesses the link, an automated message will pop up to require access to the user's loca4on.



We will now proceed to describe the ac4ons required in every screen.

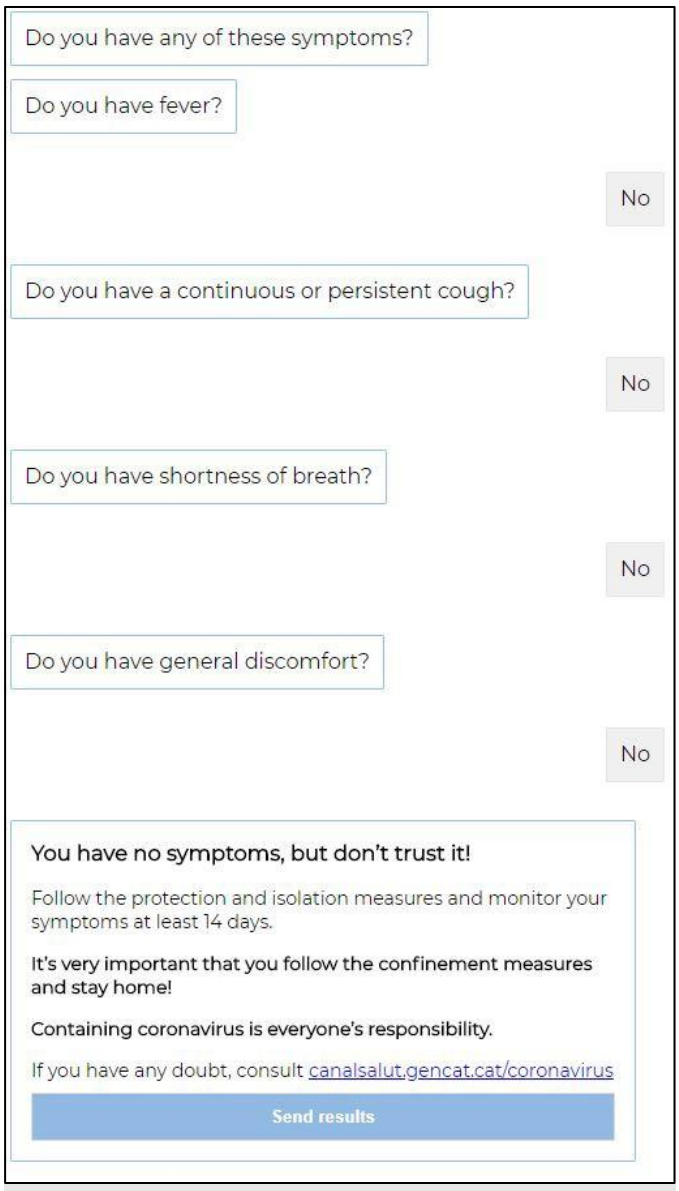
5.1.1 Home page

The home page offers descrip4on informa4on about the chatbot and requires acceptance of the privacy and security terms and condi4ons. Once these are accepted, the iden4fica4on screen will open up. The user will have to fill in his/her CIP code (health service number), or, alterna4vely, iden4fica4on with ID or Passport is also allowed. The user will also need to introduce his/her mobile phone number.

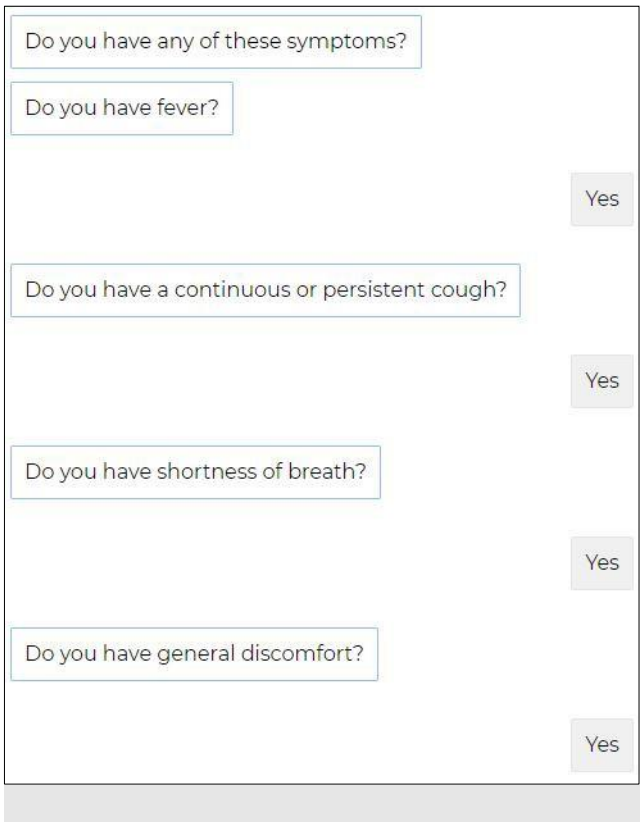


5.1.2 Symptomatology

In case of a nega4ve answer to ques4ons of main symptoms, the chatbot will consider it not necessary to conduct any further survey as the user is not displaying any symptoms and it will provide the user with monitoring advice.

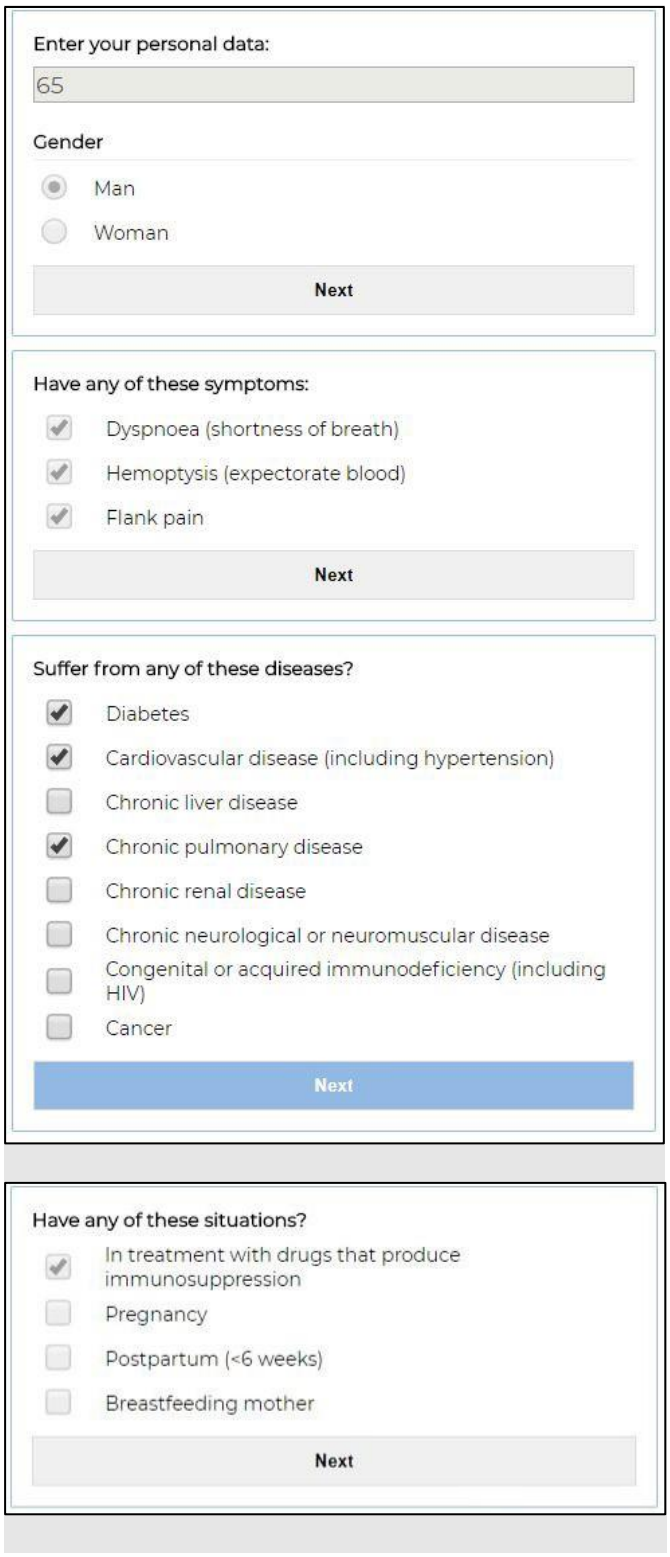


In case of an affirma4ve response to any of the ques4ons asked, the test will ini4ate in order to monitor the user's data and his/her past health records (see next sec4on).



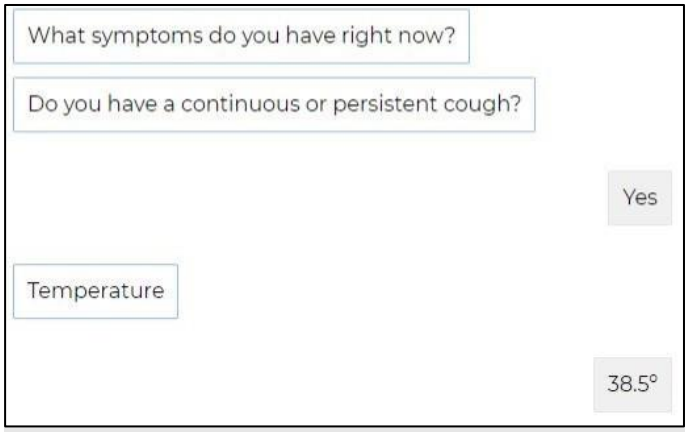
5.1.3 Patient symptoms and past health records

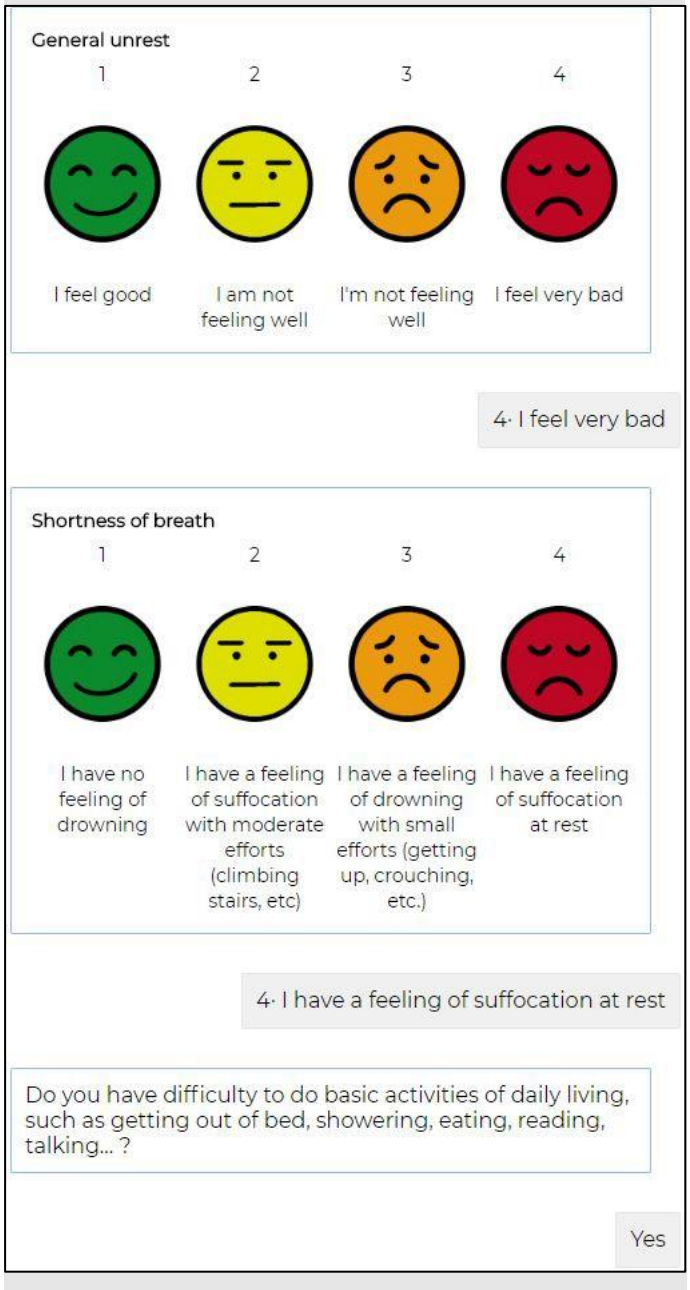
Anerwards, the chatbot will ask the user to introduce his/her age and gender, previous illnesses, symptoms and current situa4on.



5.1.4 Current health condition

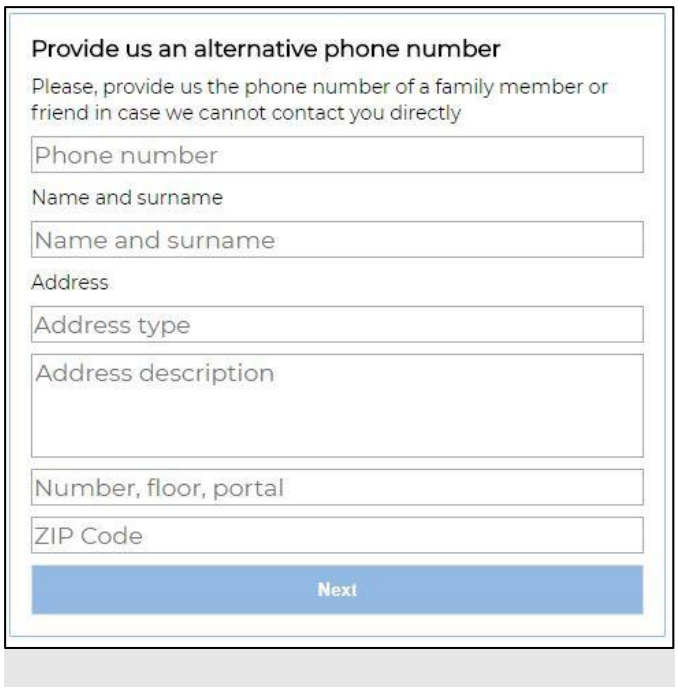
Once the user has filled out the aforemen4oned informa4on, the ques4onnaire will ask the user to describe his/her current health condi4on in order to be able to assess the degree of severity of his/her case.


What symptoms do you have right now?
Do you have a continuous or persistent cough?
Yes
Temperature
38.5°


General unrest
1
2
3
4
I feel good
I am not feeling well
I'm not feeling well
I feel very bad
4· I feel very bad
Shortness of breath
1
2
3
4
I have no feeling of drowning
I have a feeling of suffocation with moderate efforts (climbing stairs, etc)
I have a feeling of drowning with small efforts (getting up, crouching, etc.)
I have a feeling of suffocation at rest
4· I have a feeling of suffocation at rest
Do you have difficulty to do basic activities of daily living, such as getting out of bed, showering, eating, reading, talking... ?
Yes

5.1.5 Result

In case of a suspected COVID-19 case, the chatbot will ask the user an alterna4ve contact.



Lastly, the result will show and an indica4on of how to proceed in accordance with the level of severity of each case (as explained n sec4on 3.2).

5.2 Non-functional requirements

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- **Increasing ability**: the increasing ability both with regards to the number of users as well as data processing should be taken into account.
- **Extensibility**: a solu4on to add new func4ons should be considered.

6. Performance review

In order to measure the impact of the digital tools described, the following indicators have been established:

- Number of downloads of the app in Android
- Number of downloads of the app in IOS
- Number of individual users
- Number of self-assessments carried out
- Percentage of first-4me self-assessment test versus consecu4ve tests
- Number of poten4al asymptoma4c cases iden4fied
- Number of poten4al level 1 cases iden4fied

- Number of poten4al level 2 cases iden4fied
- Number of poten4al level 3 cases iden4fied
- Number of poten4al level 4 cases iden4fied
- Number of re-classified cases
- Other indicators by province through geolocalisa4on