

First Iteration Test of the Navigation User Interface from ADAPEI Transport App with Adults Having Intellectual Disabilities

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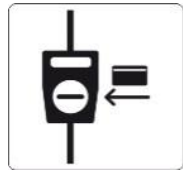
Professional Experience:

- Research and Innovation Leader at the Capgemini Engineering.
- Research and Development Engineer at the Strasbourg University.
- Research engineer at CNRS in France.

Publications & Activities:

- In charge of research projects in the fields of Mobility, Artificial Intelligence and Internet of Things.
- Lecturer at ECAM (Engineering School) in the field of IoT.
- Catheter Tracking and data fusion for reducing the X-ray exposition in an interventional Radiology procedure (2020).
- "ADAPEI Transport": A GPS mobile App for Learning Paths and Improving Autonomy for Young Adults Having Intellectual Disabilities To Take Public Transport (2020).
- "Geo indoor": Design of an indoor navigation app to help elderly people to navigate in buildings (2019).

1 Use Case: Transport workshop



Home



IME
ADAPEI building

Difficulty of the network





- Creation of the « **small paper book** » to teach to the children and young adults (14-20 years olds) with intellectual disabilities, the different steps, in a sequential way, to arrive from a departure point to the arrival point, using public transport.
- The specialists walk the path with the children as many times as necessary. In this way, the children gain in confidence to memorize the different landmarks to arrive to the destination. The landmarks (cinemas, train stations, crossing lines, bus stations, boutons to press, etc..) that are going to help when they do the path by themselves.
- Other problems can arrive when young adults do the path alone, for example: the bus does not arrive at the right time, the young adult can be lost and unable to comeback to a known landmark or there are no people around to help,. currently, they call a responsible or a relative to help.
- ✓ Ergonomic difficulty observed → It is difficult to find the name of the person in the menu of the telephone to make a call. Description of the place given by the children, sometimes it is not clear.



Step 1 mornig



Step 2 morning



Step 1
afternoon/nigth

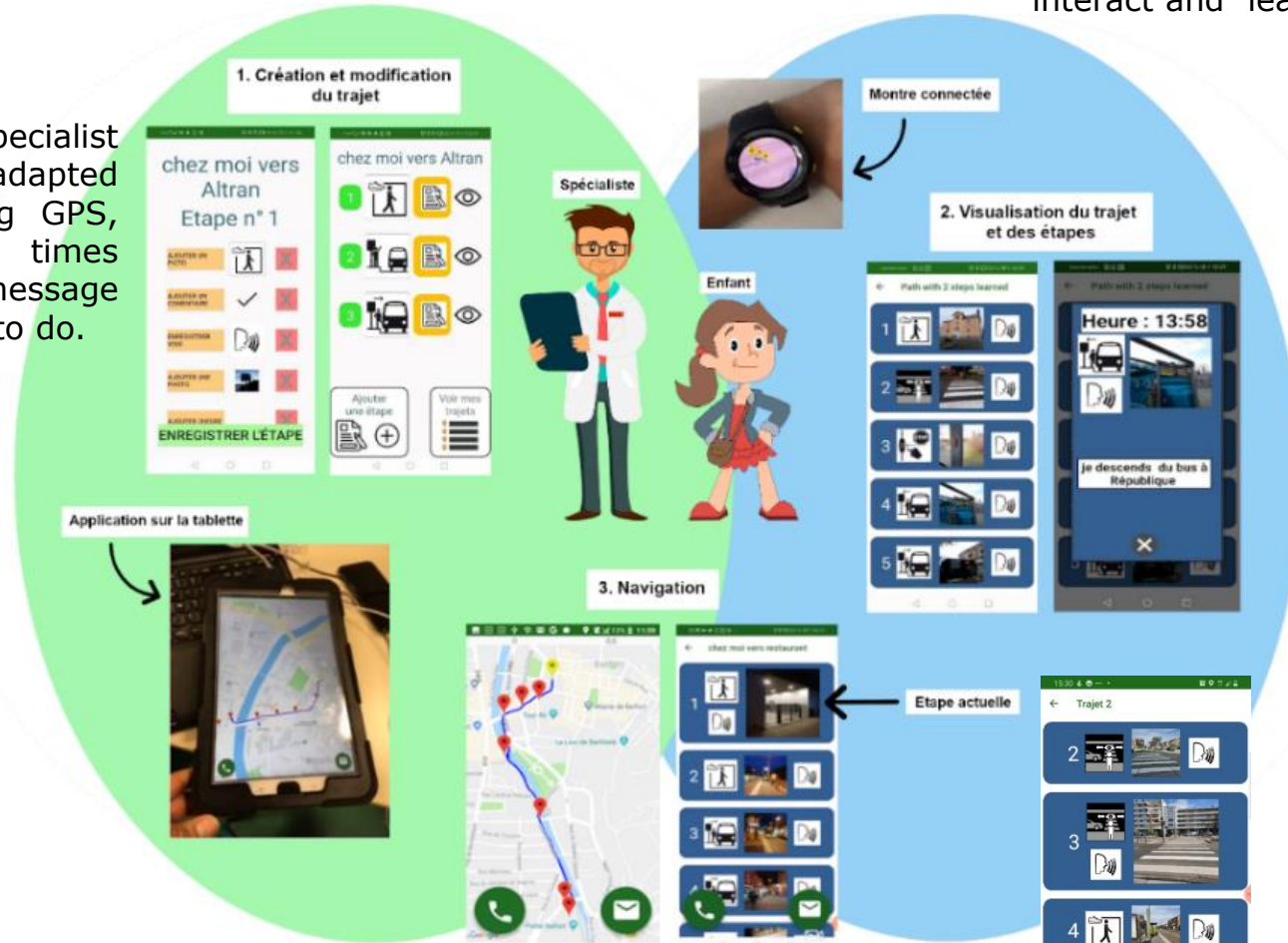


- The pages in yellow background represents a morning activity (before 2pm)
- The pages in dark background represents an afternoon/night activity (after 2pm)
- Use of pictograms, photos, times, colors, sun images, and the text of the different actions to do (steps in a sequential way) learning tool.

2 ADAPEI TRANSPORT

The app also has a visualization part in which, the person can interact and learn all the steps.

The app allows the specialist to create an adapted reference path using GPS, pictograms, photos, times and voice message indicating the action to do.



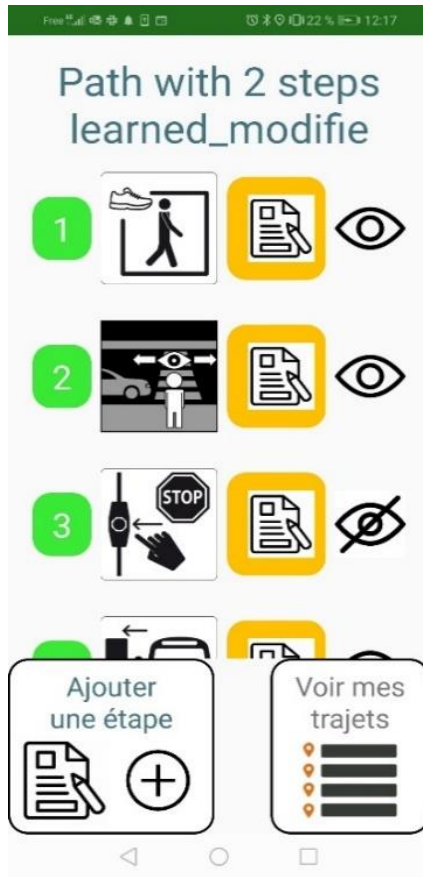
The app also has a navigation part in which a specific user interface has been developed delivering information of the whole path selected and from every step of this path when the person is close to a landmark. Information about if a bus is late or not is also available.



Announcing bus is late 1 minute.



Stopping steps



Video demonstration



PEDAGOGICAL VIDEOS TO TEST NAVIGATION WITH ADULTS HAVING INTELLECTUAL DISABILITIES



Two paths were created as reference paths using the app recording all the information.

A navigation simulation is created using the navigation interface screen synchronized with the video from the environment showing the information presented to walk from one-step to another.

We have edited two videos:

- one having the information of photos of landmark, pictograms and the actions to do.
- and another who has photos, pictograms and arrows to indicate to turning right or left in an intersection.

Focus group: three adults having intellectual disabilities who are able to walk independently in known paths and environments and a specialist in mobility.

The 3 disabled subjects are older than 20 years old. One of them is not familiar with the use of smartphones.





- The progression bar showing the distance walked by the person was not very visible. It should be bigger and with more contrast color compared to the background.
- All the subjects agree that images and pictograms are more understandable than turning right and turning left arrows on the screen.
- Currently, the landmark steps of the path disappears automatically once the person has finished the action and gets out from the step zone. For the specialist, one improvement is not to make the image of the step disappears, in contrast, to validate a landmark step it could be more convenient to put on the step a big X cross once the step has been done by the user.
- Currently, the validation when a person is in the zone of a step is done 30 meters before the GPS coordinates recorded of the step position. Users ask if that could be done the closest possible to the step position to avoid confusion when 2 steps are very close.
- A user who already uses Google maps in cars has told us that one of the problems about car navigation is that they do not have the photo or image of the destination. An advantage of our app is that we can create and edit a specific path with the photo of the landmarks and the destination.
- According to the specialist, the subjects seem not to have problems of comprehension of the environment, but they could experience lack of self-confidence in new environments. The app can help them to be reassured.
- All the subjects would also like to be informed that they do not take the right direction in the path (for example, in case of intersection).



- In general, the results are very encouraging; the three people having intellectual disabilities seem to have understood, after asking them, the indications in our video and all the steps using the images and the pictograms.
- The app can be used to reassure the person that he/she has taken the right path especially in unknown environments.
- For giving information about if he/she has taken the wrong path in an intersection, the use of the information of the compass of the phone could be integrated.
- After this first iteration, we will rework on the code to add and change the parts in the app to improve the user interface.
- The next iteration will consist of testing the user interface of the app with end-users in a real situation.