

## **FITTING ADAPTIVE REAL-TIME TECHNOLOGY TO THE POPULATION GEOGRAPHY AND REGIONAL RESOURCES ACROSS THE EUROPEAN UNION**

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### ***ABSTRACT***

*The ASSISTANT AAL project supports older adults using public transportation using real time location data and publicly available route and schedule information. ASSISTANT is targeted at those public transport agencies that do not have the resources to create such applications*

**Keywords:** Assisted public transportation use, infrastructure re-use

### **1. Introduction**

The AAL program is aimed to support ‘the emergence of innovative ICT-based products, services and systems for ageing well’ supported by ‘developing common approaches and facilitating the localisation and adaptation of common solutions’. Part of aging well is being able to continue to be mobile in ones own community. While using public transportation can be daunting for elders, giving it up can have deleterious repercussions. Fortunately the current IT environment includes the availability of real-time location data as well as common file structures for storage of telemetric data. This situation, combined with widespread mobile data connectivity and ever cheaper smartphones with a plethora of sensors and powerful processors, has created a environment ready for creating systems that provide real-time travel support for elders continuing use of public transport.

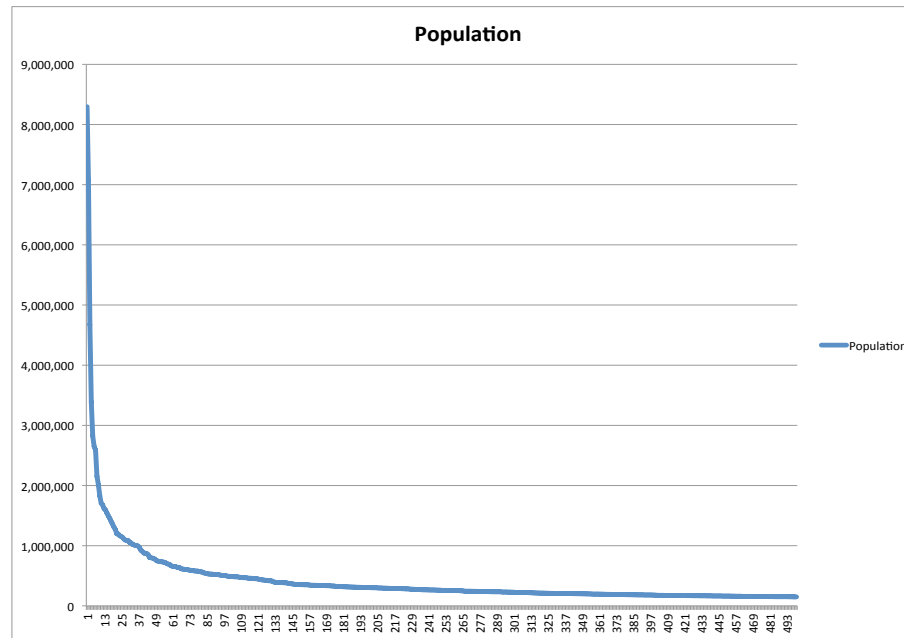
However the creation of a system to incorporate all the available data and implement it on new hardware platforms is not a trivial task. Very large urban transit systems are already creating bespoke systems to do this, however for regions with populations below 150,000 the resources to design, implement and support such systems is too large a percentage of their available resources; and the significant percentage of the population of the EU live in such areas, which is often described as the long tail phenomenon [1]. The AAL ASSISTANT project [2] addresses this problem and is designed to fit into this specific economic niche, using open source software (Open Trip Planner [3]) and common file systems (General Transit Feed

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Specification [4]) which many mid sized European transport systems are already publishing (and doing on-going updates of) their transport data.



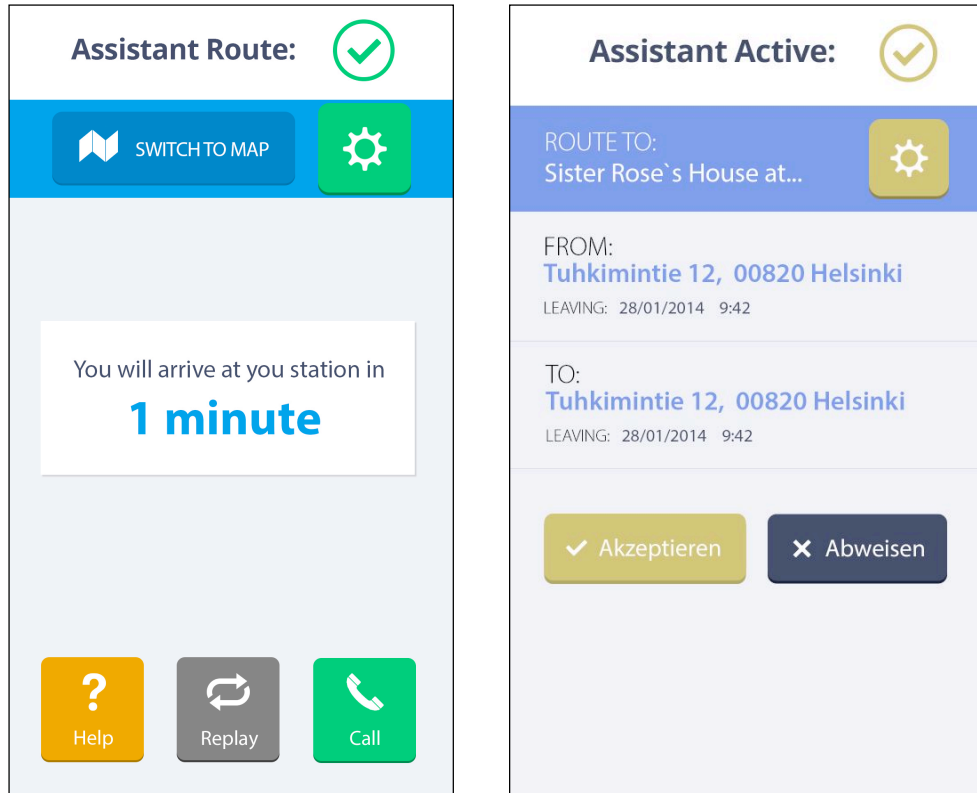
**Figure 1 - Urban population in EU**

## **2. Providing adaptive real-time technology with respect to geographic density and available resources in the EU**

An analysis of the distribution of EU urban size and population shows that in 2003 the EU population was 458 million [5] of this 497 cities are larger than 150,000 (see Figure 1) which accounts for 211.5 million, so in 2003 54% of the population was in cities (and rural areas) of less than 150 thousand and 46% in the larger cities. This both shows the potential market share and the motivation to provide the Open Travel Planner approach. The commercial advantage of addressing the long tail, is that while the price of installation and upkeep may be (and is designed to be) relatively small and affordable, the number of urban areas below the 150 K population line is numerous (about 450 between 200,000 and 50,000[6, 7]).

ASSISTANT involved final users and transport companies from different European countries, with the aim of generating solutions that fits with the real needs and requirements. In this project, researchers have put special attention into the design of the application to adapt it to elderly and also to create a final product that can reach the market. In ASSISTANT, stakeholders were involved in every phase of

the project including co-designing and evaluation to ensure that the final product is adapted to future clients.

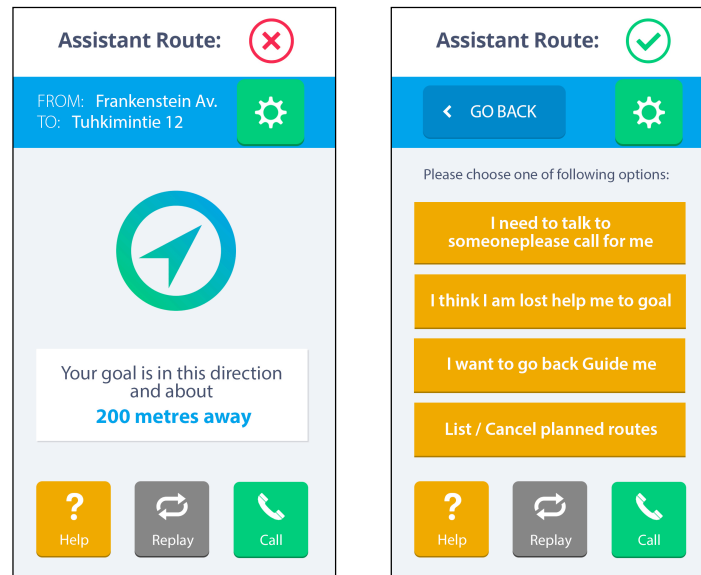


**Figure 2 - (left) PND<sup>3</sup> travel prompt (right) PND route loading**

The interface and functionality are built to fit older adults specific needs and customisable to accommodate any special requirements that aging and fading abilities require. Additionally the system captures problems in the trip and has personalised mitigation strategies to apply that conform to the users requirements. Another unique offering of ASSISTANT is providing guidance to the user for the “last kilometre” of the trip – from the last transport stop to the voyage goal (as well as the first kilometre – from the starting place to the initial transport stop); ASSISTANT, like another AAL project (Name [8]), takes into account the realities of GPS reliability in urban ‘canyon’ environments and does not promise GPS guidance but rather a set of guidance tools that are reliable and work with the users ability rather than replace the end-users ability.

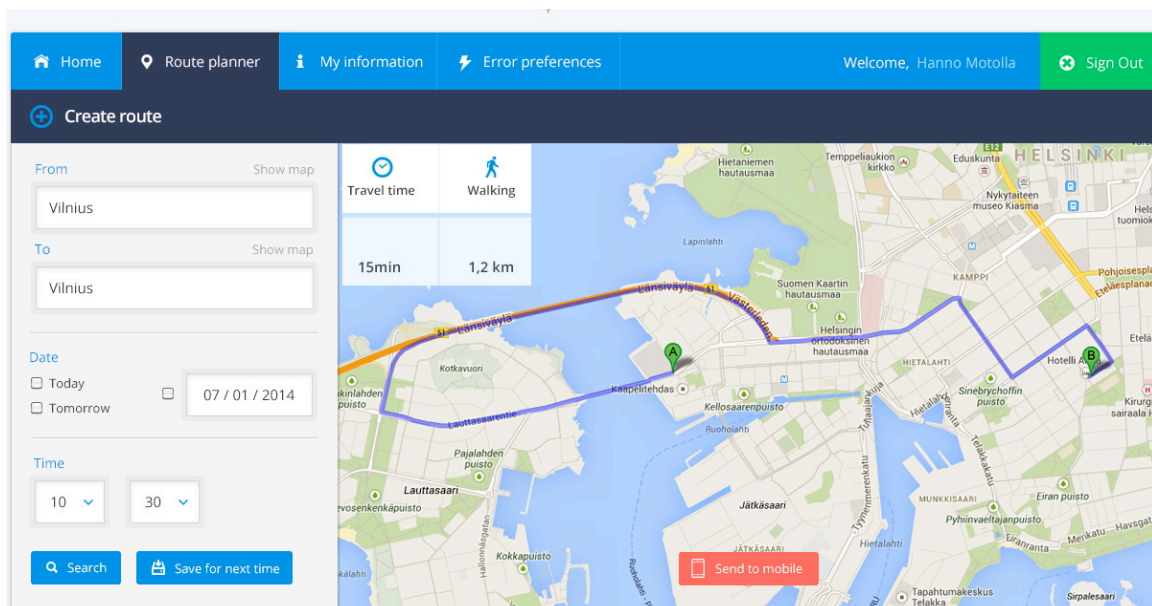
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<sup>3</sup> A PND is a Personal Navigaiton Device, in this case an application on a smartphone



**Figure 3 - (left) PND last kilometre instruction (right) PND asking for help**

Expecting that there will be also large urban transport organizations that may not be ready or interested in creating their own system similar to ASSISTANT, especially with regards to the personalised user interface that will conform to atypical user needs and abilities as well as mitigation of ‘lost’ conditions and the



**Figure 4 - Browser based route editor**

unique last kilometre guidance from the last stop to the trips goal, ASSISTANT provides an alternative base system that can, with a small amount of customisation (which is part of the exploitation plan), utilise the API that these large systems typically provide for route planning and real-time tracking. Both of these base systems will be instantiated and undergo field trials in cities, the API in Vienna and Helsinki, the Open Trip Planner in San Sebastian (Spain).

The screenshot displays the ASSISTANT web application's preferences editor. At the top, a navigation bar includes links for HOME, ROUTE PLANNER, MY INFORMATION, PREFERENCES (the active tab), and ERROR PREFERENCES. A user greeting 'Welcome, Hanno Motolla' and a 'Sign Out' button are also present. The main content area is titled 'Preferences' and is divided into three columns. The left column, 'USER THEME', offers radio button options for 'No type', 'Typical Senior', 'Typical Adult', 'Tourist', 'Mobility Disability', and 'Visual Disability'. Below this, the 'DISABILITIES' section features sliders for 'Visual' (ranging from NONE to BLIND) and 'Mobility' (ranging from NONE to IN WHEELCHAIR), with 'Save' and 'Restore' buttons at the bottom. The middle column, 'ALERTS', contains checkboxes for 'Audio', 'haptic', and 'Full screen blind', followed by a section for 'Play alert till confirmation' with options for 'Invert screen', 'Ambient lighting adjustment', 'Alarm on lost GPS', 'Alarm on lost mobile data', 'Alarm on lost phone service', 'Audio PC confirmation beep', 'Audio PND confirmation beep', 'Haptic PND confirmation', and 'Active Map Zoom controls'. The right column includes 'REPEAT' settings for 'Auto repeat prompt' (set to 10) and 'Space between repeat (millisec)' (set to 30), a 'TOUCH SCREEN DELAY' section with a 'Touch screen delay on' checkbox and a 'Touch screen delay (milliseconds)' dropdown (set to 5), a 'WALKING DISTANCE' section with a 'Maximum distance to walk (meters)' dropdown (set to 5), and a 'TIME TO EXIT HOME' section with a 'Delay before exit (minutes)' dropdown (set to 0). The footer contains the AAL logo and a copyright notice: 'Copy Right(c) 2014 ASSISTANT no. AAL-2011-4-040 has received funding from AAL JP, co-funded by the European Union'.

**Figure 5 - Browser based user preferences editor.**

### 3. Conclusions

ASSISTANT pulls together the fortunate confluence of cities public transport systems exporting their routes, schedules and stop location into common file formats and committing to updating them regularly allows our system to have current and near future data that matches the day by day in the case of schedules, i.e. weekend, holidays and seasons as well as reflecting new routes and stops which are not separate from the local system but the same data as the system uses. Similarly

assistant is built so that localization of the interfaces language is a matter of dynamically choosing a new file to base the user interface on. The goal is that the base system and documentation will make the implementation of a new system easy and tying the support with a commence model similar to those of open source customizing and integration consultants.

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