

build APIs for web application. The web services are implemented with JAVA programming language with the use of Jersey library. The source code developed in Eclipse Integrated Development Environment (IDE). The web services are deployed on Apache Tomcat web server (servlet container) which is an open-source web server developed by the Apache Software Foundation.

Finally, the tool uses the Test of Attentional Performance - Mobility (TAP-M) application.

Only the healthcare professional has access to the data obtained through the driving assessment tool and they are anonymised (user code instead of name is used) and only they know to which name the user code belongs to. Therefore, patient/client privacy is not violated. Privacy is protected and data entry is anonymised.

3.1.2 Accessibility

The tool is based on web technology, JAVA programming language and the TAP-M application. Users require a web browser (better user experience using Google Chrome and Mozilla Firefox), an Internet connection, the JAVA installed in their PC and an installation of TAP-M application.

The tool is accessible through web browser. In case of execution control and neuropsychological estimation, the user has to use the TAP-M application.

Accessibility through a mobile device (smart phone or tablet) is provided, through a web browser. Additionally, there is a mobile application that can be accessed in Android based smart phones or tablets. However, the mobile application has limited functionality, since it provides only the user's assessment.

3.2 Tool specifications and functionality

The car driving ability assessment and enhancement tool has been developed and integrated on the IN LIFE platform. The tool developed by CERTH/HIT is divided in three major tiers and a consultation service that provides information on driving aids that are appropriate for the elderly, namely:

- Initial assessment questionnaires (Tier 1)
- Neuropsychological estimation (Tier 2)
- Road tests (Tier 3)
- Consultation on the available driving aids

If the user fails in the first tier, then proceeds with the second tier and if the user also fails in the second tier, then he/she goes to the third tier. In case the user succeeds in the first tier then he/she does

not follow the next tiers. The same applies in case of successful completion of tier 2.

The core modules of the first tier are given next:

- A module that implements and manages the questionnaires.
- A module that starts/stops the TAP-M application and retrieves the results.
- A module that implements an algorithm that computes the overall score.
- A database module that stores the users' questionnaires answers and results.
- A module that provides web services to IN LIFE APP Center.

The core modules of the second tier are listed below:

- A module that starts, stops the TAP-M application and retrieves the results.
- A module that implements an algorithm that computes the overall score.
- A database module that stores the results obtained by the TAP-M application.
- A module that provides web services to IN LIFE APP Center.

The core modules of the third tier are:

- A module that implements and manages the road test checklist.
- A module that implements an algorithm that computes the overall score.
- A database module that stores the checklists, the answers and the results.
- A module that provides web services to IN LIFE APP Center.

The core modules of the driving aids component are the following two:

- A module that presents and manages the driving aids.
- A database module that stores the driving aids.

3.2.1 Tier 1: IADL questionnaire

In this tier, the Instrumental activities of daily living questionnaire (IADL) has been implemented, which is the initial assessment of the system. For using it, the system user (i.e. a formal caregiver, driving assessor, clinician, etc.) has to define the username of the elderly and the test number. Each user can manage only the elderly drivers data for which he/she is responsible and can fill in, edit, remove, view or print a questionnaire (Fig. 3).



Fig. 7. Driving aids screenshots.

3.3 Mobile application

Except from the web application, the car driving ability assessment and enhancement tool includes also a mobile application. The application has limited functionality and it is an informative system. The user can be informed about either the overall assessment results or the assessment scores in each of the three tiers.



Fig. 8. Driving ability mobile app screenshot.

4 Conclusion

Fitness to drive should be viewed as a public health related issue instead of only as a road safety issue. Car driving is synonymous with independence and an active life.

The advantage of the IN LIFE driving ability assessment tool is that it takes into consideration the

right of mobility for all, that it takes advantage of the greater experience of elderly drivers who are often able to compensate their deficits. The developed tool promotes the right of mobility. It balances between sensitivity (during the first tier using the screening battery) and specificity (during the latter tiers of the procedure, using the in-depth assessment battery). In conclusion, the assessment of fitness-to-drive is part of an integrative process to determine if an elderly driver with MCI can hold his/her driving license. It is not limited to the assessment of residual capabilities.

The potential economic impact of IN LIFE for Europe is huge as the elderly ('silver') market (i.e. products and services for independent living, home care and mobility) represents an enormous business sector, which currently is highly concatenated in terms of individual-regional markets, as well as independent-focused micro services.

Currently all the modules of the travel support system are under evaluation, with 150 elderly drivers. The tests are taking place in Thessaloniki, at the premises of the Hellenic Institute of Transport. with the overview of a driving instructor and a psychologist. Final adaptations to the modules are expected, once the user's feedback is available.

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