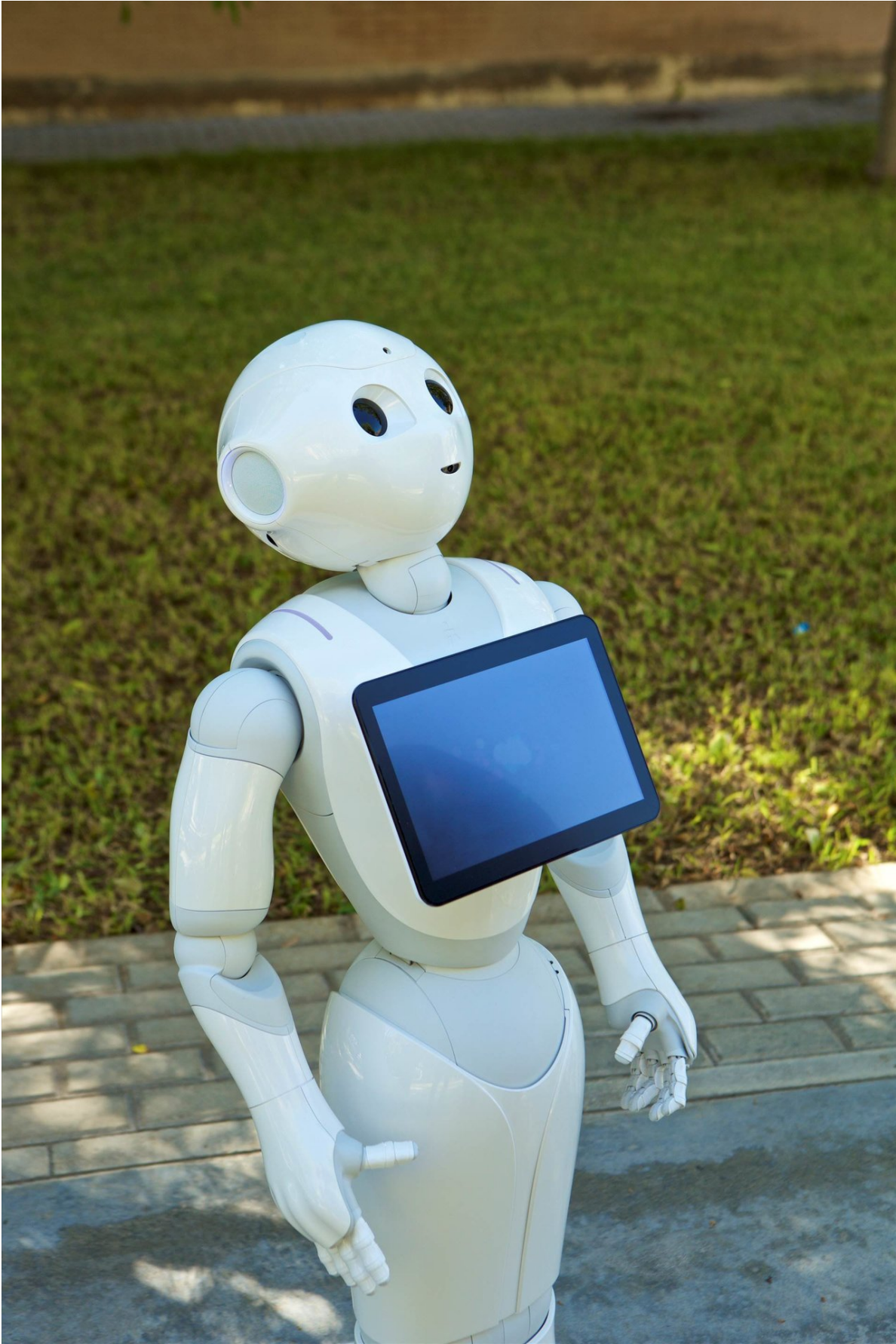


# **New robot helps the elderly exercise and detects underlying health problems**

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Credit: Asociación RUVID

According to the latest report on the evolution of worldwide population submitted by the United Nations, 13 percent of today's population is over 60 years of age; by 2050, this percentage will almost double, reaching 25 percent. The ageing of society is a reality, and technologies are adapting day-to-day to this demographic change.

Researchers at the Universitat Politècnica de València (UPV), the Universidad de Alicante (UA) and the Universidade do Minho are working on an interactive robot called Pharos that will help the elderly with their daily household chores. Their work has recently been published in the journal *Sensors*.

"Our objective is to turn Pharos into another companion of the [elderly](#); a virtual assistant, friendly and easy to use, which regularly recommends personalised physical activities, promoting a healthy life and facilitating the active ageing of the population," highlights Vicente Julián, researcher at the Computer Technology and Artificial Intelligence Group of the UPV.

Pharos is based on a commercial robot, Pepper, to which researchers have added two modules: The first recommends an exercise plan adapted to each user, and the second, through advanced AI techniques, assesses completion of the exercise, verifies whether the user has completed it correctly through Deep Learning by comparing it to a library of stored exercises, and registers them on the system.

The robot also includes a visual and physical interface that the user will

interact with in order to identify them through a camera. "Once they are identified, Pharos determines the most appropriate exercises depending on their capabilities. Furthermore, the exercise programme is regularly adapted to the evolution and health of the user. To this effect, it includes a recommendation algorithm which can even help detect health issues," explains Ester Martínez, researcher of the Robotics and Three-dimensional Vision Group (RoViT) of the UA.

The main difference of Pharos compared to other similar systems is the detailed monitoring of users, as well as the possibility to determine whether they are performing the exercises correctly or not. It is a very useful tool for carers and assistants, as it makes it possible to easily check if the ability to perform certain exercises diminishes, which can reveal progressive physical and/or cognitive problems.

"Low performance when conducting the planned exercises can indicate some sort of issue with the user. And, by registering the exercise history, Pharos can help reveal underlying problems which would otherwise be impossible to see," explain the researchers.

The Spanish-Portuguese research team is currently working on perfecting the user-robot interactions, optimising the [exercise](#) recognition system and making it possible for several users to use it without interfering with the others, making use of planification strategies.

**More information:** Angelo Costa et al. PHAROS—PHysical Assistant RObot System, *Sensors* (2018). [DOI: 10.3390/s18082633](https://doi.org/10.3390/s18082633)

Provided by Asociacion RUVID

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