Holistic care system based on affective and proactive robots for older adults

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Purpose Socially Assistive Robots (SARs) are interactive, intelligent systems that employ social interaction strategies to assist in a specific healthcare context (Feil Seifer et al, 2005). This work contribute to the improvement of the quality of life of elderly people at home through assistants based on proactive and affective robotic platforms, and the study of their proactive intervention, according to the needs of the user and their context. The main contribution of this work is to model and implement proactive behaviors, where the robot intervenes and collaborates with the elderly person by its own initiative, based on the context, and always ensuring non-intrusiveness and privacy (Figure 1) (Villa et al, 2022). **Method** The hardware design includes a 3D printable model and components such as Jetson Nano with 4GB RAM, a 7-inch display, a ReSpeaker microphone array to capture 360° sound, and servo motors for fluid head movement. For voice interaction it uses cognitive cloud services and a communication system based on fine-tuned Large Languages Models (LLMs) (Villa et al, 2023). A proactivity model has been designed at different levels to interact with the elderly on their own initiative, suggest activities or intervene autonomously for the well-being of the user (Johnson et al, 2023). **Results and Discussion** The assistive robot has been evaluated in functional tests, including the cognitive services for voice interaction, the conversational system based on LLMs, as well as heuristics and algorithms, based on computer vision (locally executed to ensure privacy concerns), to distinguish users and detect their presence in front of the robot and activation by looking directly at the robot. The proactivity model is being evaluated to determine what levels of autonomy and decision-making are accepted by end-users and their caregivers.

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Keywords: socially assistive robots, proactivity, affective computing, cognitive computing

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Acknowledgement This work was supported by SHARA3 project, funded by the JCCM (SBPLY/21/180501/000160).

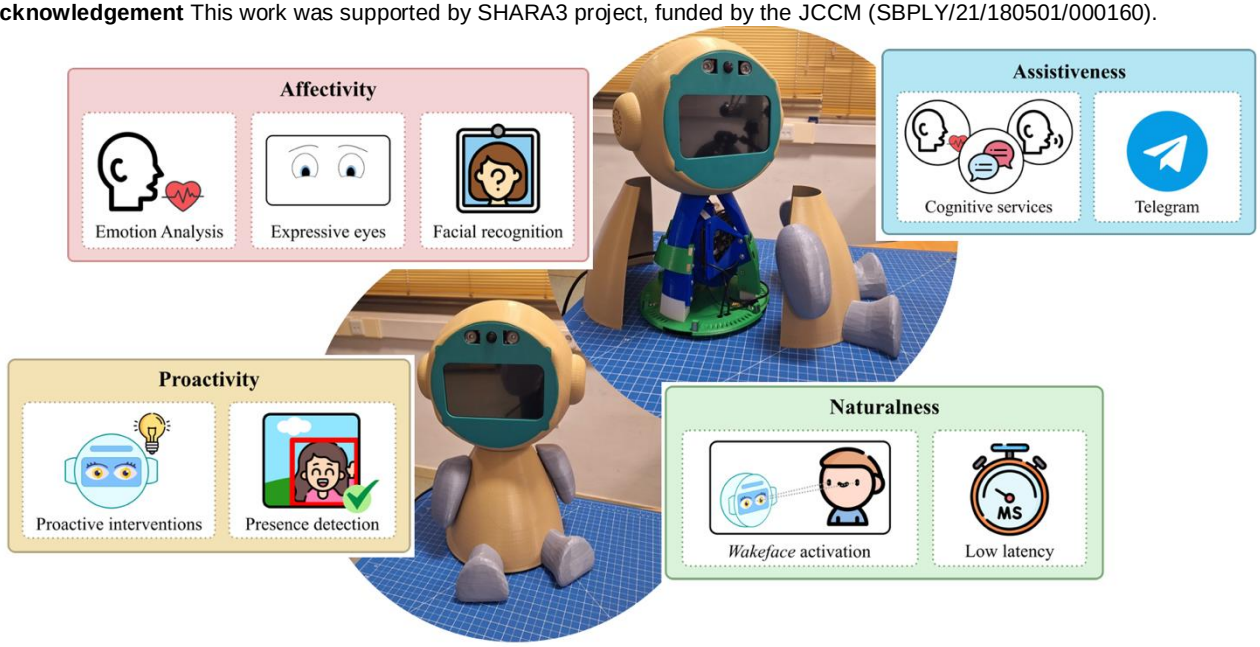

Figure 1. Overview of the assistive robot SHARA, design and main characteristics main features, including services for proactive behavior, affective aspects, and concrete services for conversations about emotional state and quality of life, as well as friendly communication with relatives