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Suggestions for an Assistant Robot for a Person Living with Parkinson's Disease

This work is the result of my personal brainstorming on the topic. All ideas presented here are my own. Below the table, I also include additional proposals aimed at supporting patients and making their daily functioning easier.

Contents of the document:

Purpose

To develop functions (with justifications) for a portable assistant robot designed to support individuals living with Parkinson's disease.

Parkinson's Disease and Daily Difficulties Associated with It[1]

Parkinson's disease is a common neurological disorder affecting 1–3% of the population over the age of 65. It has a multifactorial etiology, with increasing evidence pointing to the role of genetic

1 Author's own translation based on the article: Adnan Z. Khan, Deepthi Lavu and Richard D. Neal, *Parkinson's disease: a scoping review of the quantitative and qualitative evidence of its diagnostic accuracy in primary care*, *British Journal of General Practice*. Available at: https://bjgp.org/content/bjgp/74/741/e227.full.pdf (accessed 06 January 2026).

factors. The characteristic features of idiopathic Parkinson's disease include muscle rigidity, bradykinesia, asymmetry of symptoms, and typical resting tremor.

Common difficulties experienced by patients[2]:

- hand tremors
- problems maintaining stable posture
- slowed movement
- difficulty initiating movement
- muscle stiffness
- additional health issues (depression and sleep disorders are increasingly recognized as comorbid conditions, though other age-related or individual health problems may also occur)

Proposed Functions for the Assistant Robot

Function: Emergency button calling 112 (optionally voice-activated)

Justification: With trembling hands, poor well-being, or stress, reaching for a phone, dialing a number, and holding the device during a call may be difficult. Parkinson's disease typically affects older adults, who may also have vision problems or other health conditions that further complicate daily functioning. A large, clearly marked emergency button—or a voice command—significantly increases the chance of successfully calling for help. Pressing a single button is easier than dialing a full number, and since the robot remains stationary, the patient does not need to hold it with trembling hands. The button should be large and brightly colored.

Function: Medication reminders requiring manual confirmation

Justification: Parkinson's disease often affects older adults who may take multiple medications and experience memory difficulties. The reminder must be turned off manually. If the robot includes a built-in pill compartment, the patient can take the medication immediately. If the reminder is not turned off—suggesting the medication may not have been taken—the caregiver can receive a notification.

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2 Based on: ibid., supplemented by an interview with an individual affected by this condition and by observations of their functional abilities in daily life.

Function: Voice message to an SOS number or caregiver

Justification: The robot can initiate a call via a button or voice command and automatically provide the patient's personal details, address, and health status.

Consideration: The robot could potentially monitor vital signs via a smartwatch worn by the patient and automatically call an SOS number or caregiver if necessary. However, this may cause false alarms if the watch turns off or is removed. Expecting an older patient to manually disable and re-enable the monitoring function each time they remove the watch would be impractical.

Function: Calling selected numbers via dedicated buttons, with labels

Justification: Beyond the SOS button, the robot should allow easy contact with a caregiver or loved one. Labels can be displayed electronically or inserted as physical cards in a budget-friendly version.

Function: Monitoring vital signs

Justification: The robot could allow the patient to check vital parameters using a built-in pulse oximeter or through IoT-connected devices such as a smartwatch.

Function: Automatic connection with a caregiver's app or phone

Justification: This enables the robot to send notifications to the caregiver—for example, about changes in vital signs, the need for servicing, or missed medication confirmations—prompting the caregiver to check on the patient.

Function: Voice control

Justification: Useful when the patient is unable to approach the robot or operate its buttons.

Function: IoT connectivity with other devices (e.g., phone, smartwatch)

Justification: Allows remote control, receiving notifications, or monitoring vital signs through connected devices.

Function: Battery or USB power status notifications

Justification: Alerts about low battery or charging needs ensure continuous operation. Battery levels can be displayed on the robot's screen.

Function: USB charging and AA battery power

Justification: Dual power sources ensure the robot remains functional in case of power outages or battery failure.

Function: Built-in medication drawer with compartments

Justification: A medication drawer allows the patient to take their medication immediately after turning off the reminder, reducing the risk of forgetting once the alert stops.

Function: Lightweight construction

Justification: Weight is important for older adults or anyone who may struggle to move the device.

Function: Non-slip feet or wheels

Justification: Rubber or silicone feet (or suction cups) prevent accidental sliding or tipping. Wheels may be useful for patients with limited mobility, allowing the robot to move closer to the bed, for example.

Function: Service indicator light

Justification: A service light alerts the patient or caregiver when the robot requires maintenance.

Function: Large buttons

Justification: Motor difficulties can make precise button-pressing challenging; large buttons improve usability.

Function: User manual

Justification: A simple Polish-language manual with large print (e.g., WCAG-inspired) helps users understand the robot's functions.

Function: Speakerphone mode

Justification: Allows the patient to talk to a dispatcher or caregiver without needing to hold or approach the device, especially during weakness or fainting.

Function: Voice-activated dialing

Justification: Useful when the patient feels unwell and cannot reach the robot; a short voice command can initiate an emergency call.

Function: Waterproof sticker with service number

Justification: Ensures the patient or caregiver can easily find the service contact information without searching through documents.

Additional Ideas for Addressing Challenges Related to Parkinson's Disease

- Tremor-stabilizing spoon with sensors and active tremor compensation
- Set of utensils with detachable stabilizing rings—more economical and flexible than purchasing individual self-stabilizing utensils
- Wristbands detecting and reducing tremors
- Motor-skills workshops tailored to patients' psychomotor abilities (e.g., knitting, simplified meal preparation)
- A supportive community where patients can share coping strategies, connect with others, and build social relationships—especially important for older adults