Apkinson: a Mobile Solution for Multimodal Assessment of Patients with Parkinson's Disease

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Apkinson

Figure 1: Different screens from Apkinson for multimodal and longitudinal assessment of the state of the patients.

Introduction

- Parkinson's disease (PD) is a neurological disorder that produces different motor impairments in the patients.
- The longitudinal assessment of the neurological state of patients is important to improve their quality of life.

Aim:

- We introduced Apkinson, a smartphone application to evaluate continuously the speech and movement deficits of PD patients.
- The speech assessment considers phonation, articulation, and prosody capabilities of the patients.
- Movement exercises captured with the inertial sensors of the smartphone evaluated symptoms in the upper and lower limbs.

Key results and Conclusion

- A group of 20 patients in Medellín, Colombia is testing the functionalities of Apkinson.
- The speech state of the patients is evaluated in terms of phonation, articulation, and prosody.
- The assessment of movement deficits is evaluated according to the tremor amplitude and the stability of the movements.

https://github.com/jcvasquezc/SMA2

Description

- The main screen of Apkinson is divided into four sections to be accessed by the patients, caregivers, or the medical examiners:
- ***Profile*:** Patients can visualize information related to the medication intake and the number of completed exercise sessions.
- ***Settings:*** This section allows to manage general aspects of Apkinson like medication updates. In addition, when a patient attend a medical appointment, the medical examiner can export the information from the patients.
- ***Exercises:*** The daily exercises are selected from a set of 35 exercises (5 different tasks per day during a week).
  - Speech exercises (21) include tasks such as the phonation of sustained vowels, diadochokinetic utterances, read sentences, and the description of images that appear in the screen.
  - Movement exercises are captured using the inertial sensors of the smartphone, and include postural tremor, kinetic tremor, finger tapping, gait, among others.
- ***Results:*** Patients can see their performance after doing the exercises, and to compare the results with previous sessions.

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