Neurograph Project

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Use drawing to detect Parkinson's Disease

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Health

Spiral drawing test detects signs of Parkinson's

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present in 25 persons. Furthermore, in two persons (of which one person is familiar with autosomal dominant cerebellar ataxia) drawings were not suited for our post-processing analyses. Therefore, we chose to exclude these results and 1,912 persons were left for further analyses.

FINE MOTOR SKILL ASSESSMENT

Fine motor skill was assessed by requiring participants to trace a picture of a spiral template that was printed on a piece of paper attached to an electronic drawing board (WACOM Graphire Wireless Pen Tablet, model CTE-630BT). Participants were instructed to place the pen in the middle of the spiral before the tracing started (**Figure 1A**). They were not allowed to lean on the drawing board with their hand or arm. Participants were asked to trace the spiral as accurately and as fast as possible using their dominant hand.

Figure 1.

QUANTITATIVE ANALYSIS OF SPIRAL DRAWING

Automatic quantitative analyses were performed using custom-made software written in MatLab (version 8.1; The Mathworks, Natick, MA, USA). This yielded the following outcome measures: movement time (s), defined by the time it took the participant to trace the spiral; length of drawing (cm), defined as the length of the drawn spiral; *average speed*, defined by the ratio of length of drawing and movement time; speed variability (cm/s), defined as the SD of the instantaneous velocity; deviation from template (cm^2), defined as the area between the template and the drawn spiral; and number of crossings, defined as the number of times the drawn spiral crossed the template (**Figure 1A**). A smoothly drawn spiral with a clinical score of 0A would have a length of drawing about

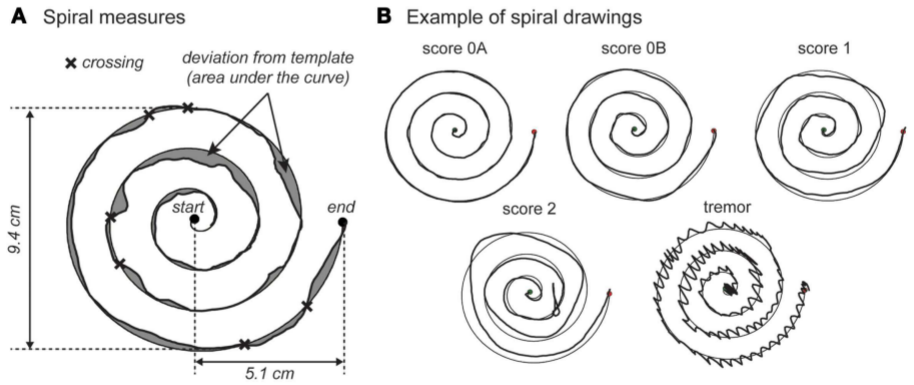
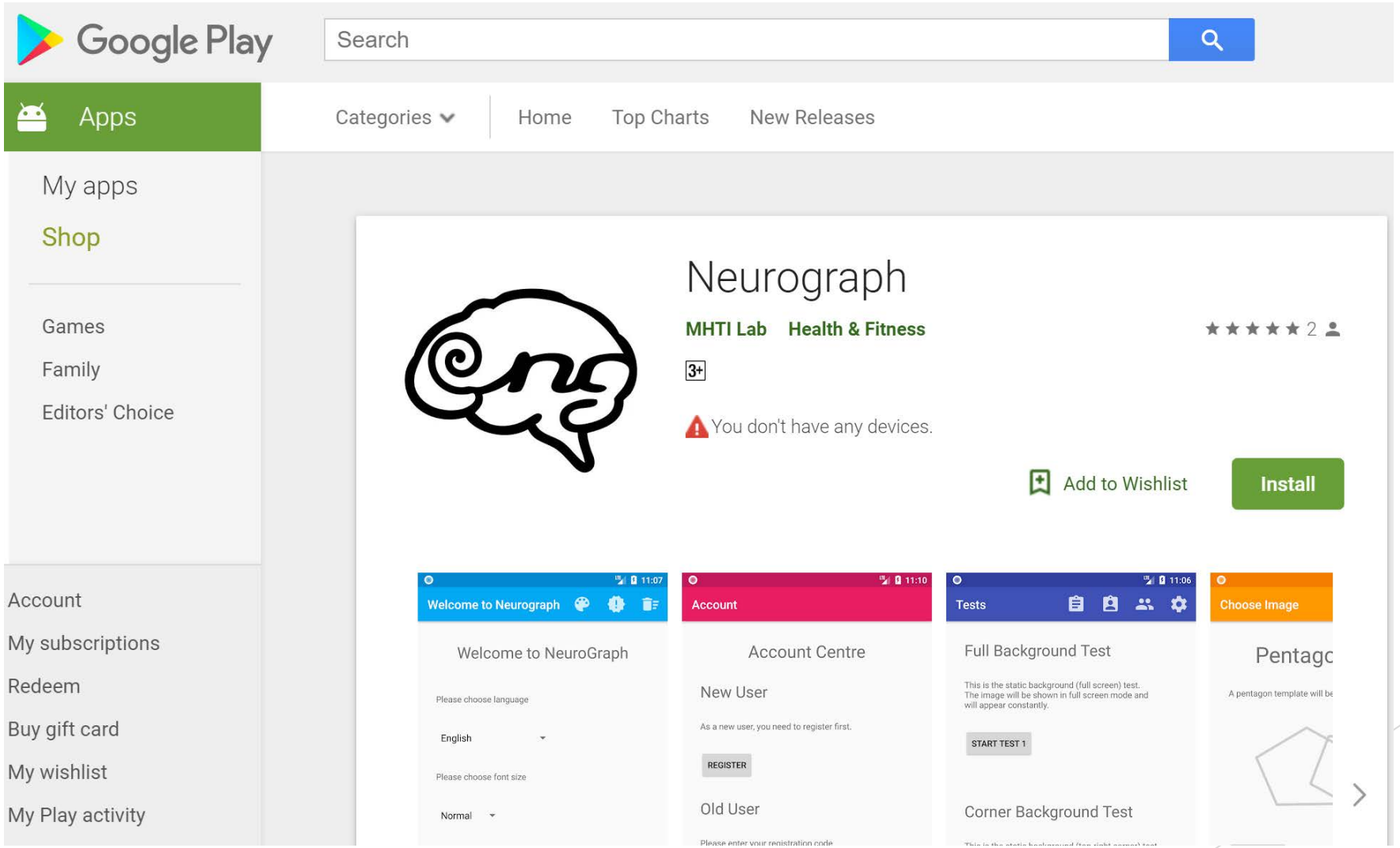


FIGURE 1 | Examples of spiral-drawing quantification and clinical scores. **(A)** shows an example of the calculation of quantitative measures of fine motor skills. The start and endpoint are indicated by a dot. The figure explains how deviation from template and crossings are defined. **(B)** shows examples of clinical scores of the spiral drawings with score 0A, 0B, 1, 2, and a tremor.

What this project is about

- Part 1: An app which captures the drawing data
- Part 2: Analyse the drawing data and study interesting features

App demonstration



Data Files

Q & A

Thank you ^_^