ISO 9241-940:2017-11 (E)

Ergonomics of human-system interaction - Part 940: Evaluation of tactile and haptic interactions

Contents

Page

Foreword iv

Introduction v

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 2

4 Conformance 4

5.1 Structure 4
5.2 Uses of this document 5
5.3 Evaluation in the design and development lifecycle 5
5.4 Planning activities 6
5.5 Initial assessment 6
5.6 Unique aspects of haptic interaction 7

6 Types of evaluation methods 8
6.1 General 8
6.2 Physical measurements against requirements 8
6.3 Inspection by an expert 8
6.4 Usability test 8
6.4.1 General 8
6.4.2 Measurement context 8
6.4.3 Evaluation data 9

7 Quality of haptic interaction 10
7.1 Quality model 10
7.2 Haptic system attributes 11
7.2.1 Quality attributes 11
7.2.2 Haptic device attributes (see Annex A) 11
7.2.3 Haptic user interface attributes 12
7.3 Usability attributes 12
7.3.1 Context of use (see Annex D) 12
7.3.2 Specific usage qualities (see Annex E) 13
7.3.3 Human-centred quality (see Annex F) 14
7.4 Evaluation matrix 14
7.4.1 Types of attributes 14
7.4.2 Measures of haptic quality 14

8 Guide to the annexes 17

Annex A (informative) Haptic device attributes 19

Annex B (informative) Haptic effect design principles 27

Annex C (informative) Haptic effect task elements 32

Annex D (informative) Context of use 37

Annex E (informative)Specificusagequalities 39

Annex F (informative)Human-centredquality 46

Annex G (informative) Gesture attributes 55

Annex H (informative) Examples of evaluation of device attributes 65

Annex I (informative)Uniqueaspectsofhapticinteraction 77

Annex J (normative) Evaluation by usability walkthrough or usability task test 79

Bibliography 100