Software Requirements Specification for Chess Connect: Online tools combined with on-board vision to improve and share your game

Team #4,
Alexander Van Kralingen
Arshdeep Aujla
Jonathan Cels
Joshua Chapman
Rupinder Nagra

October 4th, 2022

Contents

Table of Revisions

Table 1: Revision History

Date	Developer(s)	Change
2022-10-04 date	Jonathan Cels name	Template creation and document formatting change

1 Units, Terms, Acronyms, and Abbreviations

1.1 Table of Units

Throughout this document SI (Système International d'Unités) is employed as the unit system. In addition to the basic units, several derived units are used as described below. For each unit, the symbol is given followed by a description of the unit and the SI name.

symbol	unit	SI
V	electric potential	volt
A	current	ampere
Ω	resistance	ohm
s	time	second
°C	temperature	centigrade
J	energy	joule
W	power	watt ($W = J\,s^{-1}$)

1.2 Abbreviations and Acronyms

symbol	description
A	Assumption
DD	Data Definition
GD	General Definition
GS	Goal Statement
IM	Instance Model
LC	Likely Change
LCD	Liquid Crystal Display
LED	Light-Emmitting Diode
MCU	Micro Controller Unit
PS	Physical System Description
R	Requirement
SRS	Software Requirements Specification
T	Theoretical Model

9 Requirements

9.1 Functional Requirements

9.2 Nonfunctional Requirements

9.2.1 Look and Feel Requirements

9.2.1.1 Appearance Requirements

LF1. The product shall use white, black, grey, and brown as its primary colours.

LF2. The product shall use green, red, and blue as its secondary colours.

9.2.1.2 Style Requirements

LF3. The product shall look and feel similar enough to traditional chess boards and chess pieces that the target audience will recognize the product as a chess set when encountering it for the first time. The level and speed of audience recognition achieved by the design shall be described following the procedure given in Section 5.2.1 of the VnV (Verification and Validation) Plan.

9.2.2 Usability and Humanity Requirements

9.2.2.1 Ease of Use Requirements

UH1. The system shall require the user to place chess pieces fully on their intended squares.

9.2.2.2 Personalization and Internationalization Requirements

UH2. The system will only display information in English.

UH3. The system will only use the Arabic numerals.

9.2.2.3 Learning Requirements

UH4. The product shall be able to be used by members of the public over with no previous training. Details on the learnability of the system

shall be described following the procedure given in Section 5.2.2 of the VnV Plan.

9.2.2.4 Understandability and Politeness Requirements

UH5. All symbols and words shall be similar to historically used Chess symbols [1]

9.2.2.5 Accessibility Requirements

UH6. The system shall follow guidelines for correct colour contrast ratio for text to the background as stated in the WCAG [2]

9.2.3 Performance Requirements

9.2.3.1 Speed and Latency Requirements

PR1. The average time between a user placing down a piece and the visual model response shall be small.

PR2. The maximum time between a user placing down a piece and the visual model response shall be small.

PR3. The average time between a user picking up a piece and the visual board indicator response shall be small.

PR4. The maximum time between a user picking up a piece and the visual board indicator response shall be small. The degree of speed for PR1 through PR4 shall be described following the procedure given in Section 5.2.3 of the VnV Plan.

9.2.3.2 Health and Safety-Critical Requirements

PR5. The system shall be properly grounded to *Standards*

PR6. The maximum power on any single wire shall be within the safety limits as deemed by *Standards*

9.2.3.3 Precision or Accuracy Requirements

PR7. The software application game state will model the game state on the Chess Connect hardware with a high degree of accuracy. The level of accuracy shall be described following the procedure given in Section 5.2.4 of the VnV Plan.

9.2.3.4 Reliability and Availability Requirements

PR8. The product shall be available with a high degree of uptime. The level of availability shall be described following the procedure given in Section 5.2.5 of the VnV Plan.

9.2.3.5 Robustness or Fault-Tolerance Requirements

PR9. The software application shall maintain the game state if the connection between the software and hardware systems is interrupted.

9.2.3.6 Capacity Requirements

PR10. The software shall require computer memory to function effectively. The level of memory capacity required shall be described following the procedure given in Section 5.2.6 of the VnV Plan.

9.2.3.7 Scalability or Extensibility Requirements

PR11. The product must support the addition of new features and components.

9.2.3.8 Longevity Requirements

PR12. The product must be supported while the application remains deployed.

9.2.4 Operational and Environmental Requirements

9.2.4.1 Expected Physical Environment

OE1. The hardware and software systems shall be close enough to each other to facilitate communication. The degree of proximity required shall

be described following the procedure given in Section 5.2.7 of the VnV Plan.

OE2. The area shall be clear of potentially dangerous or harmful environmental factors.

9.2.4.2 Requirements for Interfacing with Adjacent Systems

OE3. The system shall interface with an external server to make requests to a chess engine.

9.2.4.3 Productization Requirements

OE4. The product shall be deployed to a public website where users may access it.

9.2.4.4 Release Requirements

OE5. The product will be tested for bugs and issues. These issues will be fixed and the application will be redeployed accordingly.

9.2.5 Maintainability and Support Requirements

9.2.5.1 Maintenance Requirements

MS1. The product shall be maintained actively by the developers until the Chess Connect team graduates.

9.2.5.2 Supportability Requirements

MS2. N/A

9.2.5.3 Adaptability Requirements

MS3. The software application will be able to be hosted on Apple, Windows, and Linux devices.

MS4. The product shall be accessible from any web browser.

9.2.6 Security Requirements

9.2.6.1 Access Requirements

SR1. N/A

9.2.6.2 Integrity Requirements

SR2. The product will not store game data after a game has concluded.

9.2.6.3 Privacy Requirements

SR3. The product will not store or collect user data.

9.2.6.4 Audit Requirements

SR4. Requirements shall be easy to follow and verify against both the system and the VnV plan in order to facilitate regular inspections.

9.2.6.5 Immunity Requirements

SR5. N/A

9.2.7 Political and Cultural Requirements

9.2.7.1 Cultural Requirements

PC1. The product will not use and terms or symbols that are deemed offensive to any culture.

9.2.7.2 Political Requirements

PC2. N/A

9.2.8 Legal Requirements

9.2.8.1 Compliance Requirements

LR1. TBD - may be some compliance for circuits/hardware products?

9.2.8.2 Standards Requirements

LR2. The product shall comply with *Grounding standards TBD*

LR3. The product shall comply with *Power standards TBD*

LR4. The product shall comply with WCAG. 2

10 Likely Changes

11 Unlikely Changes

12 Traceability Matrix

A Values of Auxiliary Constants

A Reflection

A.1 Skills for Success

A.2 Knowledge and Learning Approaches

References

1. History of chess sets and symbols. https://www.chesscentral.com/pages/chess-sets-pieces-boards/a-history-of-chess-pieces-and-chess-sets.html, 2003. Accessed: 2022-10-04.

2. Web content accessibility guidelines 2 overview. https://www.w3.org/WAI/standards-guidelines/wcag/#intro, 2018. Accessed: 2022-10-05.