Software Requirements Specification: Simulation Platform for SmartFridge and Sudoku Solver

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Contents

1 Introduction

1.1 Purpose

This document is a software requirement specification for the simulation platform which is built to aid the SmartFridge and Sudoku solver projects by providing simulated data.

1.2 Document Conventions

The following conventions have been defined:

- Links are marked in blue color and are accessible through the web browser.
- Reference titles are in italics for easier viewing

1.3 Intended Audience and Reading Suggestions

The document is intended for the Systems and Software Engineering lecture (WS 2017-18) at Goethe University. This document is also intended for developers and document writers of our related projects: SmartFridge and sudoku solver. The document should be read completely in order and it is preferred to read through the documents of the related projects to get better understanding.

1.4 Product Scope

A software platform for generating images which could be used as a dataset for other projects. For understanding the scope of the other projects, please refer to smart fridge software requirements specification document.

1.5 References

- IEEE, *Software Requirements Specification*. Available at https://view.officeapps.live.com/op/view.aspx?src=https://web.cs.dal.ca/~hawkey/3130/srs_template-ieee.doc
- Stuart R. Faulk, *Software Requirements: A Tutorial*, 1995. Available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.198.7770&rep=rep1&type=pdf

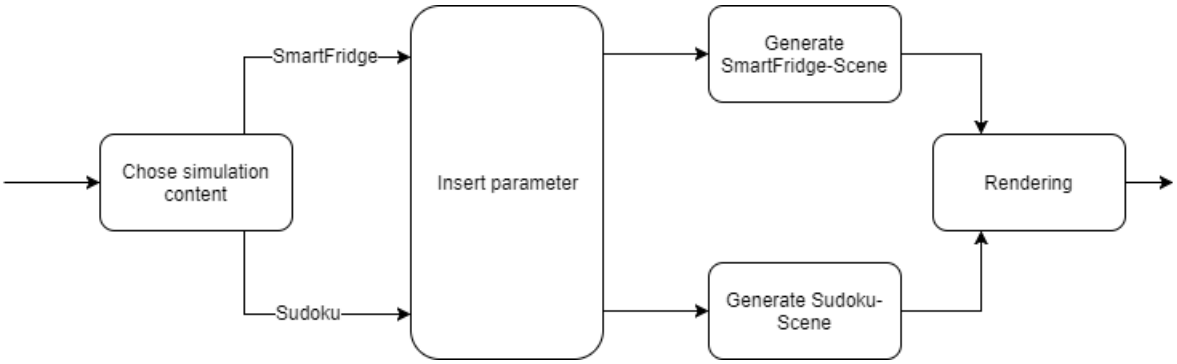
2 Overall Description

2.1 Product Perspective

The simulation platform is a self contained project that can be used to produce a user-defined amount of simulated data, which can potentially be used by developers, testers and users who wish to simulate images. These images include vegetables (in specific banana and tomatoes) both in rotten and non-rotten form and sudoku puzzles with varying transformation (deformations, rotations, translations) and noise to support other projects that require simulated data.

2.2 Product Functions

The simulation software has to be able to produce context based and adjustable images. Therefore the user choses a context and adjusts the parameters if necessary. The software produces a preview for review of the user and renders the image(s) if he accepts the scene.



2.3 User Classes and Characteristics

The following table contains the expected users and their characteristics.

User	Developer	Tester	External users
Importance	highest	high	low
Usage extent	Only specific feature	Only specific feature	All features
Technical expertise	high	high	low
Frequency of use	high	high	low
Term of usage	limited	short	long
Description of usage	The Developer will use the simulation platform to design and validate their code.	Tester will use the simulation platform form to test and validate specific systems.	External users may use the software for practical and/or. nonpractical use.

2.4 Operating Environment

The generated images should primarily be readable and usable for the other project groups which use this to test their algorithms. Therefore, the software should run on common

and available operating systems like Linux and/or Microsoft Windows. The results are stored in common file formats on these operating systems to grant the maximum possible compatibility.

2.5 Design and Implementation Constraints

- The software should run on any computerlike device and scale the scene according to the processor and RAM.
- The required simulation time scales with the hardware of the operating system. It his highly recommended that a user is aware of his system's capabilities.
- The software is exclusively available in an english version.
- There will be no maintaining in excess of this lecture.

2.6 User Documentation

The following documents in pdf format will be available for users:

- User Manual.
- Troubleshooting, FAQs.

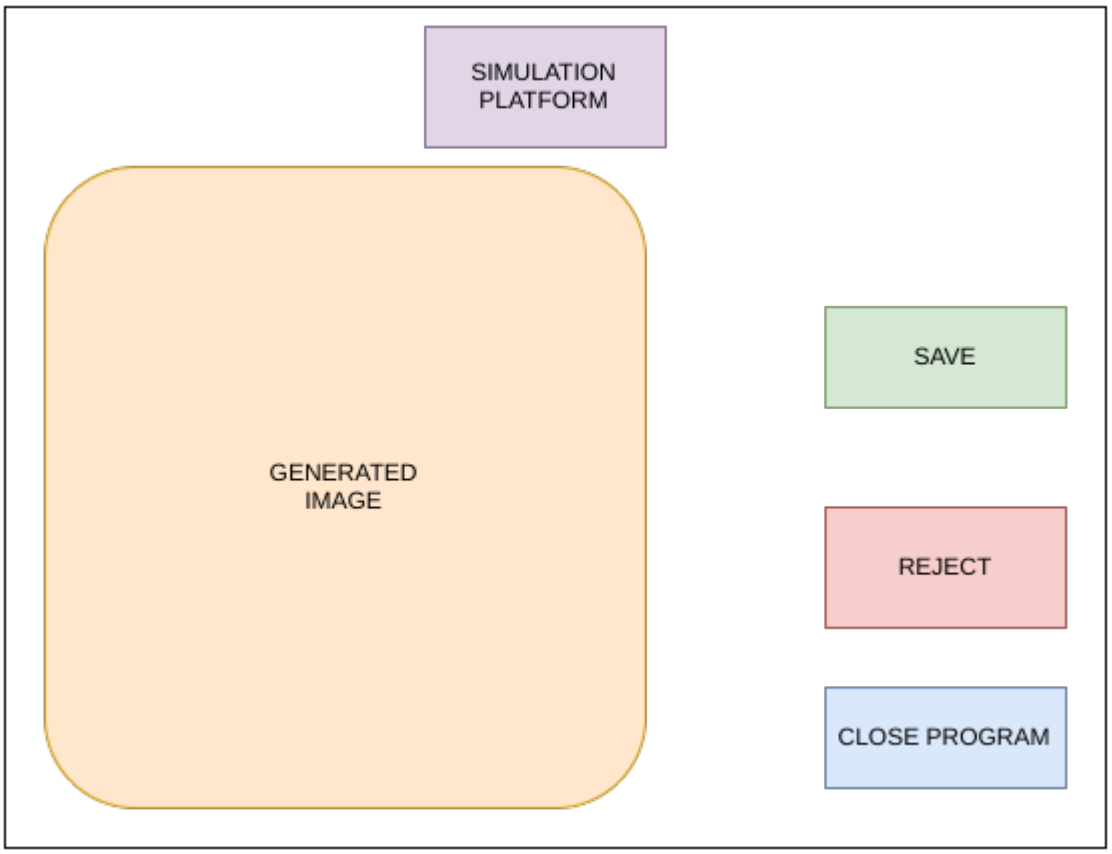
2.7 Assumption and Dependencies

This particular software depends on the open sourced software Blender.

3 External Interface Requirements

3.1 User Interfaces

The software provides a simple user interface as shown below:



3.2 Hardware Interfaces

The systems works stand alone and the generated results are stored on the same hardware device.

3.3 Software Interfaces

The dataset generated from the hardware is passed on as an image data.

4 System Features

4.1 Generate Images

This feature pertains to generating a dataset of rendered images. It has highest priority.

4.1.1 Stimulus/Response Sequences

Stimulus	**Response**
User runs the software.	Context dialogue shows up.
User selects content	parameter dialogue shows up.
User adjusts parameters.	Scene preview appears.
User confirms or rejects the generated scene.	• Image is rendered and saved. • New scene is generated.

4.1.2 Functional Requirements

- **REQ-1:** Simulate images based on the requirements from the projects: SmartFridge and Sudoku solver.
- **REQ-2:** Display scene for user interaction.
- **REQ-3:** Provide labels/annotations for selected images by the user.
- **REQ-4:** Saving the selected images for future use.

5 Other Nonfunctional Requirements

5.1 Performance Requirements

- **REQ N-1.1:** Must run on a single core CPU with/without a GPU.

5.2 Software Quality Attributes

- **REQ N-2.1:** The software should be portable across systems and platforms.
- **REQ N-2.2:** The software must be reliable enough such that there is not a huge disparity between the results generated from simulations and real images.

6 Other Requirements

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