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

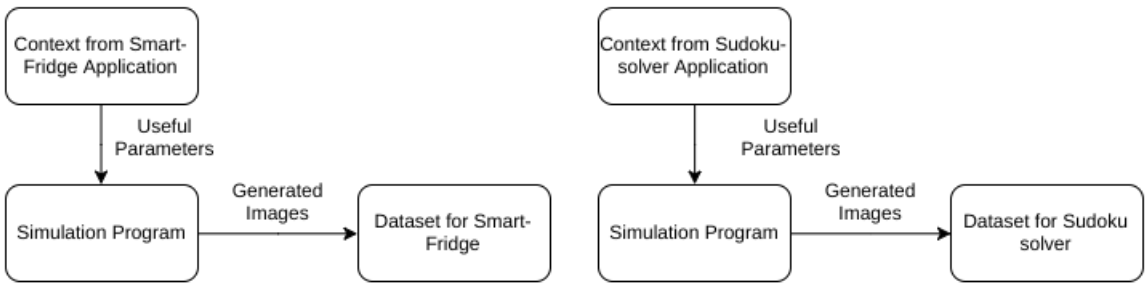
2 Overall Description

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

- User gives context for his application which we use in our simulation platform
- The simulation platform generates a dataset of images with labels based on the context.



2.3 User Classes and Characteristics

- Developers and testers: Use simulated data for testing their algorithms
- Others: Create fancy simulated images.

2.4 Operating Environment

The generated images should be readable and useful for other projects which use this to test their algorithms. The software should run on Linux and/or Microsoft Windows. The results should be readable on all major Operating Systems.

2.5 Design and Implementation Constraints

- Complexity of the model in context to simulate is a constraint for the developers.
- The software should run on a laptop with average capabilities.
- Users/Customers should know how to run simple exe files or commands from the terminal and have basic knowledge on their system's capabilties.

2.6 User Documentation

The following documents will be given to the user:

- User Manual.
- Troubleshooting, FAQs.
- Tutorials and samples.

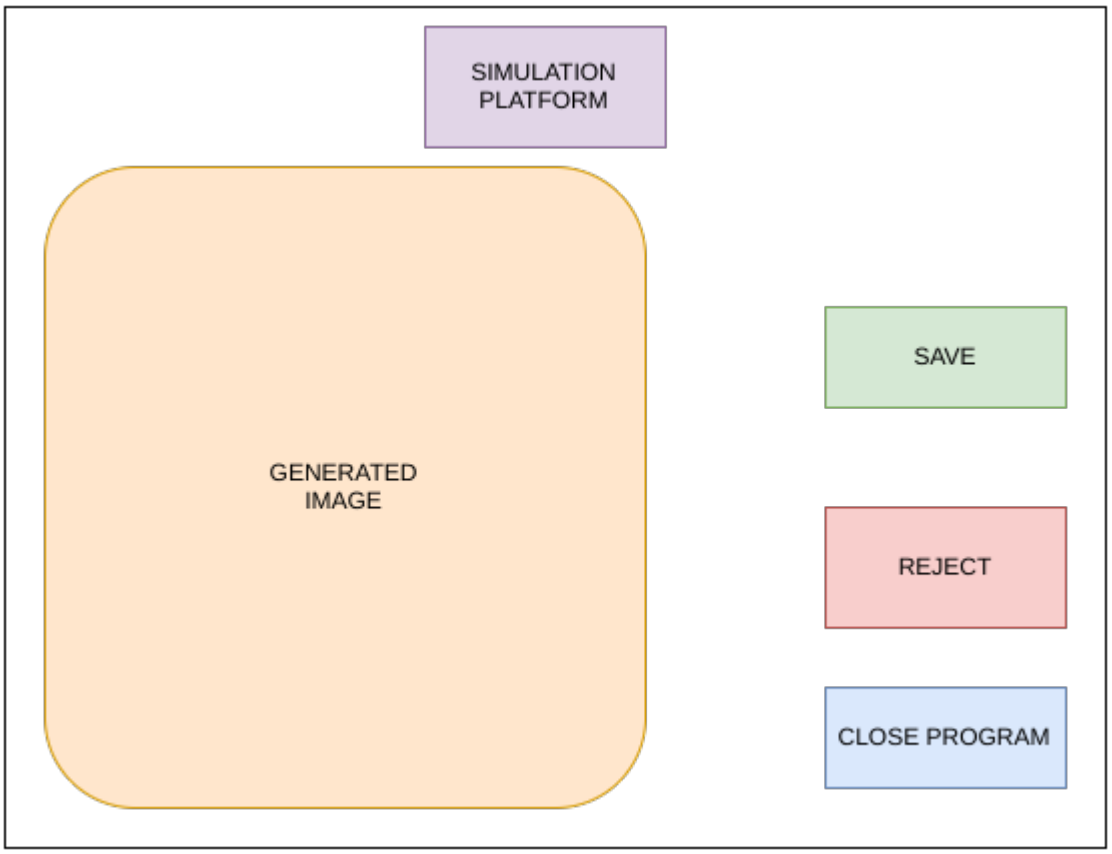
2.7 Assumption and Dependencies

This particular software depends on open sourced simulation platforms such as Blender, Unreal Engine.

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 high priority.

4.1.1 Stimulus/Response Sequences

- User runs the software.
- User chooses to select or reject the generated image.

4.1.2 Functional Requirements

- **REQ-1:** Simulate images based on the requirements from the projects: SmartFridge and Sudoku solver.
- **REQ-2:** Display images 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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