Software Design Specification

For

Cheese Magnifier

Submitted by

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1. Introduction

1.1 Purpose

This document is the System Design Specification for Cheese Magnifier. This document contains only some of the sections of a full specification, but section numbers are set to match the numbers of the full SDS. Expected audience is individuals with vision impairments. This document explains how the various system functions of Cheese Magnifier interact with one another.

1.2 Scope

Cheese Magnifier is an additional feature to GNOME Cheese to improve image quality with high contrast visual filters. Cheese is a free web-camera application inspired by Apple Photobooth. Cheese allows a user to take pictures and /or video via a web-camera and manipulate it with visual effects like blurring, outline highlights, cheeseEffects, and other aesthetic properties. The system will convert images to a white and black or a blue and yellow version of the image based on a cheeseEffect of the visually impaired user's discretion. The system will also display a red, horizontal line along the center of the screen which a camera user can turn on and off to use as a guideline to read text or focus on an image's center. The system will not magnify the image. The system will not auto-apply the filters. The focus will be on implementing these features for text, not pictures. If a picture were to be used instead, it might just look funny.

1.3 Definitions, Acronyms, and Abbreviations

GNOME: A desktop environment native to Linux operating systems.

FOSS: Free Open Source Software

Linux: Any number of free, open source operating systems.

GNOME Cheese: An application that uses a web camera.

High Contrast: Visual difference between two colors.

cheeseEffect: An object that defines a visual effect for Cheese.

Hardware: Physical equipment used to interact with the system.

UAC: Universal Access Control

Universal Access Control: A set of controls for the filters and guideline as intended to be used by a visually impaired user.

1.4 References

Software Requirements Specification for Cheese Magnifier, by Team B

Software Requirements Specification for ZooC, by ADAP

Gnome Human Interface Guideline 2.2.2: http://developer.gnome.org/hig-book/stable/

IEEE-1016

1.5 Overview

Section 2: Section 2 will describe Cheese Magnifier's overall architectural design.

Section 3: Section 3 will describe the User interface for Cheese Magnifier.

Section 4: Section 4 will describe the individual classes of Cheese Magnifer.

2. Architectural Description

GNOME cheese program as seen in Figure 2.1 will be modified for the Cheese Magnifier project. Our Universal Access Controls will be accessed through the application as shown in figure 2.3. Cheese has built-in effects as it stands, but these are mostly aesthetic in purpose. Our effects will be new cheeseEffects.

Our understanding is that cheeseEffects utilize GStreamer and its plugins to display the modified video stream. As shown in Figure 2.1, GStreamer receives input from the camera using CameraBin, and outputs the modified stream to the monitor. GStreamer's architecture is outlined in figure 2.2; however, we will not be working with audio for this implementation.

Our implementation will consist of adding five new cheeseEffects to the program. Our understanding of how GStreamer works at present time is very limited and we have not figured out if there is a way to establish priorities or layers for effects in any order other than "next one goes on top of the current one". Our proposed modifications to the architecture are described in Figure 2.3.
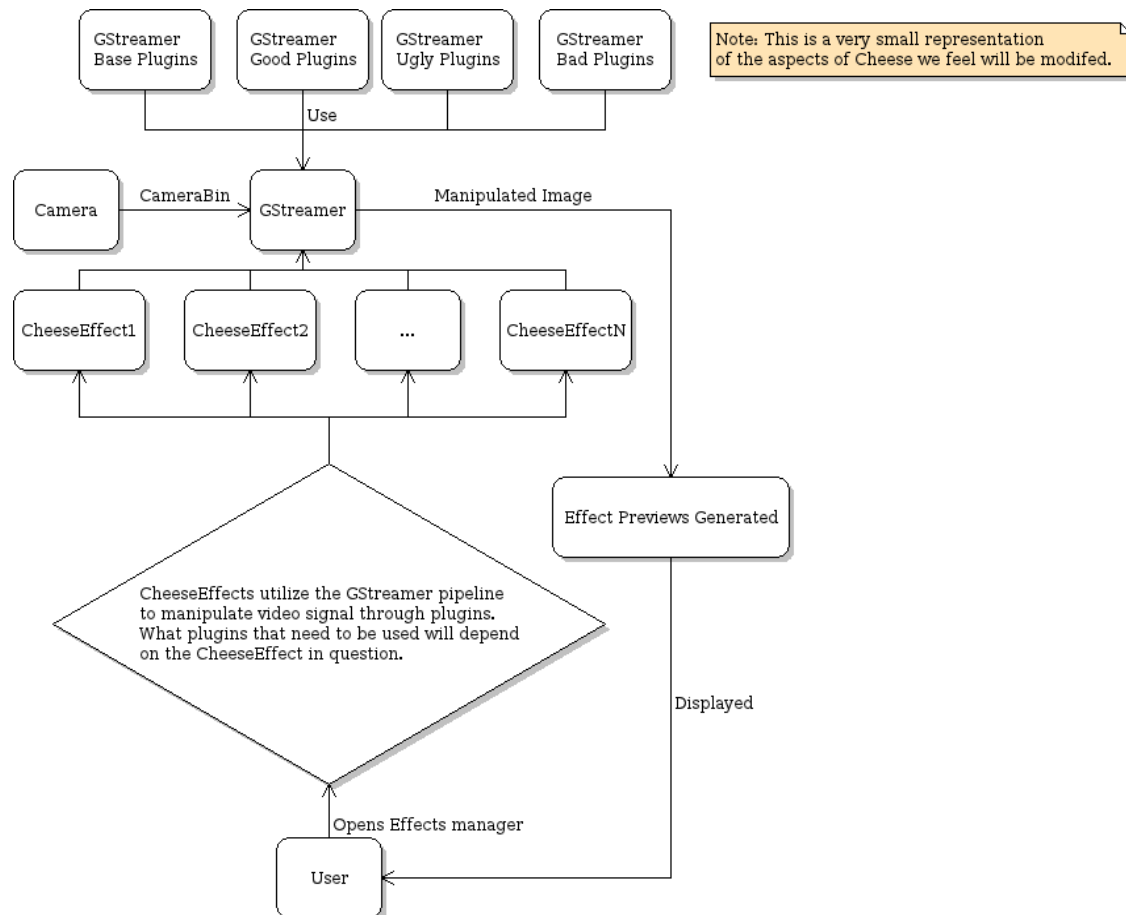

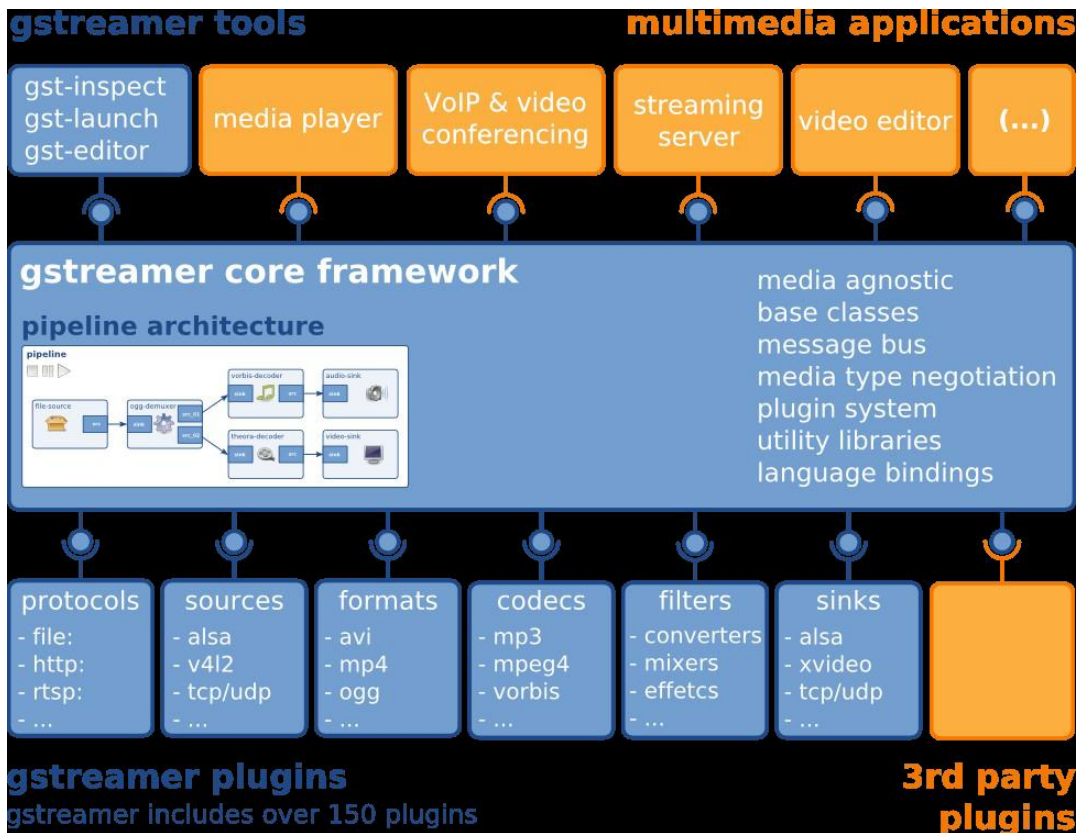**Figure 2.1 Gnome Cheese as we will need to modify**
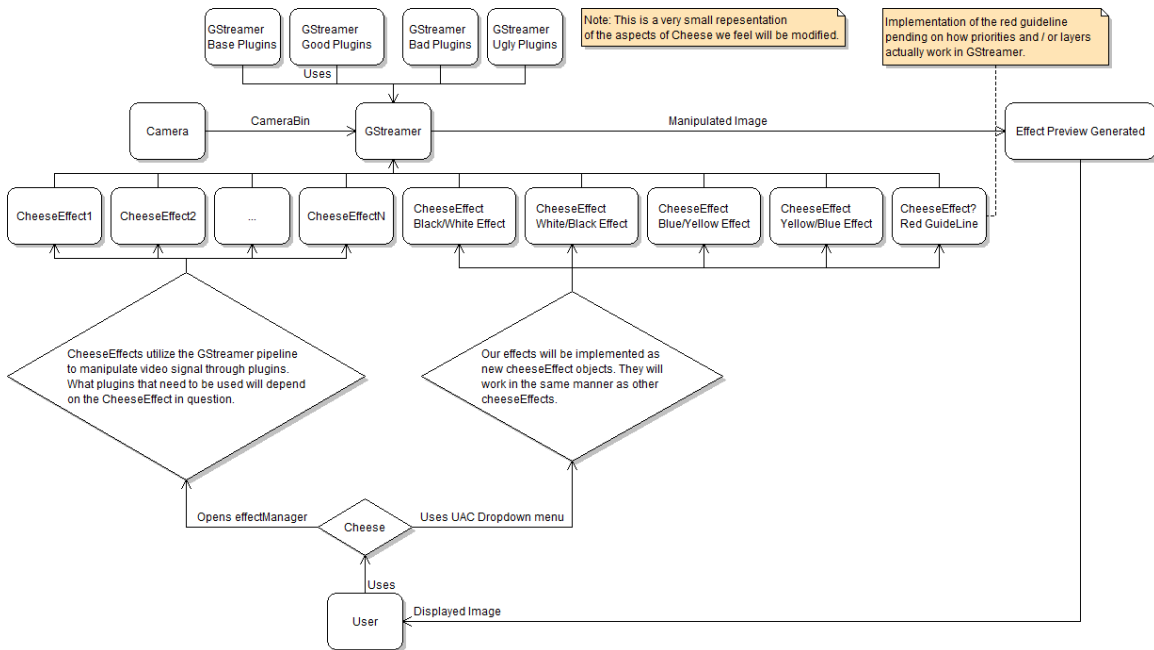
Figure 2.2: GStreamer Architecture
http://lac.linuxaudio.org/2010/download/GStreamerAudioApps.pdf

Figure 2.3: Proposed Implementation

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3. Interface Description

3.1   User Interface

The Cheese magnifier will come with a simple interface, of which user can select an option to display according to their needs. There will be five options in our add on programs, which include a Red Guide Line, a Black/White cheeseEffect, White/Black cheeseEffect, a Blue/Yellow cheeseEffect, and a Yellow/Blue cheeseEffect. When Cheese is started, the new menu with will be displayed on the top of the menu bar next to the Edit menu on the top of the application window. Our menu will be called "UAC", which stands for Universal Access Control. Cheese, by default, does not contain its own UAC options, for this implementation, we will be adding one.
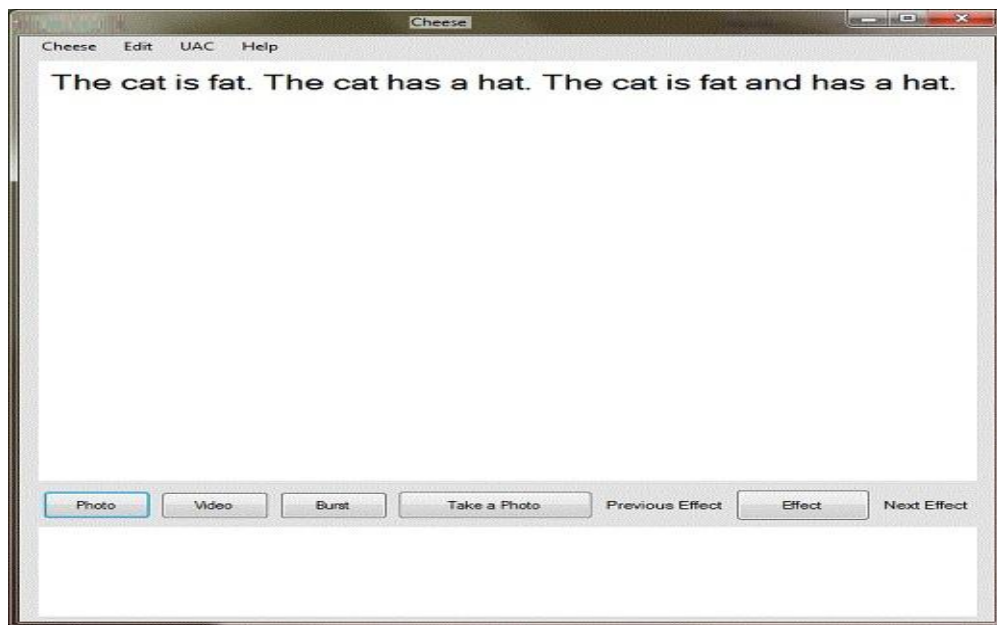

Figure 3.1: User input or text file display.

The Cheese magnifier will have a drop down menu called UAC implemented between the Edit and Help menu for the user to select which type of modification to the input text or image to be modified. (Figure 3.2).
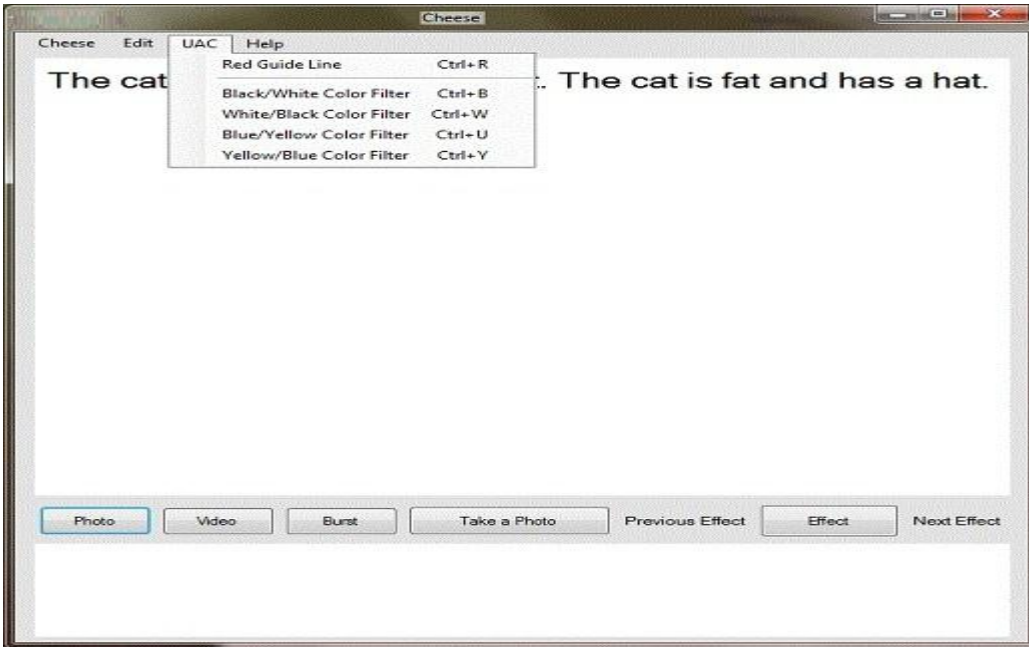
Figure 3.2: User selections for a specific cheeseEffect or Guide Line.

When the user selects the Red Guide Line option, a red guide line display will be displayed in the center of the screen as shown in figure 3.4, and any other effects will remain active as shown in figure 3.5.
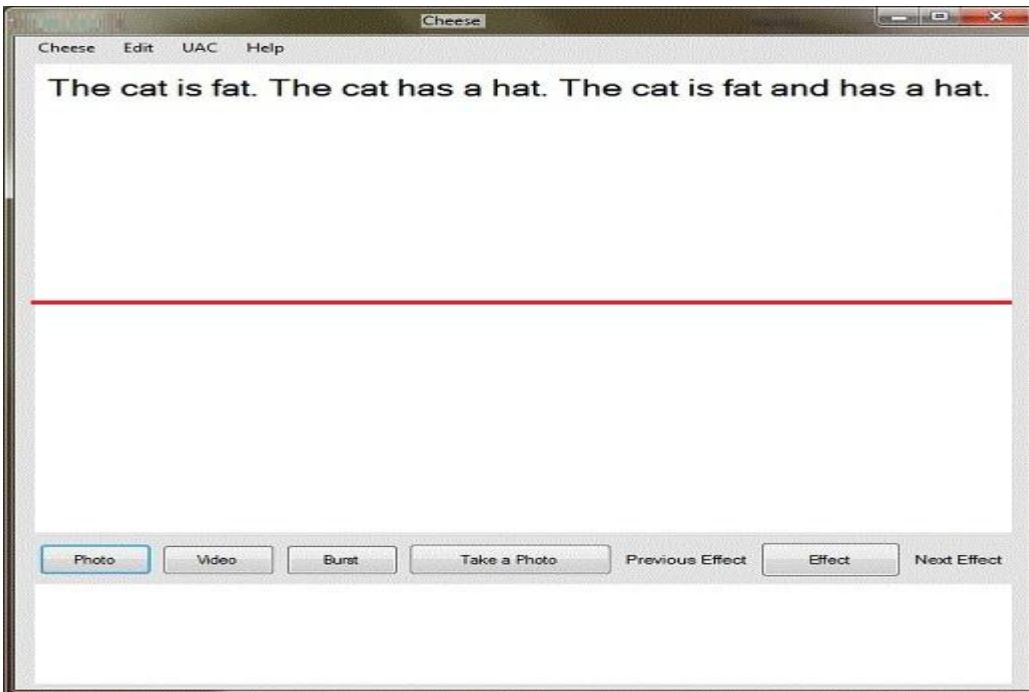

Figure 3.3: User selected the Red Guide Line option in the UAC.

When the user selects a color filter option, Cheese Magnifier will display the appropriate cheeseEffect accordingly as shown in Figure 3.4. If the red guideline is activated it will remain on top of any currently selected effect as shown in Figure 3.5.
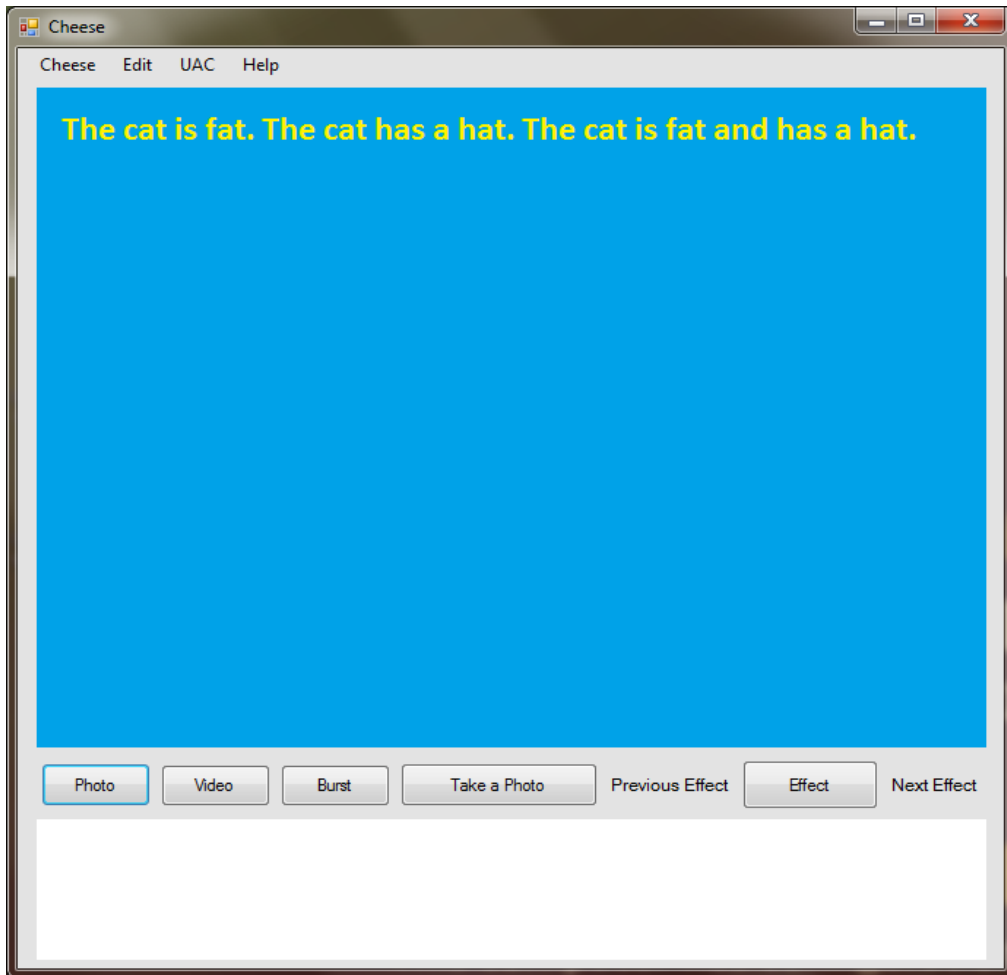

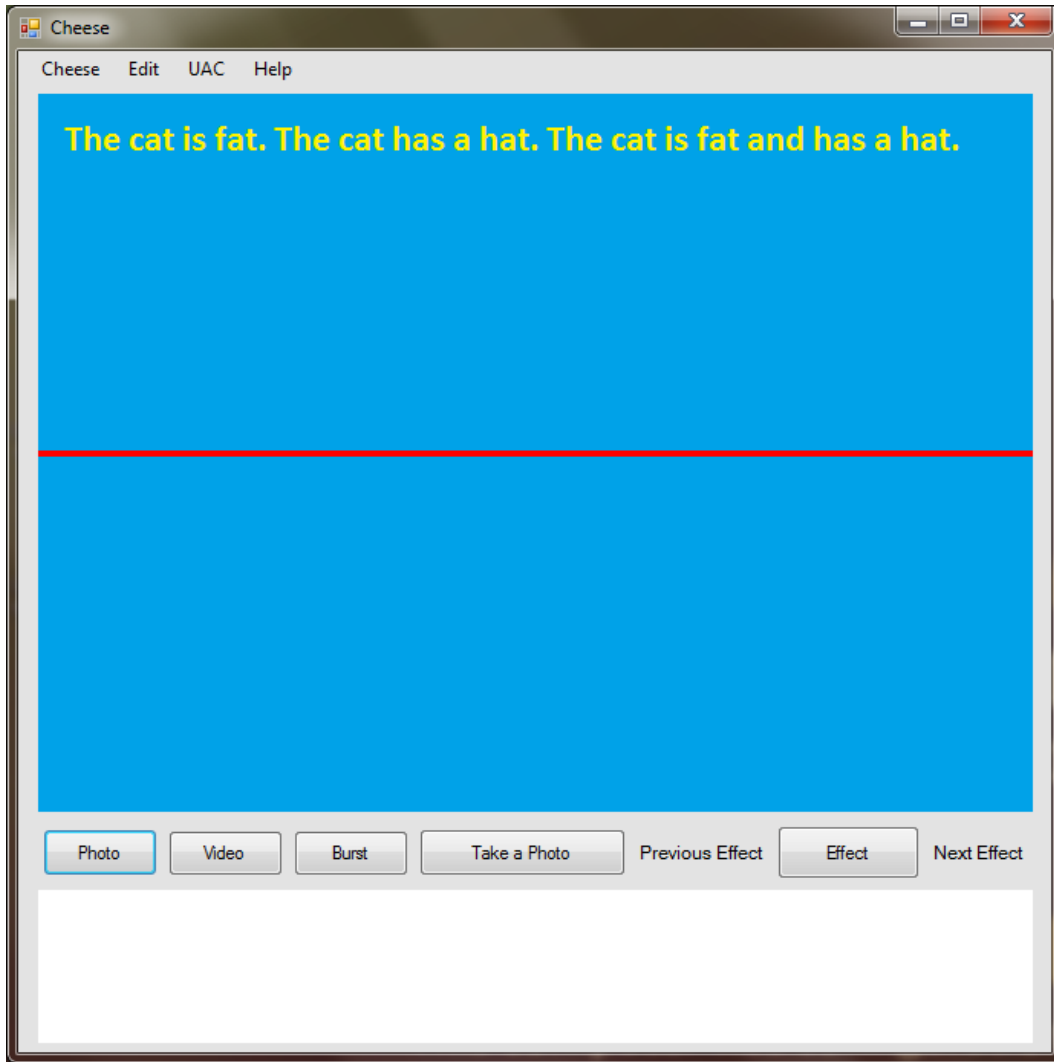**Figure 3.4: Display yellow text and blue background.**

Figure 3.5: Display Red Guideline with effect in place

3.2 Data Interface

The data that will be passed between Cheese, GStreamer, and the implemented CheeseEffects will be streaming video data.

3.3 Programming Interface

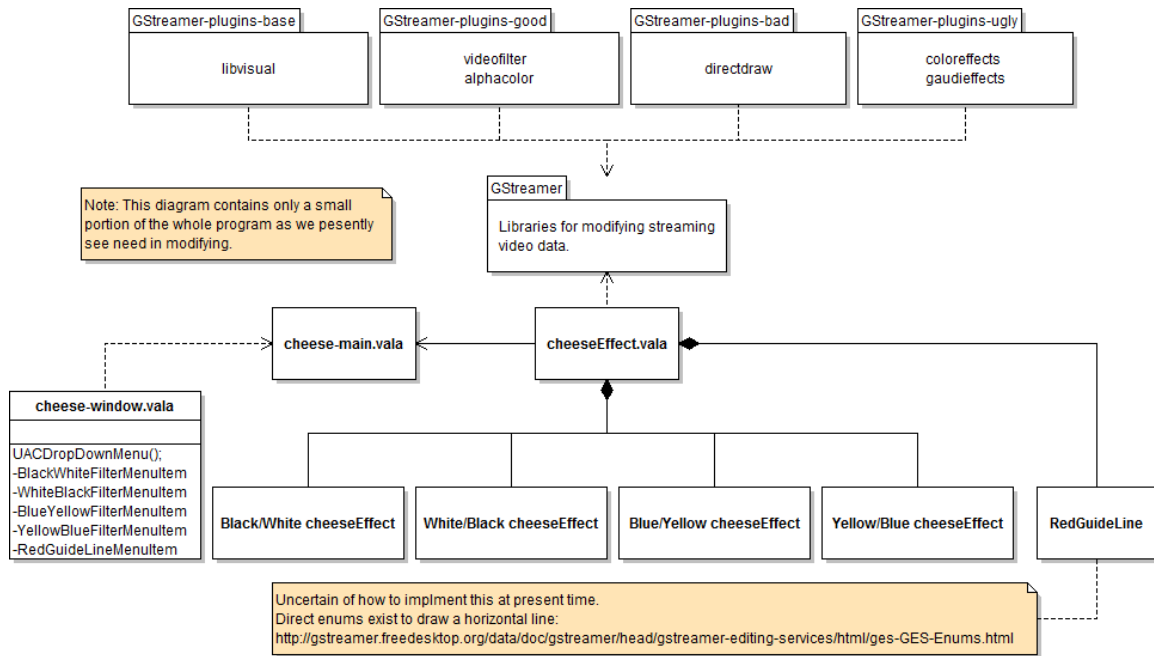Cheese Magnifier uses GStreamer libraries to create its effects.

4. Detailed Design

Figure 4.1: Proposed UML

4.1 Class 1 – cheese-window

4.1.1 Type

Class

4.1.2 Requirement

ACF1, ACF2, ACF3, ACF4, ZGL

4.1.3 Description

This class doesn't directly generate the Visual cheeseEffects or the Red Guideline. This class is initialized with the program when the main program is called. This class hosts the UAC Dropdown menu that will allow us to access the cheeseEffect filters. The file is located under /src/ in the source code as a .vala file.

4.2 Class 2 - Black/White cheeseEffect

4.2.1 Type

Class

4.2.2 Requirement

ACF1 Requirement.

4.2.3   Description

The purpose of this class is to generate and apply the Black/White color filter.

4.3   Class 3 – White/Black cheeseEffect

4.3.1   Type

Class

4.3.2   Requirement

ACF2 Requirement.

4.3.3   Description

The purpose of this class is to generate and apply the White/Black color filter.

4.4   Class 4- Blue / Yellow cheeseEffect

4.4.1   Type

Object

4.4.2   Requirement

ACF3 Requirement.

4.4.3   Description

The purpose of this class is to generate and apply the Blue/Yellow color filter.

4.5   Class 5 Yellow / Blue cheeseEffect

4.5.1   Type

Object

4.5.2   Requirement

ACF4 Requirement.

4.5.3   Description

The purpose of this class is to generate and apply the Yellow/Blue color filter.

4.6   Class 6 – Red Guide Line

4.6.1   Type

Object

4.6.2   Requirement

ZGL requirement.

4.6.3   Description

The purpose of this class is to generate and apply the Red Horizontal Guideline in the center of the video display.