

BU ProPane Technical Specification

BU ProPane Team:

Griffin Dunn

Colin Madigan

Phillip Stahlfeld

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This document contains the technical specification for the Professional Portable Automatic Note Extraction (ProPANE) system as determined by both the ProPANE team as well as Dr Robert Midkiff and Dr Douglas Gabauer. Each specification describes a quantifiable, measurable aspect of the system in addition to providing a testing procedure.

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1 Overview and Scope

Can we really do this now?

2 List of Deliverables

Software source code

Users guide

3 System Specifications

3.1 Setup

3.1.1 Maximum Steps Required

The maximum number of discrete steps required to prepare the capture system for recording shall not exceed X steps. This requirement exists to ensure that the system is simple to set up.

This requirement will be verified by showing that the number of steps for setup in the user manual does not exceed X.

3.1.2 Maximum Time Required

The maximum time required to prepare the capture system for recording shall not exceed 5? minutes. This is to ensure that setting up the system does not interfere with class time.

This requirement will be verified through a demonstration of a third party setting up the system in fewer than 5 minutes.

3.2 Capture Environment

3.2.1 Distance from Board

3.2.2 Capture Field

3.2.3 Viewing Angle

3.2.4 Lighting

3.3 Capabilities

3.3.1 Information Capture

The ProPANE system shall capture all of the information written on a board provided that there exists a clear line of sight from the capture device to the information for a minimum of X continuous seconds. This requirement exists to ensure that no information is lost.

This requirement will be verified through a test of covering a portion of a board for all but X seconds and ensuring that the system captured all of the board.

3.3.2 Key Frames

4 Hardware Specifications

THIS NEEDS TO GO IN THE DEFINITIONS SECTION

The hardware of the system will be composed of the following:

- Capture system hardware
- Analysis system hardware

The capture system hardware will be the components of the ProPANE system that are transported to class rooms and record the information written on boards. The analysis system hardware will be the components of the ProPANE system that process the data from the capture system.

4.1 Dimensions

4.1.1 Maximum Weight

The total weight of the capture device shall not exceed 2.5 kg (current weight of 15' MacBook Pro). This requirement exists to maintain the goal of portability. Professors must be able to carry the device to classes and weight should not be an issue.

This requirement will be tested by weighing the system and verifying that its weight is less than 2.5 kg.

4.1.2 Maximum Size

The capture device shall fit inside of a cube with 0.75 m sides in its most collapsed and fully assembled state. This requirement exists to maintain the goal of portability. Professors must be able to carry the device through door frames.

This requirement will be tested by ensuring that the final product can fit inside of a box with 0.75 m sides.

4.2 Cost

Production cost

Component cost

4.3 Computational Power

Not enough research yet to fill this in

4.4 Presence

4.4.1 Visual Profile

The visual profile of the capture device shall not exceed that of a typical student. This requirement exists to protect students from having their vision blocked by the capture system.

This requirement will be tested by NEED TO DEFINE THIS BETTER

4.4.2 Peak Audio Output

The loudest noise made by the capture device during normal operation in a 10 second period shall not exceed that of a projector or something else in the room?. This requirement exists to protect students from distracting noises.

This requirement will be tested by recording the capture device during normal operation and ensuring that its peak audio output does not exceed whatever we choose

4.4.3 Continuous Audio Output

The average output noise level created by the capture device shall not exceed that of a projector during 120 minutes of continuous operation. This requirement exists to protect students from distracting noises

This requirement will be tested by recording the audio output from the capture device and averaging the audio amplitude.

4.4.4 Visual Distraction

The capture device shall not create any visual distractions for students (i.e. no blinking lights). This requirement exists to protect students from being distracted by the system.

This requirement will be tested by verifying that there are no visual signals visible to the students.

5 Software Specifications

5.1 Operating System

5.1.1 Capture System

Is this an app (iOS or Android) or a programmable camera (like Microsoft paper)?

5.1.2 Analysis System

The analysis system shall support the Ubuntu 10.04 operating system. This requirement exists to ensure that the software can be run on a free-of-cost operating system.

This requirement will be verified by developing the analysis system on the Ubuntu 10.04 operating system.

5.2 File Formats

5.2.1 Proprietary Formats

The ProPANE system shall generate images that are in an open format (no proprietary formats). This requirement exists to ensure that the images can be viewed with free-of-cost software.

This requirement will be verified by demonstrating that the output file formats are in an open format.

5.2.2 Editable

The images generated by the ProPANE system shall be editable—to the extent of rotating and cropping—through the use of a free-from-cost editor. This requirement exists to ensure that professors have the ability to share selected portions of the captured images with their classes.

This requirement will be verified through a demonstration of image rotation and cropping utilizing a free image editor.

6 Interface Specifications

6.1 Capture System

6.1.1 Starting Mechanism

The mechanism for starting the capture system shall be simple enough to use as to require no special training aside from reading the user manual. This requirement exists to ensure that any professor will have the ability to use the system.

This requirement will be verified by having a third party with no special training start the capture system with only the help of the user manual

6.1.2 Stopping Mechanism

The mechanism for starting the capture system shall be simple enough to use as to require no special training aside from reading the user manual. This requirement exists to ensure that any professor will have the ability to use the system.

This requirement will be verified by having a third party with no special training start the capture system with only the help of the user manual

6.2 Analysis System

6.2.1 Image Browsing

The analysis system shall provide a graphical interface for displaying all images captured and generated by the ProPANE system. This requirement is to ensure that images are easily accessible and viewable through more than just a file browser.

This requirement will be verified through a demonstration of the system showing that images can be browsed.

6.2.2 Export System

The analysis system shall provide a graphical interface for exporting image files to a specified location. This requirement exists to ensure that the images can be shared without difficulty.

This requirement will be verified through a demonstration of the system showing that images can be exported to a specified folder.

7 Legal Specifications

7.1 Special Education

Meet all legal criteria (Dr Midkiff)