

# TOWARDS THE DEVELOPMENT OF IMAGE PROCESSING AND ANALYSIS TECHNIQUES TO INFLUENCE CREATION OF STRUCTURED TYPEFACES FROM HANDWRITTEN TEXT IMAGES.

# INTRODUCTION.

Written letters can be used only during the process of writing its self:  
the moment of production and use are one and the same.

— Fred Smeijers

Smeijers, 1996

Smeijers, 1996 **Counterpunch: Making type in the sixteenth century, designing typefaces now.** United Kingdom: Chronicle Books.

JAMES MITCHELL - 10425907 - Towards the development of Image processing and analysis techniques to influence creation of structured typefaces from handwritten text images.

**THE PROCESS OF DESIGNING A TYPEFACE HAS A HIGH BAR FOR ENTRY  
TAKING MANY HOURS TO CREATE  
AND MANY MORE HOURS TO MASTER.**

# TYPE DEVELOPMENT IS NOT A SKILL AVAILABLE TO ALL DESPITE ARTISTIC ABILITY OR INTENT.

THIS FACT TAKES THE POTENTIAL FOR COMPLETE PERSONAL AND VISUAL EXPRESSION AWAY FROM EVEN THE MOST CREATIVE USERS.

## THE PRIMARY OBJECTIVE

**DESIGN AND IMPLEMENT AN APPLICATION  
THAT WILL LOWER THE BAR FOR THE  
AVERAGE USER TO CREATE TYPEFACE FONTS  
FROM IMAGES OF HANDWRITTEN TEXT.**

# DESIRED FUNCTION.



Original Image Grayscaled

hello

abcdefghijklmnopqrstuvwxyz

abcdefghijklmnopqrstuvwxyz

abcdefghijklmnopqrstuvwxyz

Thresholded 30%



**BACCKGROUNDA**



## METHODOLOGY

**BREAKING DOWN THE PROBLEM.  
COLLECTION OF RESOURCES.  
RESEARCH, DEVELOPMENT, IMPLEMENTATION.**

**BREAKING DOWN THE PROBLEM**

# **IMAGE PROCESSING AND ANALYSIS LETTERFORM COMPOSITION. GENERATING OUTPUT. USER INTERFACE DEVELOPMENT.**

IMAGE PROCESSING

CREATING THE RIGHT ENVIRONMENT.

AND ANALYSIS

FINDING THE FEATURES

LETTERFORM COMPOSITION

# CREATION OF A TEMPLATE. APPLYING ATTRIBUTES.

GENERATING OUTPUT

SVG.  
TRUETYPE.  
OPENTYPE.

**USER INTERFACE DEVELOPMENT.**

# **PROVIDE STATION FOR INPUT. OPTIONS FOR OUTPUT.**

**COLLECTION OF RESOURCES**

# **HANDWRITTEN SUBJECTS. RESEARCH MATERIALS.**

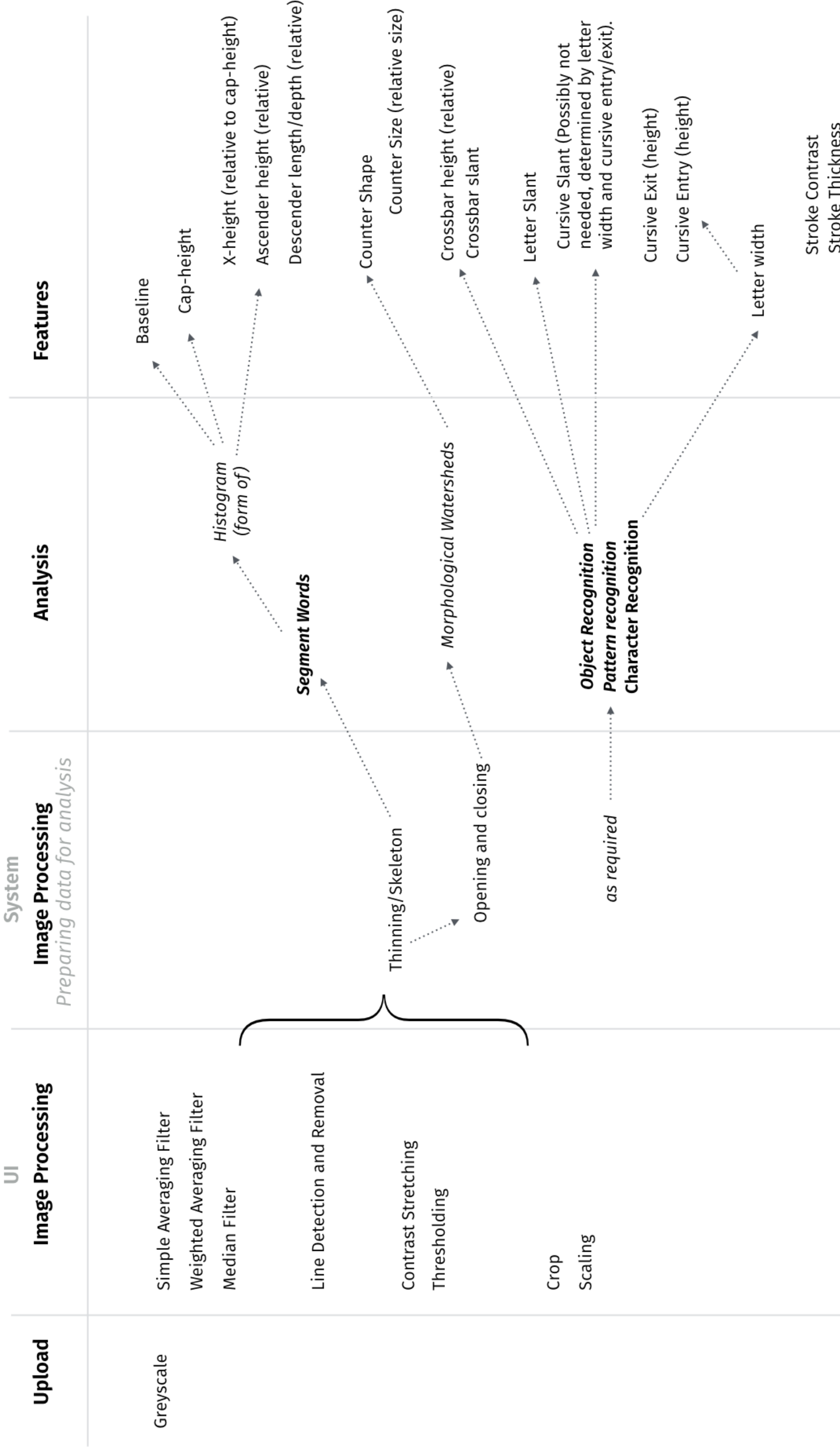
**RESEARCH DEVELOPMENT AND IMPLEMENTATION.**

# **BACKGROUND RESEARCH PSEUDO CODE DEVELOPMENT IMPLEMENTATION.**



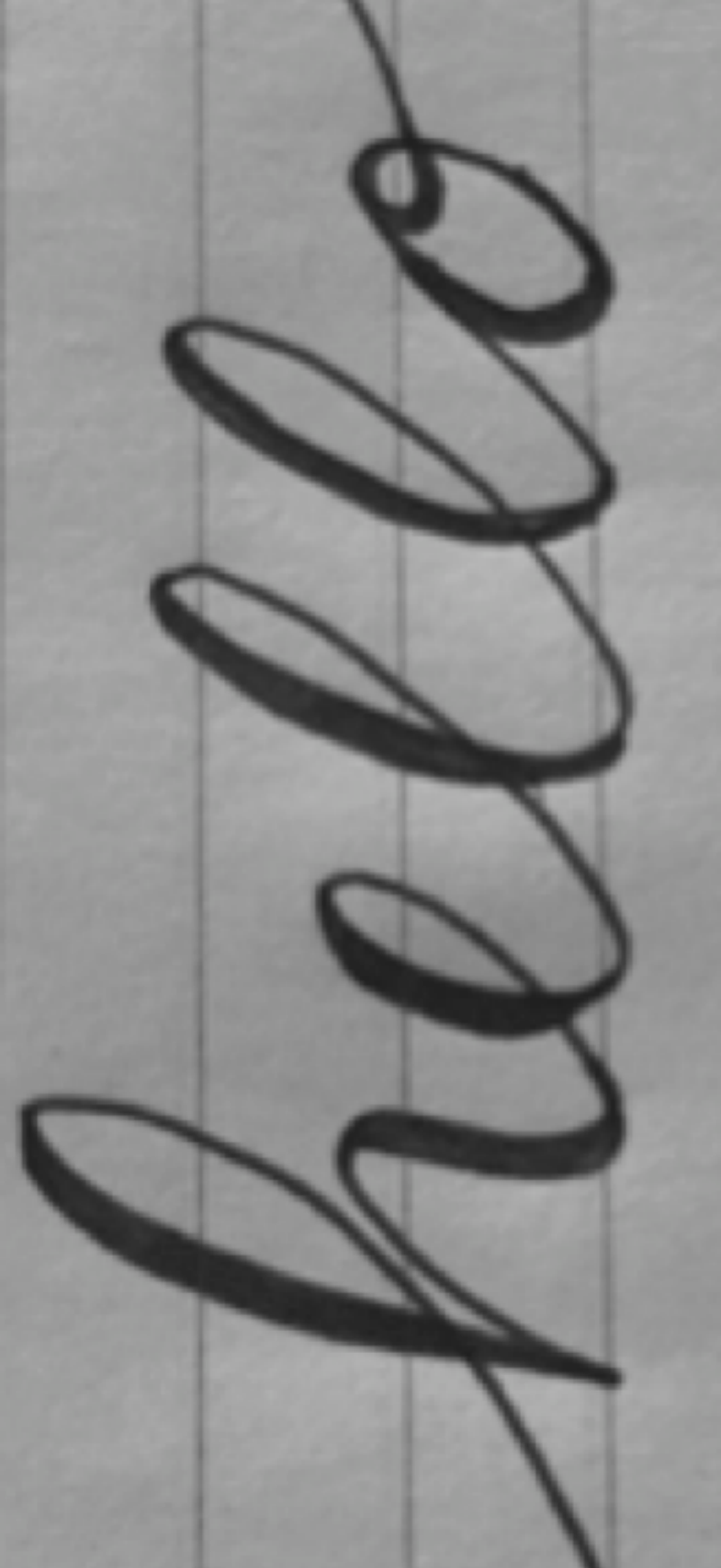
**RESEARCH DEVELOPMENT AND IMPLEMENTATION.**

# **IMAGE PROCESSING AND ANALYSIS.**



**RESEARCH DEVELOPMENT AND IMPLEMENTATION.**

# THRESHOLDING.



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# THRESHOLDING.

## FINDING THE EQUATION.

$$g(x, y) = T[f(x, y)]$$

$$g(x, y) = \begin{cases} 1 & \text{if } f(x, y) > T \\ 0 & \text{if } f(x, y) \leq T \end{cases}$$

**Gonzalez and Woods, 2002**

**RESEARCH, DEVELOPMENT AND IMPLEMENTATION**

# **DEVELOPING THE PSEUDO CODE.**

T = threshold value

for each row y in representation  
for each column x in row

if pixel(x, y) > T then  
    pixel(x, y) greylevel = 1  
else  
    pixel(x, y) greylevel = 0

**RESEARCH, DEVELOPMENT AND IMPLEMENTATION**

**IMPLEMENTING.**

```
- (NSBitmapImageRep *) thresholdWithValue:(int)value
{
    // get the image data
    NSBitmapImageRep *output = [self grayScaleRepresentationOfImage:self.image;
    unsigned char *data = [output bitmapData];

    // ..
}
```



```
// Iterate over the image.
```

```
for ( int y = 0; y < self.height; y++ )
{
    for ( int x = 0; x < self.width; x++ )
    {
        int index = x + (y * self.width);

        // ..

    }
}

return output;
}
```

```
// apply the threshold
if ( data[index] < value) {
    data[index] = 0;
} else {
    data[index] = 255;
}
```

# DEMONSTRATION.

CRITICAL  
CAPS

# 1. DELAY IN ESTABLISHING THE METHODOLOGY FOR RESEARCH AND DEVELOPMENT.

# 2. THE INCORRECT ORDER OF RESEARCH FOCUS.

# 2. THE INCORRECT ORDER OF RESEARCH FOCUS.

# 3. INABILITY TO CORRECTLY ESTABLISH THE PROBABLE PRIOR TO IMPLEMENTATION OF SOME FEATURES.