

# AutoMosaic Report

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# **1 Introduction**

## **1.1 Purpose**

This document describes the software requirements, algorithm, results obtained on different test cases and future scope of AutoMosaic Software. This software is a standalone application designed to restore a torn document from the pieces. The specified requirements are of high priority and AutoMosaic Software works best when they are followed.

## **1.2 Product Scope**

The product stitches randomly torn paper documents in an automated fashion. This product is useful for recovering documents in archival study and investigation science. The product helps in automating the recovery of torn documents, which requires a lot of manual effort otherwise.

## **2 Overall Description**

### **2.1 Product Perspective**

This software takes individual images of the torn fragments of a document as input, and returns an output merged image. Mosaicing of torn documents is an important and indispensable labour in the field of the forensics or archival study. The manual process being quite tedious, automation of the same utilizing this software can result in a phenomenal increase in efficiency.

### **2.2 Operating Environment**

This software has been exported into an executable file and hence is compatible with Windows OS. It runs on all Windows OS version above Windows XP.

### **2.3 Design and Implementation Constraints**

- The images of the fragments, which are provided as the input must be taken against a white background for an efficient extraction of the fragment contours.
- There is a considerable amount of error in presence of white regions inside the fragment contour.
- To tackle the issue of memory overload due to high resolution images, we resize the images for convenience and final image is constructed retaining original image size, which may result a small amount of inaccuracy.

### **2.4 User Documentation**

A user manual in pdf format would be made available along with the software.

### **2.5 Assumptions**

- Document pieces do not contain any straight line cut as they are hand cut.
- Documents are not torn using a shredder.

## 3 Libraries and Languages Used

### 3.1 Libraries

#### 3.1.1 OpenCV 2.4.8

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products

#### 3.1.2 GPC General Polygon Clipper library

A library for calculating the overlapping area between three contours.

#### PyQt

PyQt is a Python binding of the cross-platform GUI toolkit Qt. It is one of Python's options for GUI programming.

#### Numpy

NumPy is an extension to the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large library of high-level mathematical functions to operate on these arrays.

Apart from these, we have also used PyInstaller. PyInstaller is a program that converts (packages) Python programs into stand-alone executables, under Windows, Linux, and Mac OS X.

### 3.2 Languages

#### 3.2.1 Python 2.7

Python is a widely used general-purpose, high-level programming language. Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library.

Like other dynamic languages, Python is often used as a scripting language, but is also used in a wide range of non-scripting contexts. Using third-party tools, such as Py2exe, or Pyinstaller, Python code can be packaged into standalone executable programs. Python interpreters are available for many operating systems.