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HIGH RESOLUTION DOCUMENT IMAGE CONSTRUCTION FROM VIDEO USING MACHINE LEARNING

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ABSTRACT:

Today, smartphones with high-quality built-in cameras are very common. People prefer to take pictures from documents with smartphones instead of scanning them with a scanner. Due to the limitation of scanners input size, it is difficult to scan everything with them. Resolution and quality of smartphone cameras are not enough to take a picture from large documents like posters. The documents scanned by mobile phones may not be that accurate. In this project, we propose a pipeline to make a high-resolution image of a document from its captured video. We suppose that during the record of the video, the camera was moved slowly all over the surface of the document from a close distance. In this method we find the location of each frame in the document and we use a sharpness criterion to select the highest possible quality for each region of the document among all available frames. We evaluate our method on the SmartDoc Video dataset and report the promising results.

1.INTRODUCTION

imagery is captured by an array of smaller sensors sharing an optical center, instead of one large sensor. It is desirable to generate a single image (mosaic) from the sensor array, since it simplifies higher level vision tasks. It is important that the mosaic be of high quality, without noticeable seams, and be estimated efficiently for every frame of the video. They proposed a piecewise affine model to handle image distortions not captured by a homograph.

Capturing aerial imagery at high resolutions often leads to very low frame rate video streams, well under full motion video standards, due to bandwidth, storage, and cost constraints. Low frame rates make registration difficult when an aircraft is moving at high speeds or when global positioning system (GPS) contains large errors or it fails. We present a method that takes advantage of 2 persistent cyclic video data collections to perform an online registration with drift correction. The data we consider in this paper has circular motion camera trajectories. They perform global alignment using only the imagery itself since it is possible for GPS/INS to fail and since some areas may not have accurate or existing 3D DEM's. They also propose a method to combine long video sequences into multi-view stereo panoramas using a layering approach.

2.RELATED WORK

Existing System

Image mosaicking approaches this problem by aligning high-quality pictures of various parts of the scene, and then, stitching those partial images in a seamless manner. It is applicable in numerous areas such as aerial imaging, where aerial vehicles scan the earth's surface by taking various images and it is required to integrate these images into a single map [1], [2]. Panorama image creation [3], mosaic of endoscopy videos [4], and stitching microscopic images [5] are other

applications where it is necessary to compose a complete mosaic out of partial images. With the ubiquitousness of mobile cameras, it has become common to photograph a document with a digital camera or a smartphone, instead of scanning it with traditional scanners. Apart from accessibility, mobile cameras are suitable for some cases that desktop scanners are impossible to use.

Proposed System

The problem that we approached here, is to construct a complete and legible image of a document which has been filmed and we must compose the image from the information in the frames of the video. One condition must hold about the video which we input to the method; we assumed that there is one frame in the video, that the entire document is visible in it. We call this frame, the 'reference frame'. Although the complete image of the document in the reference frame is probably of low quality, but our algorithm needs to access a coarse view of the entire shape of the object. Except such a video, there are other inputs to our method. We assume that there exists an intelligent agent that can detect the corners of the document in the reference frame and also the index of the reference frame is determined by the user.

Feasibility analysis begins once the goals are defined. It starts by generating broad possible solutions, which are possible to give an indication of what the new system should look like. This is where creativity and imagination are used. Analysts must think up new ways of doing things-generate new ideas. There is no need to go into the detailed system operation yet. The solution should provide enough information to make reasonable estimates about project cost and give users an indication of how the new system will fit into the organization. It is important not to exert considerable effort at this stage only to find out that the project is not worthwhile or that there is a need significantly change the original goal.
Feasibility of a new system means ensuring that the new system, which we are going to implement, is efficient and affordable. There are various types of feasibility to be determined.

Today, smartphones with high-quality built-in cameras are very common. People prefer to take pictures from documents with smartphones instead of scanning them with a scanner. Due to the limitation of scanners input size, it is difficult to scan everything with them. Resolution and quality of smartphone cameras are not enough to take a picture from large documents like posters. The documents scanned by mobile phones may not be that accurate.

In this project, we propose a pipeline to make a high-resolution image of a document from its captured video. We suppose that during the record of the video, the camera was moved slowly all over the surface of the document from a close distance. In this method we find the location of each frame in the document and we use a sharpness criterion to select the highest possible quality for each region of the document among all available frames. We evaluate our method on the SmartDoc Video dataset and report the promising results.

3. METHODOLOGY:

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for bothresearch and production at Google. TensorFlow was developed by the

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Google Brain team for internal Google use.

Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python.Besides its obvious scientific uses, Numpycan also be used as an efficient multi-dimensional container of generic data. Arbitrary data-types can be defined using Numpy which allows Numpy to seamlessly and speedily integrate with a wide variety of databases.Pandas is an open-source Python Library providing high-performance data manipulation and analysis tool using its powerful data structures. Python was majorly used for data munging and preparation. It had very little contribution towards data analysis. Pandas solved this problem. Using Pandas, we can accomplish five typical steps in the processing and analysis of data, regardless of the origin of data load, prepare, manipulate, model, and analyze. Python with Pandas is used in a wide range.

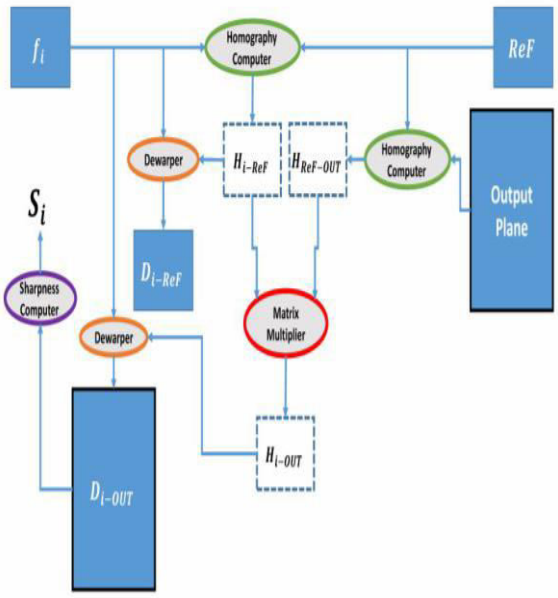

Figure 1: Architecture

Development of this application is highly economically feasible. The only thing to be done is making an environment with an effective supervision. The technical requirement for the system is economic and it does not use any other additional Hardware and software. Technical evaluation must also assess whether the existing systems can be upgraded to use the new technology and whether the organization has the expertise to use it.

Install all upgrades framework into the python widows based application. This application depends on mainly python.The system working is quite easy to use and learn due to its simple but attractive interface. User requires no special training for operating the system. Technical performance include issues such as determining whether the system can provide the right information.

Input Design

In this project we input a video which contains the whole document shot closely. Except such a video, there are other inputs to our method. We assume that there exists an intelligent agent that can detect the corners of the document in the reference frame and also the index of the reference frame is determined by the user. So, in general, the following inputs must be given to the algorithm:A video containing a reference frame with a complete image of the document. The index of the reference frame. The coordinates of the document corners in the reference frame.

Output Design

This project gives the output containing a High Resolution Document Image, Ground Truth Image.

4.STUDYOF RESULTS:

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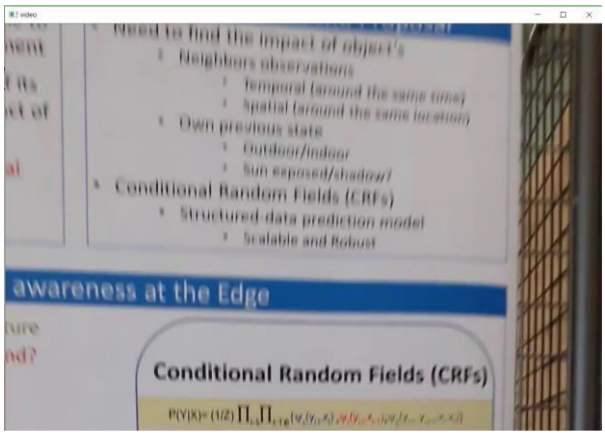

Figure2: Input Video

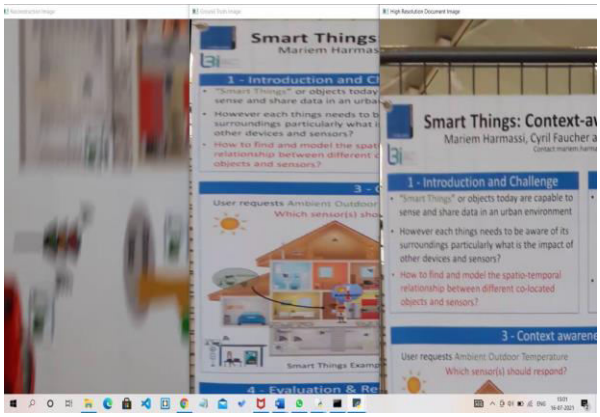

Figure 3: Output Video

5.CONCLUSION :

We introduced an algorithm for producing a high-quality image from a video recorded by a smartphone. Having various views for different regions of a document, our method, first, aligns them to a single viewpoint and second, combines them using a weighted average with respect to their sharpness scores. Our method deals with distortions like reflection, occlusion and motion blur. With the method we increased the legibility of the document image in comparison to a single camera shot that contains the whole document.Thus, in our future work we will focus on applying some more advanced algorithms.

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