Addition of 3D sound based on the position and the area of an object in a silent video

Miwa Nishimura[1)], Tsuyoshi Kobayashi[2)], Jun Murayama[3)], Yukihiro Hirata[4)], Makoto Sato [5)] and Tetsuya Harada [3)]
1) 3)Tokyo University of Science 2)5) Tokyo Institute of Technology 4) Tokyo University of Science, Suwa

KEYWORDS: Auditory sense, Sound generation, Motion vector

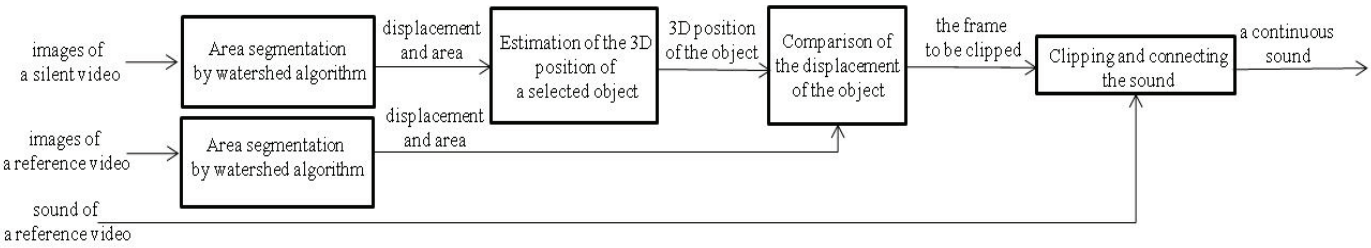

Figure 1. Processing procedure

1 INTRODUCTION

Recently, it has become possible to save and use old valuable videos easily through video sharing services. However, those videos often lose important information, such as sound or color.

This paper proposes a system for adding appropriate sound to silent videos. The proposed system gives more reality to the scenes, by adding sounds - it generates appropriate sounds based on the position and the area of objects in the videos. These are obtained by applying a watershed algorithm. Appropriate sounds were selected from a database prepared previously, and added to the silent video.

2 METHOD OF ADDING SOUNDS

A reference video is filmed prior to the addition, and is a record of an object which makes sounds similar to the object in a silent video. Figure 1 shows a block diagram of the processing procedure for adding sounds to silent videos.The system computes the position and the area of the object in each frame in the silent video using the watershed algorithm. The system also computes the displacement and the area of the object in the reference video. Next, the system clips sounds corresponding to the displacement in the reference video which has the nearest value to that in the silent video in every 0.5[s]. Figure 2 shows an example in which continuous sound corresponding to the silent video is clipped. The continuous sound that is added to the silent video is generated by linking the fragments of those sounds in sequence. The three dimentional position of the object is given by (1).

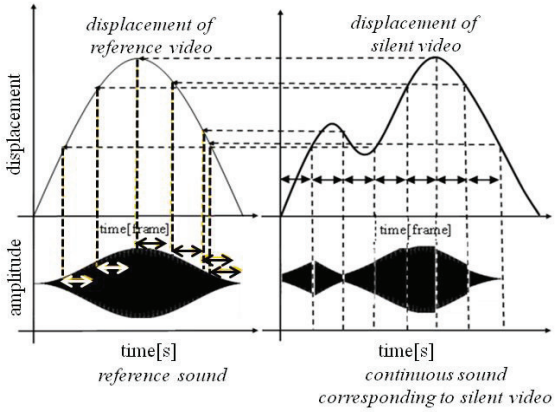

Figure 2. The rink of the *reference sound to the silent*

$$\begin{cases} x = \sin\left(\tan^{-1}\left(\frac{a_s}{a}\tan\phi_x\right)\right)\sqrt{\frac{S}{S_S}}r_s \\ y = \sin\left(\tan^{-1}\left(\frac{a_s}{a}\tan\phi_y\right)\right)\sqrt{\frac{S}{S_S}}r_s \\ z = \cos\left(\tan^{-1}\left(\frac{a_s}{a}\tan\phi_x\right)\right)\sqrt{\frac{S}{S_S}}r_s \end{cases} \quad (1)$$

The graphical representation of (1) is shown in Figure 3. Finally, the continuous sound at the three dimensional position of the object is added.

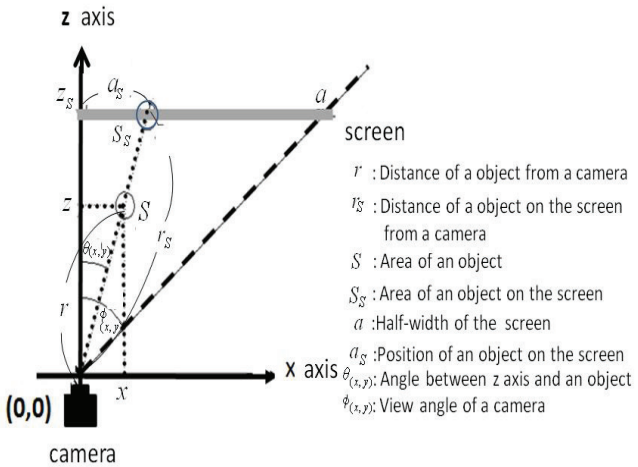

Figure3. Presumption of three dimensional position

1)email: j8110645@ed.noda.tus.ac.jp
2)email: tkobayashi@hi.pi.titech.ac.jp
3)email: {harada,murayama}@te.noda.tus.ac.jp
4)email: yhirata@rs.suwa.tus.ac.jp
5)email: msato@pi.titech.ac.jp

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