IMAGE PROCESSING

Video Analysis – Medical Sink interactions

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Introduction

Video footage are captured around the sink area in selected rooms of a medical center. The purpose of the study is to understand the characteristics of various types of interactions with the sink by analyzing and extracting insights from the videos. The information then can be used in understanding the spread of hospital specific infections. More specifically, it can also be used in understanding the correlation between the nature of interactions with the sink and the occurrence of the infection

Objectives

• Classify each incoming video based on the nature of activities in them

• Extract information related to type of interaction with sink from videos

Methodology

The first step is broadly categorizing the captured videos into different types based on the type of interaction. In the sample set, there were videos with hand washing, water running, pouring, interacting with sink for medical purposes and placing of items by sink.

We are proposing to achieve it by identifying and analyzing the initial and final frames. The cameras have motion-sensing activation, which gets triggered 6 to 8 seconds before the appearance of any foreground object. This helps in getting a reference frame for every video. Following are the characteristics of each type of video.

1. Items placed on Sink body:

• These videos have either items placed on the body of sink or removal of those items which are placed

• Comparing initial and final frame can help identify the classification of such videos. In these videos, these frames are different unlike other videos.

• Hand washing:

• First frame and last frame are going to be similar in a plain hand washing video. By identifying the frames with foreground objects we extract information.

• To classify a video into hand washing, it needs to be differentiated from other types such as pouring, interacting with sink for medical purposes, water running. Skin color detection could be helpful

• Interacting with sink for medical purposes:

• Similar to hand washing, these videos have similar static first and last frames.

• Purple colored gloves are used while interacting with sink for medical purposes. Detecting that color could help us in classifying these type of videos

• Length of interaction, identifying the items used such as syringes, containers could be useful

• Pouring:

• These videos typically contain pouring of food related items into the sink

• There is no placing of items on the sink body

• First frame and the last frame are similar. Very quick activities compared to washing or medical interaction

• Height at which the pouring is done can be a good factor to identify!?

• Running water:

• The footages have items placed by sink and water tap is opened to let water running. Items are left on the sink from the first frame to last frame.

• No idea what information can be used from this videos.

Once the categorization is done, information specific to the activity needs to be extracted. Information such as duration of hand wash, soap used or not, how many times hand washes done in a day, how many total sink interactions in a day including all type of activities could be useful.