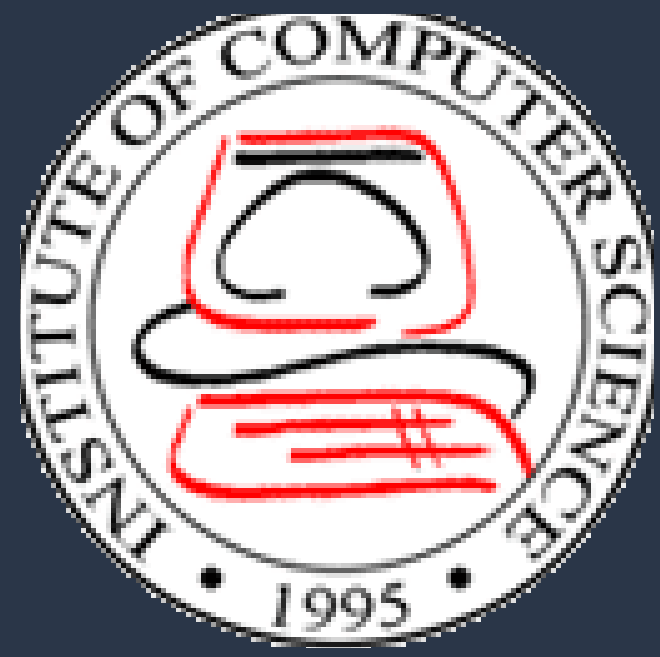# MOTION CAPTURE AND ANIMATION USING DIGITAL IMAGE PROCESSING

Eliza Mae A. Saret and Jaime Samaniego

ABSTRACT

We present a practical method for human posture recognition and animation through the use of digital image processing as an alternative for expensive means of motion capture. Given an input video of a moving subject wearing colored markers, the application identifies the position of the body parts and maps its movements into a cartoon character.
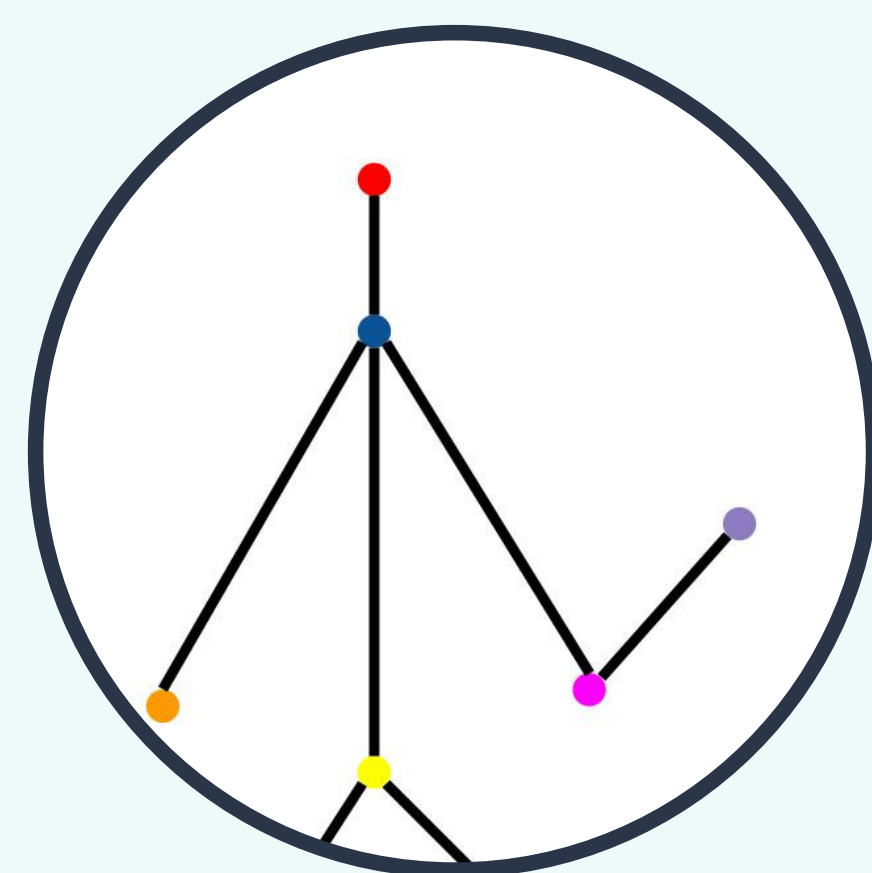
MATERIALS & METHODS

OpenCV C++ was used in enhancing the input videos, identifying body parts and in creating the character animation. Meanwhile, Qt Creator was used to create the user interface for the outputting the videos.
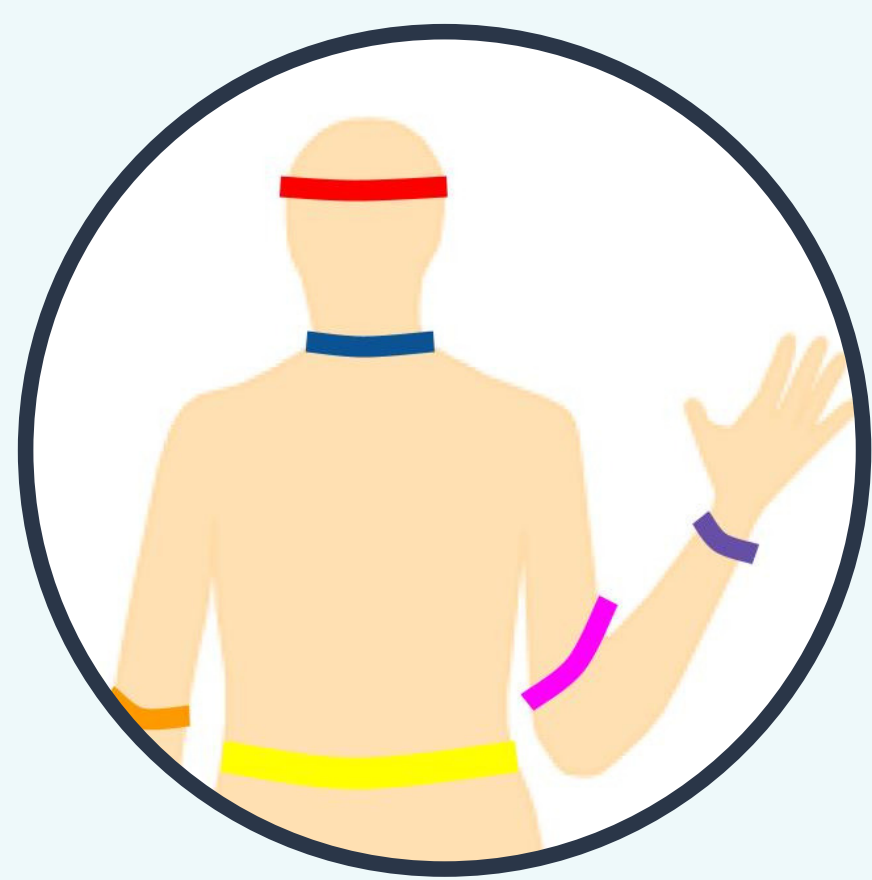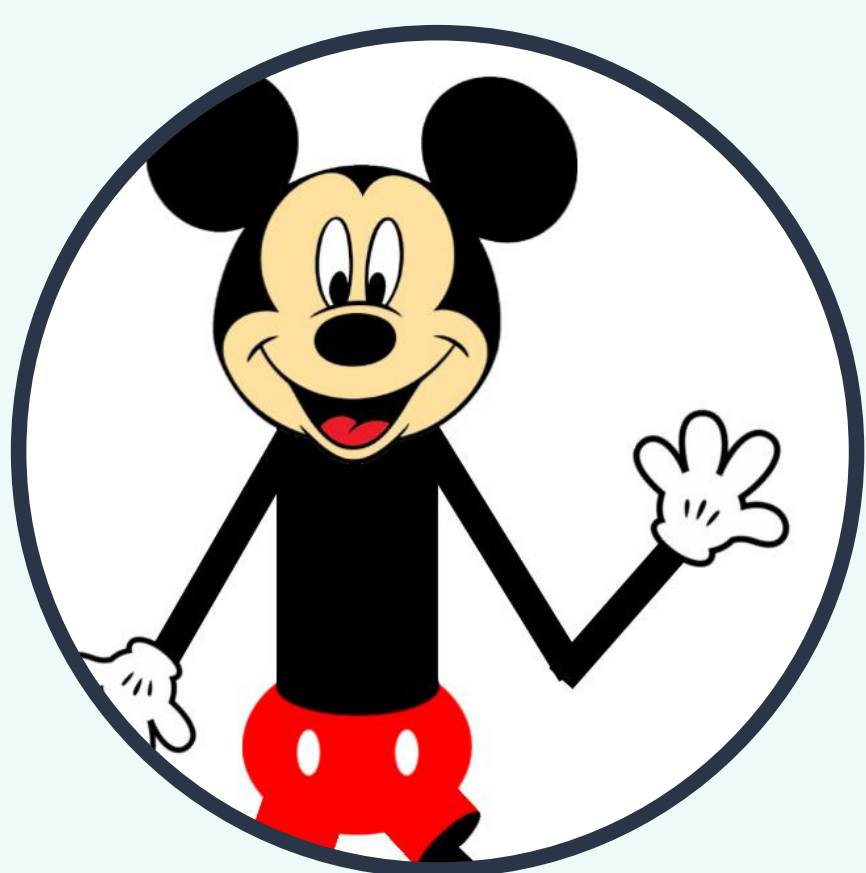

Subject with Colored Markers
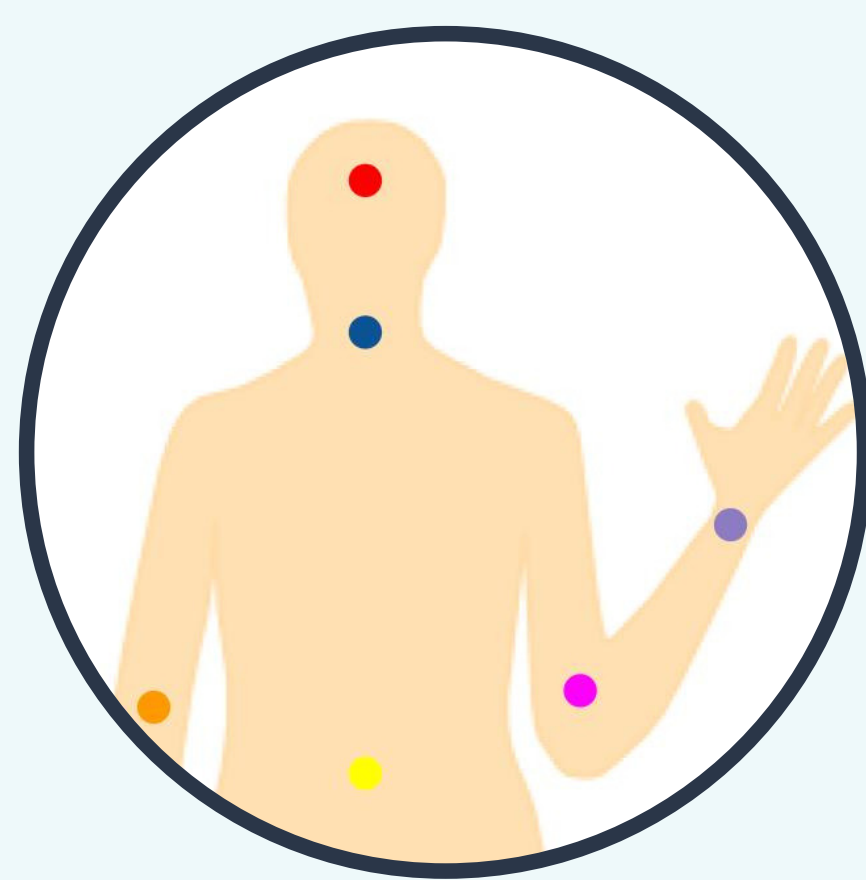
Color Detection

Body Part Identification & Model Construction

Animation

Input videos were first changed from B-G-R to H-S-V color-space. For every frame, the colors corresponding to the defined body parts were located using H-S-V threshold values. A moving character can then be mapped out and animated based on the body parts that were identified.

CONCLUSION & FUTURE WORK

The output of the input videos proved that digital image processing can be used as an alternative for expensive means of motion capture based animation.

To detect body parts more accurately, it is important to:

▶ consistent amount of lighting on the whole frame
▶ relatively neutral background
▶ all markers should be visible in all frames

Other improvements to the application can be done such as:

▶ fixing animation when not all markers are visible
▶ better human body constraint definition

RESULTS & DISCUSSIONS

The application outputs three videos: the enhanced input video, the stick model of movements, and an animation of the selected character.
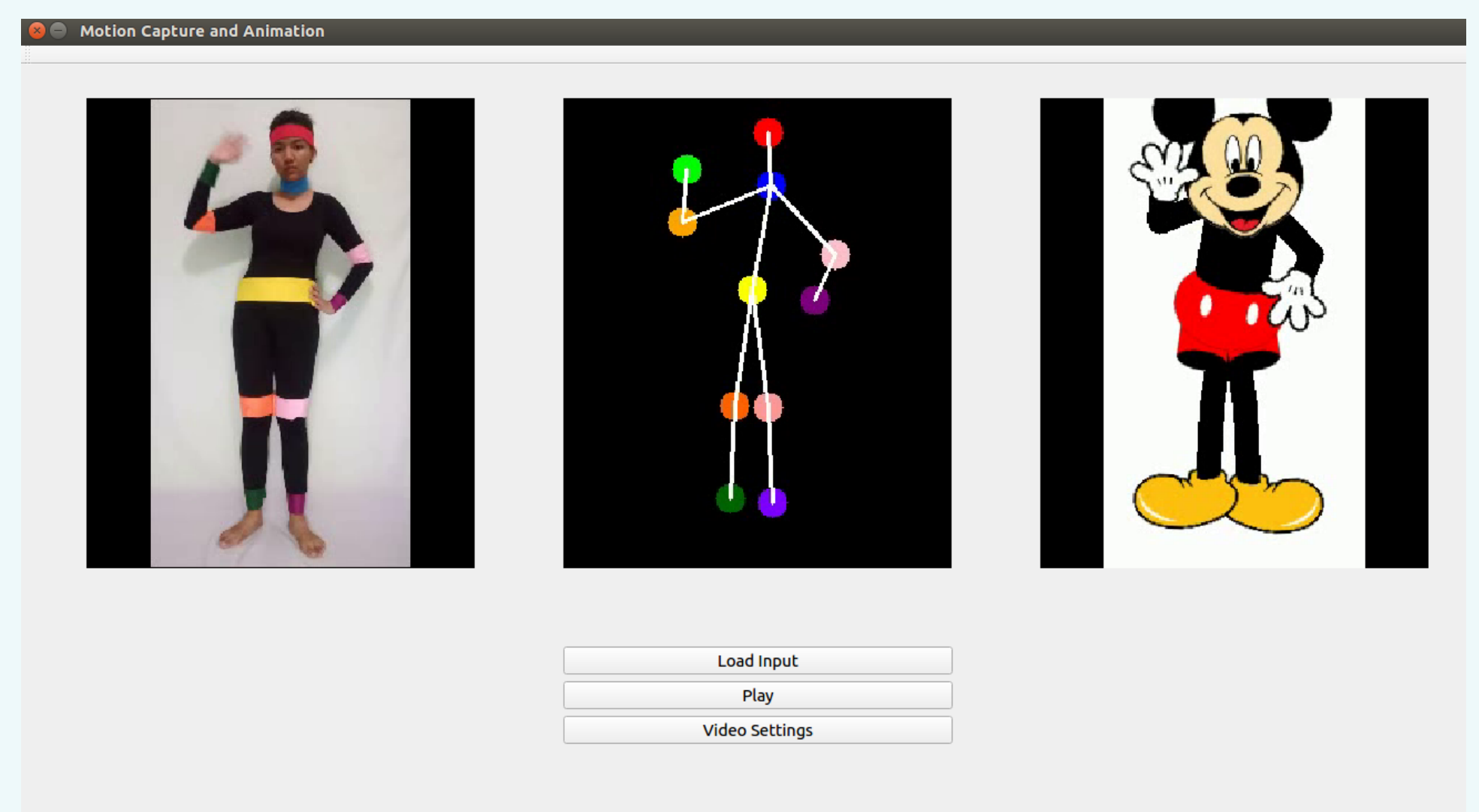
Values such as the contrast, brightness, saturation and color thresholds as well as the character to be animated can also be changed inside the video settings.
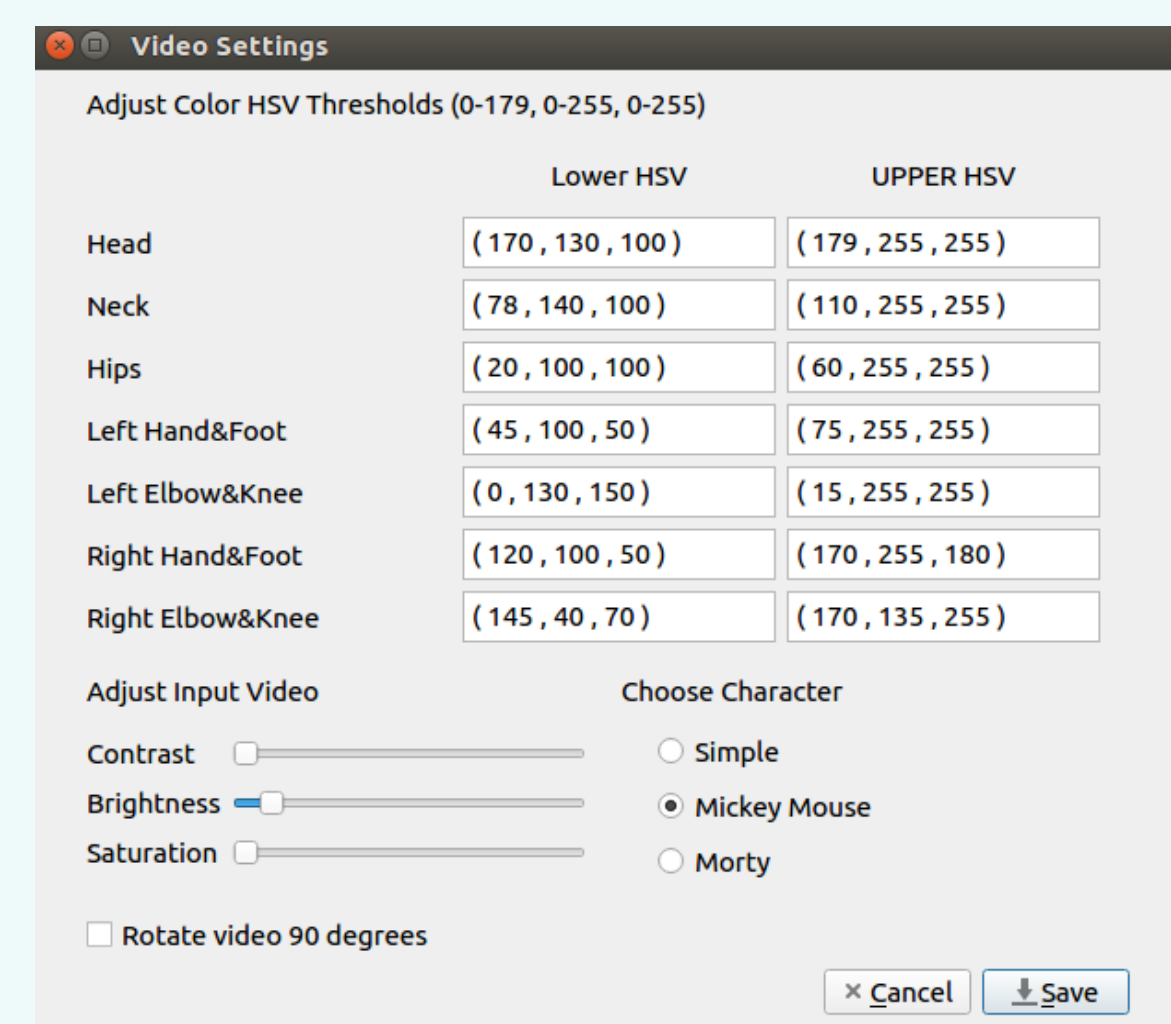
Three sets of input videos were used to test the ability of the application to detect body movements and animate them.

▶ inconsistent lighting + valid movements
▶ balanced light + valid movements
▶ balanced light + invalid body movements

The set with invalid body movements showed more mistakes in body part identification and animation as compared to the other sets of inputs.

It takes the application a few seconds to a minute to display the outputs depending on the length and quality of the input video.

AUTHOR

Eliza Mae Saret is an undergraduate BS Computer Science student at the University of the Philippines Los Baños. She enjoys reading graphic novels and sketching during her spare time.