USE OF SQUARE IMAGE SENSOR TO CAPTURE VIDEO OR IMAGE REGARDLESS OF DEVICE ORIENTATION

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Recommended Citation
HP, INC, "USE OF SQUARE IMAGE SENSOR TO CAPTURE VIDEO OR IMAGE REGARDLESS OF DEVICE ORIENTATION", Technical Disclosure Commons, (September 12, 2018)
https://www.tdcommons.org/dpubs_series/1504

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Use of square image sensor to capture video or image regardless of device orientation

This disclosure related to the field of camera design describing a method to allow users to capture content in desired orientation regardless of device orientation.

A camera design is disclosed that by use of square image sensor it can crop the captured content to portrait or landscape mode. This allows user to hold the device freely vertically or horizontally and still can capture content in their desired orientation.

This method maximizes the X and Y pixel dimension of the image sensor in landscape and portrait mode, respectively. This ensures the contents take full advantage of the sensor’s maximum resolutions.

To date camera on mobile devices has the image sensor oriented the same direction as the device’s most used direction. For example, user holding a mobile phone vertically will capture picture or video in portrait mode only. Naturally, people are accustomed to holding their phones or small size tablets vertically. Smaller devices is by design one hand operation and many times users will settle for portrait mode captures due to ease of operation. Many people are not comfortable and sometimes not convenient holding a small device sideways as it requires two hands operation. As a result, captured portrait videos when uploaded to media sharing sites such as YouTube or mirror on home TV screen will have side bars on both sides without content as it is the wrong orientation for media standard. This disclosure solves this pain point and allow users to hold their devices in either direction while still able to capture contents in desired orientation. Cropping captured content from a 1:1 aspect ratio square sensor will allow user to capture at either portrait or landscape mode regardless of orientation of the capturing device. This greatly improves the convenience for users to capture at desired mode.

All camera image sensors used by phones or tablets on the market are rectangular aspect ratio (4:3, 16:9, etc) for which it aligns the orientation to the same as the device screen. By use of high resolution 1:1 image sensor, cropping top and bottom borders will achieve landscape mode while cropping left and right borders will achieve portrait mode content. Square sensor can also maximize the resolution regardless of which orientation that the user chooses. On software level, ISP OS driver will expose this control via API for camera app to add such mode switch.
This illustrates the cropped image in landscape and portrait modes:

![Original 1:1 Capture](image)

- **Crop left & right**
- **Crop top & bottom**

- **Portrait 3:4**
- **Landscape 4:3**

**Disclosed by Alan Man Pan Tam and Yi Ko Hsiao, HP Inc.**