0 TITLES:

NAMES:

I’m Lying Down

iLieDown

Automatic Face Rotation (Auto-Face)

iRotate 2.0

1 INTRODUCTION

because the screen is oriented relative to gravity instead of the user

Handheld devices such as smartphones and tablets can be used in four different orientations: *portrait*, *upsidedown*, *landscapeLeft*, and *landscapeRight*. The device’s screen automatically changes to match which orientation the device is being held in. Current solutions commonly use the Earth’s gravity to calculate the rotation of the device. Specifically, modern devices use an accelerometer to measure the acceleration (and/or force) acting on the device due to gravity in the , , and directions. These observations are then used to confidently orient the display relative to gravity.

Let’s say for example that a user is sitting upright and holding a smartphone vertically, so the phone’s display is oriented to *portrait*. This orientation is correct since the user is also vertical. When the user lies down to the right, the device rotates from *portrait* to *landscapeRight* because that is the correct orientation relative to gravity. However, this configuration is wrong since the user has not actually rotated the device; they are still holding it vertically relative to themselves. The screen should remain *portrait*, but the accelerometer/gravity solution fails to detect this. In the remaining sections, we loosely refer to the current solution as “gravity” because it uses gravity to orient the device’s display.

Average Time Taken for analysis:

2

5

8

11

iPhone 6

iPhone XS

Noticeable lag - do this first

• Have the user test both gravity rotation and iLieDown rotating in all three directions

• Ask them if one appeared faster or slower than the other

Gravity was faster

iLieDown was faster

Same

iPhone 6

1

iPhone XS

Steps:

User is sitting down on a couch holding the device portrait

• User lays down to the left, keeping the device in portrait. Record if successful

• User rotates the device to the right. Record if successful

• User rotates the device back to portrait. Record if successful

• User sits up

• User lays down to the right. Record if successful

• User rotates the device to the left. Record if successful

• User rotates the device back to portrait. Record if successful

• User sits up. Termination.

Total Percentage of successful rotations –

Would you use the application despite the lag?

Yes

no

iPhone 6

iPhone XS

How often do you use your device upsidedown?

Weekly –

Never –

Something else -