Assessing the Impact of Apple's 3D Touch Technology on User Experience

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Introduction

Apple's 3D touch technology allows developers to build applications that are responsive to how much pressure the user applies on the screen. This technology integrates with the present-on-screen software providing the ability to add very contextual functions to an application without forcing the user to hit the right pixels. This project is a usability study aiming to evaluate various interactions normally associated with 3D touch.

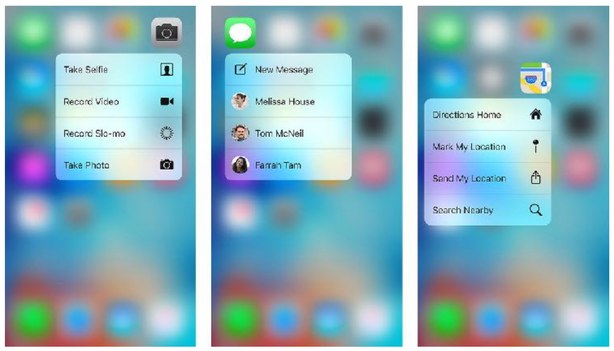

Figure 1. 3D touch allows users to access the most frequent features within an app by applying pressure on its icon.

Does 3D allow for less disruptive notifications?

iOS 10's 3D touch enabled notification center allows users to consume the information of a notification without leaving their current task. For this experiment, the user will be engaged in a not-so-trivial task when a notification will overlay itself over the current task. The user then must deal with this notification by applying pressure over the notification.

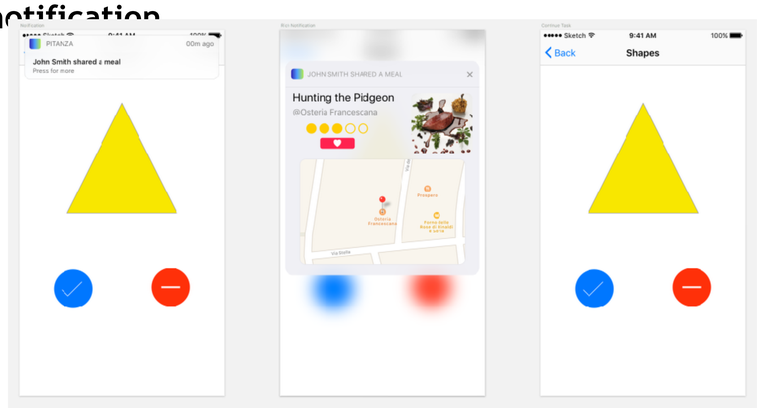

Figure 2. "Shape Game" and 3D Touch enabled "rich" notification.

Does 3D touch allows for setting parameters more accurately?

A 3D-Touch enabled rating application has been implemented to test how this technology works as a discrete input mechanism. This task aims to measure whether 3D touch is provides users with a more accurate experience when setting a rating in a range from 0 to 100. An traditional slider interface was implemented in order to compare user performance. This experiment is based on the idea that extensive visual feedback is necessary for user to perform a selection task in a 3D environment. [1]

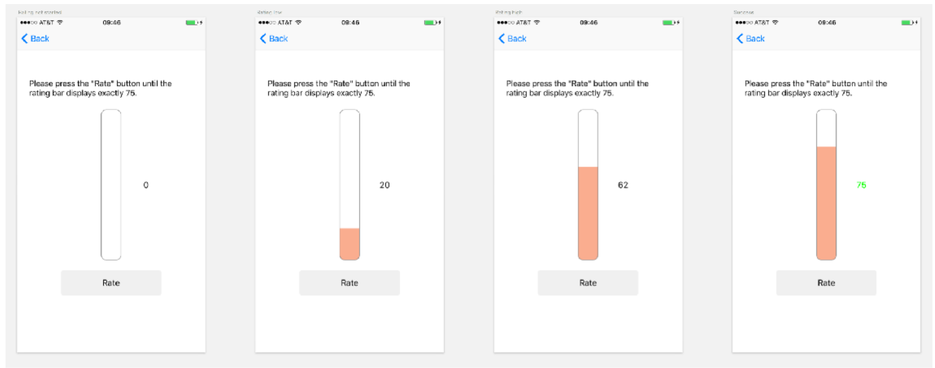

Figure 3. A 3D Touch based rating and its multi-touch alternative.

Does 3D touch allow for more effective error recovery?

3D touch interactions tend to be marked by the usage of a pop-up that gradually grows as a user applies more and more pressure on the screen. This provides a "preview" environment in which the user can abort the 3D action without being forced to navigate back to the previous screen. This idea will be tested by implementing the interface shown in Figure 4, which contains three 3D touch enabled buttons. As the user starts to apply pressure, a pop-up of a given color begins to grow. The user is given the task of finding a given color, and we will measure the time whenever they choose the wrong button to see how fast it takes for them to recover and pick the right one.

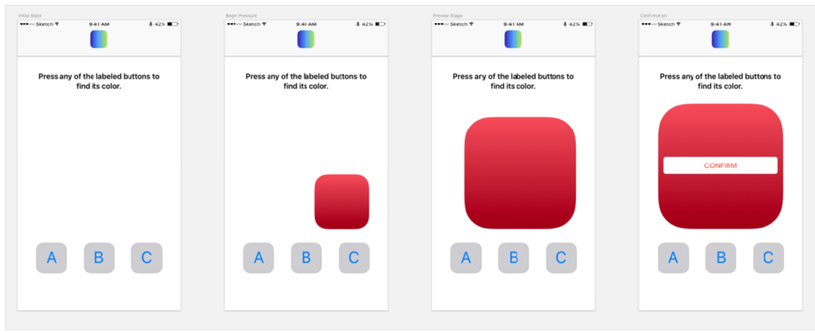

Figure 4. Whenever a user applies pressure on one of the buttons, a pop-up showing a color begins to grow on the screen.

Results and Current Status

The previous three tasks have been selected as having potential to provide reliable data in regards to whether 3D touch improves the user experience of iOS devices. However, only the accuracy experiment has been implemented and tested. The table below summarizes the results.

	Slider		3D-Touch	
	Target	*Range*	*Target*	*Range*
25	2.000 0:00:06.888	1.182 0:00:04.275	9.182 0:00:17.916	3.364 0:00:02.367
50	1.727 0:00:05.944	1.091 0:00:03.958	9.455 0:00:19.690	3.100 0:00:09.117
75	2.182 0:00:09.061	1.000 0:00:04.188	8.545 0:00:19.470	5.545 0:00:04.837
Total	1.970 0:00:07.298	1.091 0:00:04.140	9.061 0:00:19.025	4.003 0:00:05.440

Table 1. Average time taken (ms) and number of attempts per target (range or exact) value for both the slider and 3D-Touch treatments.

Acknowledgments

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References

[1] Gonzalo Ramos, Matthew Boulos, and Ravin Balakrishnan. *Pressure widgets*. In Proceedings of the SIGCHI conference on Human factors in computing systems, pages 487-494. ACM, 2004.