MEMS Scanner Application for Interactive Display

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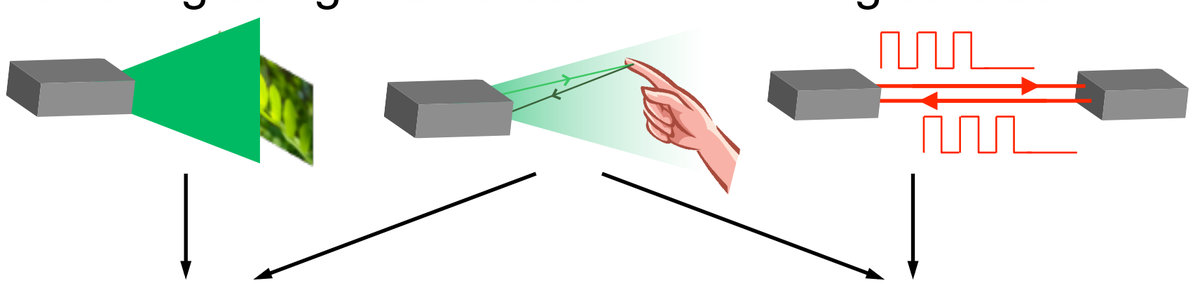
Using MEMS Optical Scanner, we constructed an interactive display, finding the object on the image while displaying an image for gesture-interaction. We also constructed the find & tracking system stable bidirectional free space optical communication (FSO). The laser is scanned circularly for finding the Passive Optical Terminal (PON) and tracks its movement by PID control of the scanner using the position of the reflected laser beam.

Introduction & Concept

MEMS (MicroElectro Mechanical Systems) Scanner consists of a mirror of a few milimeters and suspension actuators to tilt the mirror. Utilizing its fast speed, the scanner has been researched to display and position sensing. In this work, we enabled both the display and sensing to make an interactive display. Moreover, free space optical communication (FSO) supported by finding and tracking using MEMS scanner is being studied.



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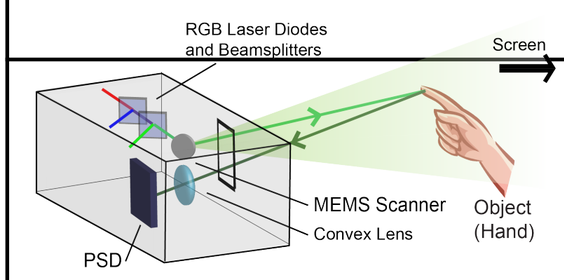
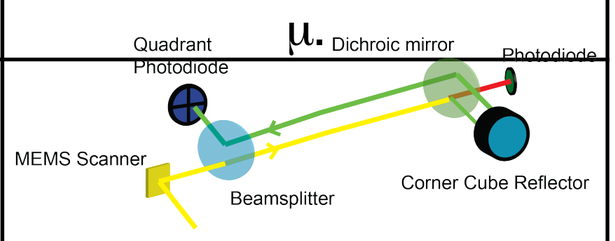
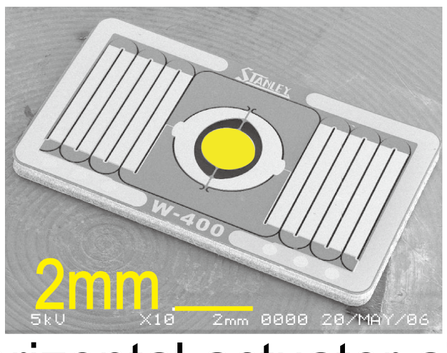
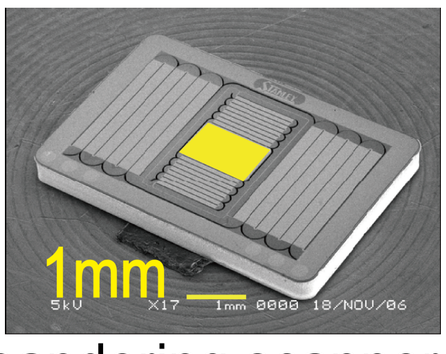
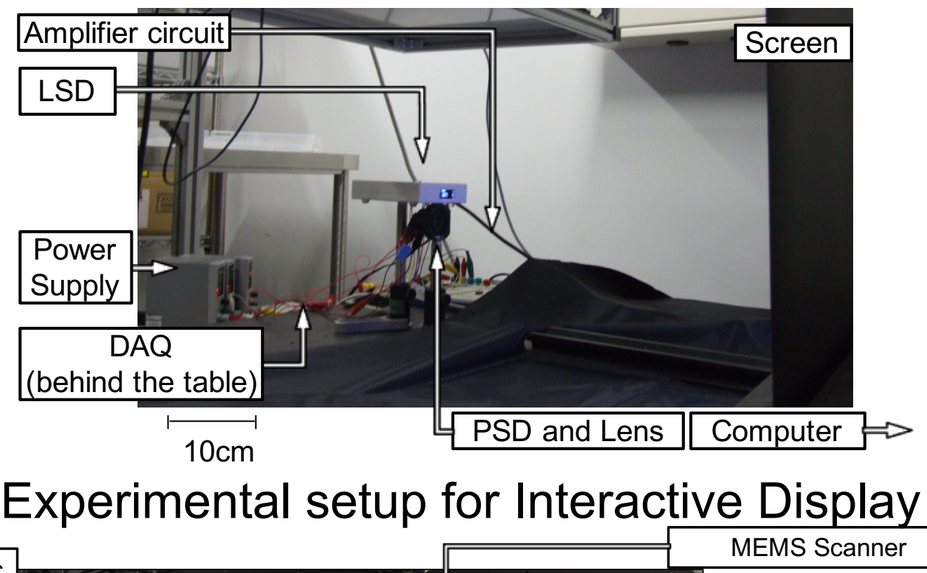
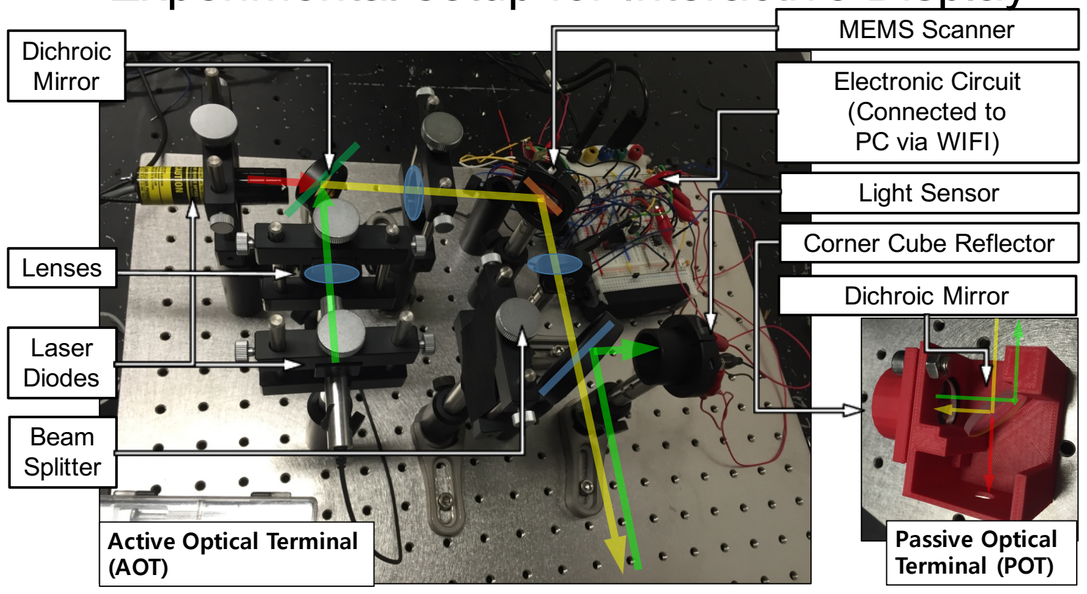
	
Red, green and blue lasers are combined and deflected by the scanner. Scattered light is sensed by the PSD(Position Sensitive Detector)	Red and green lasers deflected by the scanner finds and tracks the POT by sensing the reflected light. This link is to be used for bi-directional communication.
Scanner for horizontal resonance and vertical static movement.	Scanner for Static movement.
	
Horizontal actuator aims at high speed rather than large angle.	Meandering scanner makes the angle bigger

Experimental setup

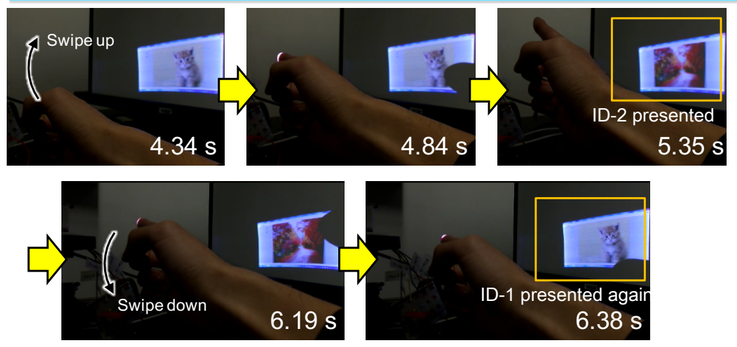


Experimental setup for Interactive Display

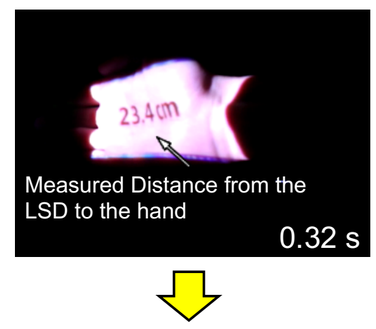


Experimental find and tracking system for FSO

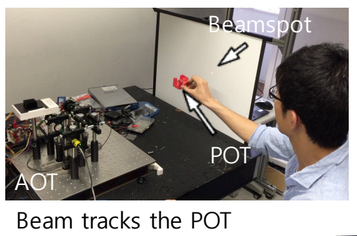
Demonstrations



Changing the page by the swipe gesture

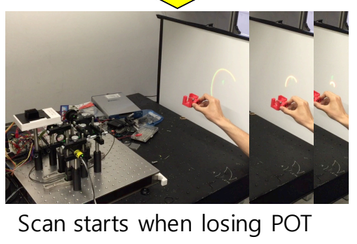


Measuring the distance to the hand and displaying it

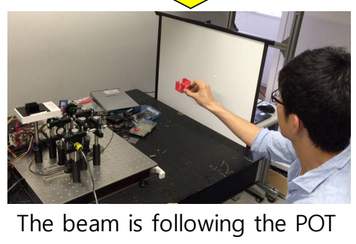


Beam tracks the POT

Scan Stops and the beam tracks after finding POT



Scan starts when losing POT



The beam is following the POT

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