

**TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
CENTRAL CAMPUS PULCHOWK**



**A Mid-Term Report**

**On**

**LASER POINTER based HUMAN-COMPUTER INTERACTION using COMPUTER  
VISION(LP-HCI-CV)**

**Submitted By:**

Aman Kandoi (067BEX403)

Manika Gartaula (067BEX424)

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**DATE: March 26, 2014**

**TRIBHUVAN UNIVERSITY  
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**A Final Year Project Proposal**

**On**

**LASER POINTER based HUMAN-COMPUTER INTERACTION using COMPUTER  
VISION(LP-HCI-CV)**

**Submitted To:**

**Department of Electronics and Computer Engineering**

**Submitted By:**

Aman Kandoi (067BEX403)

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**Supervised By:**

Dr. Dibakar Raj Pant

**TRIBHUVAN UNIVERSITY**  
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**DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING**

The undersigned certify that they have read and accepted the final year project proposal entitled **“LASER POINTER based HUMAN-COMPUTER INTERACTION using COMPUTER VISION (LP-HCI-CV)”** submitted by **Aman Kandoi (067BEX403), Manika Gartaula (067BEX424), Sradhanjali Acharya (067BEX440) and Urja Acharya (067BEX447)** in partial fulfillment of the requirements for the Bachelor’s degree in Electronics & Communication Engineering.

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Supervisor, **Dr. Dibakar Raj Pant**

**LASER POINTER based HUMAN-COMPUTER INTERACTION using COMPUTER VISION (LP-HCI-CV)**

**DATE OF APPROVAL: 23/02/2014**

## ABSTRACT

A system for direct interaction with a video projection screen using a laser pointer is presented in this project proposal. The laser point on the screen is captured by a video camera, and its location recognized by image processing techniques. The behavior of the point is translated into signals sent to the mouse input of the computer causing the same reactions as if they came from the mouse. More complex interaction paradigms are composed from the elementary operations "switch on/off" and pointing of the laser pen.

Video projection is in widespread use for multimedia presentations in classrooms and in conferences. A particular application is the interactive demonstration of software with a computer whose screen content is sent to a video beamer. An uncomfortable aspect here is that the usual keyboard/mouse computer limits the possibilities of the speakers by tying them to the location of the computer with its devices of interaction. To avoid this restriction, we have developed a system using a common laser pointer tracked by a video camera as an input device. Video cameras already present in multimedia lecture rooms can be used for this purpose, which reduces the required overhead compared to special tracking devices, like electro-magnetic ones. Compared to video-based gesture recognition or tracking of a pointing stick, video-tracking of a laser point is less sensitive to variations in the ambient light.

