

Research Topic	The influence of light environment for non-contact vital sensing	Graduate School of Information Science and Technology
Host University	Sirindhorn International Institute of Technology, Thammasat University / Pathum Thani/ Thailand	
Duration	From August 10 to November 19, 2019	
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Summary of the Research Activities

Introduction

My research topic is the non-contact measurement of pulse wave with video camera images. It's known that this measurement method is affected seriously by light condition. Therefore, I had done the following research activities in this program term with SIIT researchers.

Method

[Previous method(Before studying abroad)]

Set the cheek area to ROI and extract the green component in the area.(Fig1)

[Research topics 1] Change color component

Get 4 color components of Green, Hue, RGB(HSV) PCA(Principal components analysis) component. and compare it.

[Research topics 2] Compare the ROI(Region of Interest)

Divide the face into 12 parts and find a suitable area.

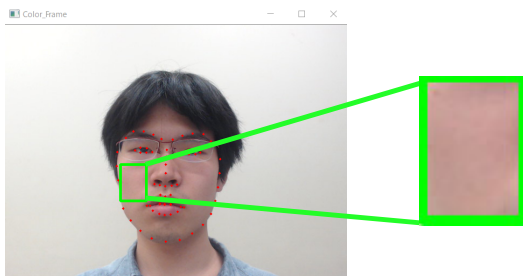


Fig1. Previous method

Result

I compared the heart rate with 1 minute sensor data. In addition, two types of lighting, fluorescent and LED, were used. The LED illuminates from the front.

[Research topics 1] Change color component

With Hue, the heart rate and peak position did not match. On the other hand, with Green or PCA, the heart rate and peak position were almost the same(Fig2).

[Research topics 2] Compare the ROI(Region of Interest)

Good results were obtained from the cheeks(red area in Fig3), nose(blue area in Fig3) and between eyebrows(orange area in Fig3). Especially during LED irradiation, the heart rate was perfectly matched from between the eyebrows.

Discussion

Regarding the fact that LED lighting was partially effective, it is assumed that be concerned with brightness. It is necessary to clarify the relationship between color component, ROI, and brightness.

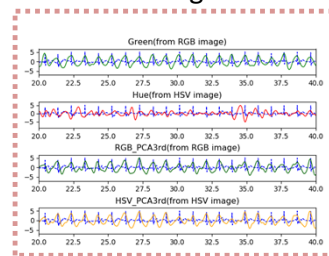


Fig2. Color space comparison

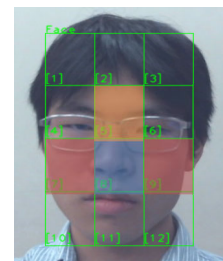


Fig3. ROI(Region of Interest)

About college

SIIT has two campuses (Rangsit and Bangkadi). Rangsit campus is in the part of Thammasat Univ Rangsit Campus. Rangsit Campus is so large and beautiful. There are so many faculty buildings and dormitories of Thammasat Univ. And there are research centers, hospital and sports stadiums (which was used in the Asian games). Recently new big building was built. Campus has a lot of nature. So, you can see many wild animals like squirrels and lizards. There are many canteens and 7-elevens in the campus. In addition, twice a week, the market is open and you can eat at the stalls.



← Big lizard!



Lunch in canteen(Pad thai)→

指導教員講評

修士の研究課題を発展させる研究を実施した。共同での成果報告に向け研究を継続している。現地での生活や学生との関係も充実したもので有意義な研修であった。

指導教員氏名: 鎌倉快之