Internet of Things Course

Assignment 3

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Introduction

In this report I suggest a few solutions for problems I personally have encountered or a friend of mine had. I think lighting devices can be also equipped with

I proposed 3 solutions here. First suing light projection to remind people to conform to norms of the environment for example reminding noisy people in library. Second proposal is for abandoned object notification through light projection and third option is emulation of daylight generation to prevent mood disorders in days with short day time.

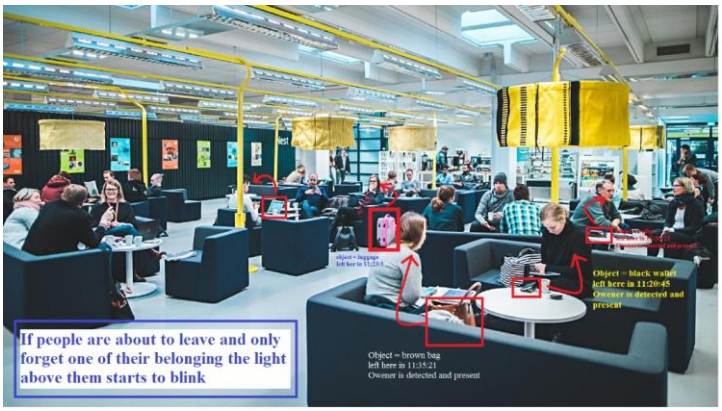
I am interested in contributing in developing any of this ideas if others are too.

Solution 1. Visual Object Localization:

1. **Locate book location in library after search**
2. **Abandoned object notification and localization**
3. **Track objects and locate later**

Abstract- In room or warehouses usually we need to locate something but unless we are perfectly organized, we cannot find it very quickly specially if it we rarely refer to that object. Here based on object tracking and using lightening we proposed to develop a solution that memorizes where any particular object is left (the shelf, location,..) and once we need that simply sheds some light on the approximate location of the object so we can find it much more easier and faster. Other than that, in this solution we proposed to use this system detect Abandoned object in classroom, library or tellus. Simply once people gather all their belonging and wanted leave but forget one of their stuff, we notify them projecting some light on the object we wanted the person pay attention to it. Further more this using light to localize objects can be used in library too, at least for me it takes quite a long time to find the location of the books I am looking for.

Description- A problem with crowded places with lots of people coming in and going out is that loss of properties like books, bags, mobile phones, ect. People usually walk around and leave their belonging for short time but if they gather all of their stuff and then leave it means they going to leave for other place and do not intent to come back soonish. One camera using computer vision and AI can detect this behavior and also detect owner of each object (since they gonna leave it there) and using lights on top of their head notify them if they are about to forget one of their belonging.



Solution 1.Noise Reminder in library,…

Abstract- Here we proposed to add Array Microphones for Environmental Noise Monitoring and Noise localization and give a reminder the noise makers through slight variation of projected light in intensity or color**.**

Description- Although Tellus is an open discussion area but sometimes the noises made by some groups of students might interfere work of the other groups or individuals. The group who are making loud noises usually do not intentionally disturb others, but they are in middle of some hot discussion or an engaging activity that they become less aware of the noise and discomfort they are making.

One idea to tackle this problem and reminding the noisy group to care for others without shaming them or hurting their dignity, is have sound sensors arranged close to each light sensor and all sensor are connected to one edge so the location of the noise source can be approximate.

Also, techniques such as Independent Component Analysis might be employed to tell the noise sources apart, though we have also and array of microphones which through phase array sensor techniques can tell the source location. If the total noise level was above some predefine threshold, the system can order to change light color or project some light with slightly different color that might blink for a few seconds and make the noisy students aware that they activity is above standard level of tolerance for that environment. The following figure depicts part of the idea, were a group of students are reminded to be more quite by a red light projected on them.

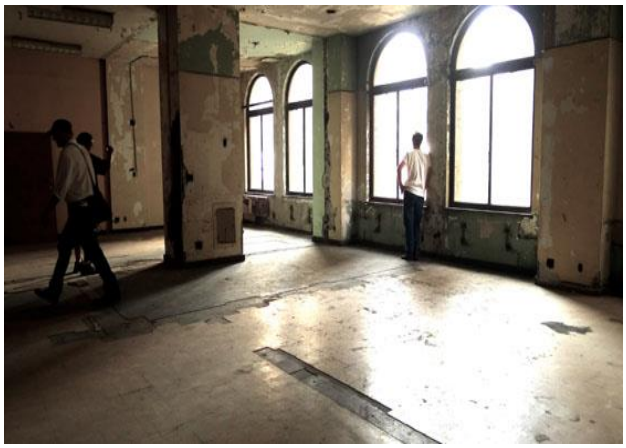
Solution 3. Daylight Emulation using LED fabric and hidden light

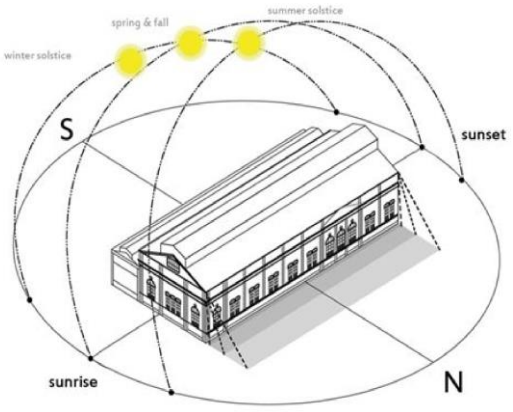
Abstract- The sunshine has a pattern effect on lighting of indoors which varies between hours of day based on earth to sun relative position. If we are aware of the day time and model the location of sun and have the 3D architecture of building we can synthetically emulate sun reflection inside the room and hence deceive human brain sensors.

Description-

Despite high level of standard of living one major problem in Nordic cities is lack of enough daylight in the end of autumn and beginning of winter which strongly correlates to mood disorder and depression during that period.

I suggest using hidden light sources and maybe LED fabric to exactly generate the same light as if there is a sun and the sunlight is currently penetrates into the building.




summer solstice
spring & fall
winter solstice
S
sunset
sunrise
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