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Performance Improvement of Content Centric Energy Management in Mobile Displays

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ABSTRACT: now-a-days mobile phones are mostly used in this world. Mobile phones are using different technologies. But, the battery life is one of the technical challenges for the developers. In this paper, focus has been given to the power consumption in mobile displays by adjusting the refresh rate and update catch content reduced methods. The commercial mobile devices normally use a fixed rate of 60 Hz to refresh the display, but many mobile applications do not require a frame rate of 60 fps. Most of the applications tend to update redundant frames even though there are no changes in content. Based on these observations, In this paper, only the content which is not having similar families has been updated. So that the power consumption has been reduced.

KEYWORDS*:* low power consumption,calculate refresh rate,frames detection.

I. INTRODUCTION

Mobile computing is an authority term used to describe knowledge that invests people to contact network services anywhere, anytime, and anyplace. Mobile and wireless is one of the characteristics in communication device. No cable checks the user, who can travel between altered wireless networks. Mobile computing is put on more applications such as vehicles, tragedies, business, credit card verification, spare of wired networks, and infotainment.

Mobile computing also using in entertainment, social uses, organization uses, hospital uses, museum uses. Mobile computing meets many technical challenges. The most technical challenge is battery life. Using, adaptive refresh rate technique is used to increase the battery life. The technique is used to reduce the refresh rate. So, the power consumption is reduced. The MATLAB simulation tool, is using for reduce the power consumption simulation. The video is converting into frames. The frames difference is calculated by spatial correlation.

The battery volume of recent mobile devices is frequently under stress as applications require better performance. In this paper, propose a power controlling scheme that powerfully reduces unnecessary power consumption by rejecting redundant frames without cooperating user practice. We define a metric called the content rate, which means the occurrence of important frame modernizes that does not result in severance in the content. The proposed system first senses the content rate for each application powerfully and correctly in real time. The system then rejects the dismissed frames by monitoring the refresh rate. By eradicating avoidable frames, the proposed system shrinks the power consumption of mobile devices without disturbing graphic quality.

The radical mechanism is definitely essential to provide energy-efficient display actions for mobile devices. This issue by seeing both the quality of display and the energy ingestion of display subsystems. The key incentives for our work were as follows:

- Marketable mobile devices generally use a fixed rate of 60 Hz to refresh the display
- Many mobile presentations do not involve a frame rate of 60 fps
- Most of the presentations tend to update redundant frames even though there are no deviations in content

The main encouragements of this paper are as follows:

- In many presentations consume redundant power to display jobless frames. Our practice showed that jobless frames account for, on average, roughly 44% of the total frames exposed.

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- We design a power controlling scheme that reduces the power consumption of mobile devices by rejecting jobless frames automatically without side effects. The results with 30 profitable applications showed that the proposed system can save the power consumption.

In this system using some terminologies:

Frame rate:

The rate at which an imaging device produces uninterrupted images.

Content rate:

The number of expressive frame variations per second.

Refresh rate:

The rate at which the display hardware refreshes the images called frames.

II. RELATED WORK

In this section we briefly consider some of the related work that is most relevant to our approach. Dongwon kim, Nohyun Jung, yohan chon, and Hojung Cha[1] have proposed a method for a refresh rate controlling system to reduce power feasting efficiently without causing corrosion in the graphic quality of mobile devices. In this paper also defined the metric content rate, which is the number of significant frames with jobless frames excluded. This paper also measures the correct content rate with a low cost at runtime using double buffering and grid-based evaluation methods. The limitation of this approach is that it can be reduce minimum amount of power. Yongbing Huang, Mingyu chen, Lixin Zhang, Shihai xiao, Junfeng Zhao,Zhulin wei [2] have proposed an intelligent frame refresh mechanism, that aims at successful energy competence of display subsystems by dropping unworkable frame restores and data contacts to frame buffers. The intelligent frame refresh mechanism bridges the semantic gap between frame refresh logics and frame buffers, by utilizing the rich information of frame buffers to assist frame refreshes. By utilizing the frame buffer transferring operations and pixel status for frame buffers. Here also propose flipping-aware refresh scheme and row level refresh scheme. Flipping aware refresh scheme travels the frame flipping processes to actively generate useful frame refreshes for frame image informs, which reduces the useless refreshes incurred by conventional refresh schemes using fixed high refresh rates. Using the row status evidence of frame buffers, row-level refresh scheme provisions to refresh only changed rows in the display board with insignificant hardware upstairs. Limitation of these approaches that can't be solve the flicker problem. Haofu Han, Jiadi Yu, Hongzi Zhu [3] have proposed a Energy Efficient Engine(E3), which routinely track the scrolling speed and adaptively regulates the frame rate agreeing to individual user fondness. The goal of E3 is to assurance the user involvement and minimizes the energy consumption caused by scrolling at the same time. In this paper, by analyzing the real traces found that scrolling operation consumes a great amount of energy on smartphones. Limitations of these approaches that can be only reducing the display power is considered.

III. PROPOSED SYSTEM

Energy efficiency is a critical issue for battery driven mobile devices. While active studies have been conducted to reduce the power consumption of display related components of mobile devices, previous work has rarely approached the issues without having to detersorate graphical quality. Maintaining factory default battery endurance rate over time in supporting huge amount of running applications on energy restricted mobile devices has created a new challenge for mobile applications developer. While delivering customer's unlimited expectations, developers are barely aware of efficient use of energy from the application itself. Thus, developers need a set of valid energy consumption indicators in assisting them to develop energy saving applications. In this paper, we present a few software product metrics that can be used as an indicator to measure energy consumption of Android based mobile applications in the early of design stage. The proposed system then sets an optimal refresh rate based on the content rate. Extensive experiments demonstrate that our system effectively reduces the total power in commercial smartphones, yet the display quality is satisfactorily maintained.

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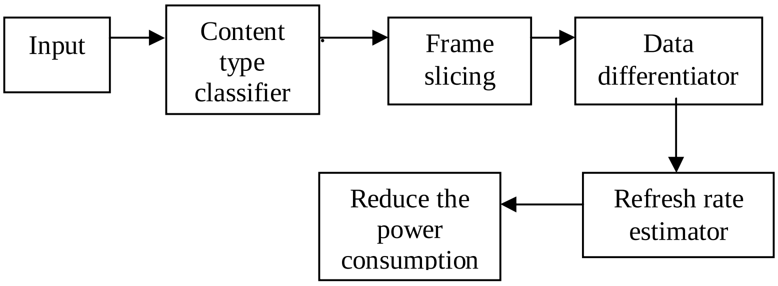

Fig1: System architecture

Input:

Video file is the input of mobile display.

Content type classifier:

Content type classifier is used to find the input that is which type of input is given from user.

Frame slicing:

The input file of video is converted into frames.

Data differentiator:

Differentiate the data between frames using correlation coefficient.

Refresh rate estimator:

Calculate the frame difference based on the correlation coefficient and then adjust the refresh rate.

IV. MODULES DESCRIPTION

Frame conversion:

An input video is get from user. Then the video is converted into frames. The input file of video is converted into number of frames. That frames are using in next module.

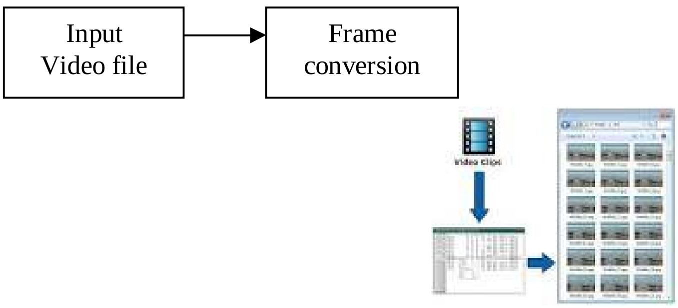

Fig2: Frame conversion

Frame detector:

The frame detector is detecting the sequential interval of time frames. Each frames are contain more number of pixels. These pixels are used to compare the video frames. The video is a sequence of images that is all are frames. The refresh rate is calculated based on the frame differences. The frame difference is identified and then calculate the refresh rate.

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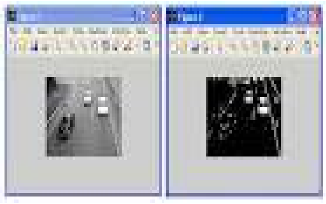

Fig3: Frame detector

Correlation detection: After frames are detected then the correlation is detected between the frames. The correlation detection is detecting the correlation coefficient between frames. The correlation detection is using spatial correlation method. Spatial correlation is a measure that looks at the relationship between "close" spatial units.

Frame extractor:

Extract the contents of the frame that have higher coefficient. Every video or animation is made up from a succession of still images.

Fig4: Frame extractor

V. IMPLEMENTION

The implementation of this paper work is first get the input from the user. The users give an input to the mobile then the following steps are followed.

a. Frame conversion
b. Frame detector
c. Correlation detection
d. Frame extractor

a. Frame conversion

Frame conversion is converting the video file into frames. The user input video file is given to display then the input is converted to frames by using frame conversion procedure

```
Usepackage{algorithm2e}
………
begin{algorithm}[H]
setAlgoLined]
kwResult{Write here the result}
initialization;
while{while condition}{
instructions;
eIF{condition}{
instructions1;
instructions2;
}{
Instructions3;
}
}
caption{How to write algorithms}
```

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end{algorithm}

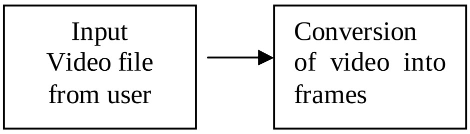

Fig: Frame conversion

b. Frame detector

Frame detector is detecting the frames in frame conversion module. The frame detector is detecting the sequential interval of time frames. Each frames are contain more number of pixels. These pixels are used to compare the video frames. The video is a sequence of images that is all are frames. The refresh rate is calculated based on the frame differences. The frame difference is identified and then calculates the refresh rate.

```
For y in 1 to height
For x in 1 to width
{
If(img(x,y)>threshold)and(Atleast 1 adjacent pixel<threshold)
Match_found=0
For n in 1 to (No of objects found)
If(x,y)falls within a small dstance of object n
Match_found=1
break;
endif
endfor
if match_found==1
increase the boundaries of  objects n to include(x,y)
else
Add a new op[object with centre as(x,y)
Endif
Endif
}
Endfor
Endfor
```

c. Correlation detection

After frames are detected then the correlation is detected between the frames. The correlation detection is detecting the correlation coefficient between frames. The correlation detection is using spatial correlation method. Spatial correlation is a measure that looks at the relationship between “close” spatial units.

```
If(largesignal && corrr_rg>0.5
        && corr_br<o.3 && corr_bg <0.3)
Sig6=1;
Modulation
Else if(!largesignal && corr_rg>0.2
        && corr_br<0.4 && corr_bg <0.4)
Sig6=1;
modulation
else if(largesignal==-1)
```

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sig6=1;
modulation
if(largesignal!=-1 && corr_rg>0.9
    && corr_rg >5*corr_br && corr_rg>5*corr_bg)
Sig6=-1;
Correlation

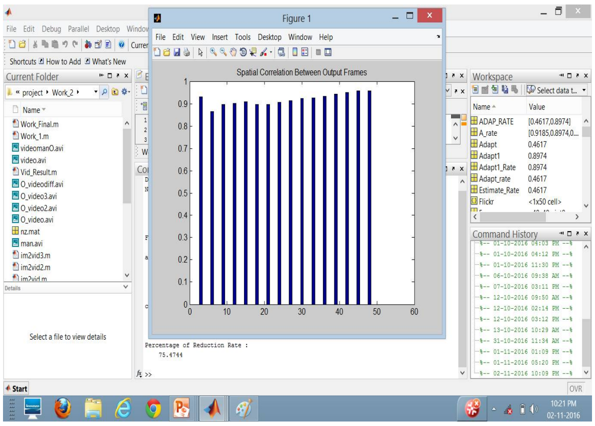

Fig5: spatial correlation difference

After fining the spatial correlation difference between frames then go to find the frame rate between actual, processed and estimate process.

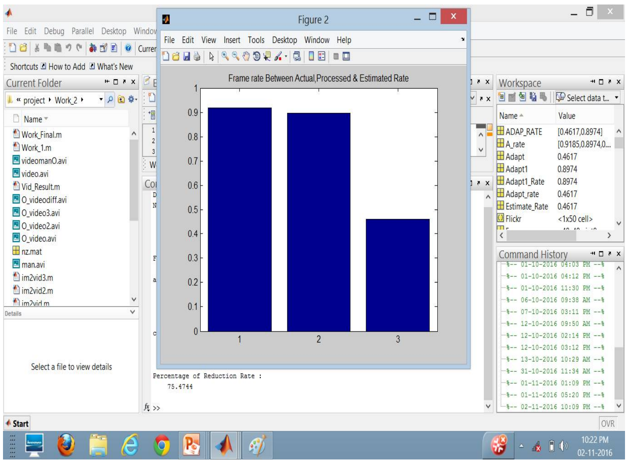

Fig6: Find the frame rate for actual,
processed and estimate process

After doing the previous work that result is used to calculate the input and output video file duration.

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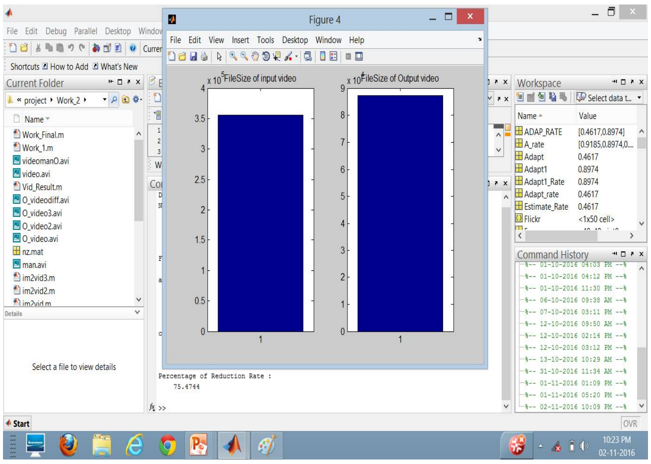

Fig7: Find the duration of input and output files

After finding the duration of input and output files going to find the refresh rate

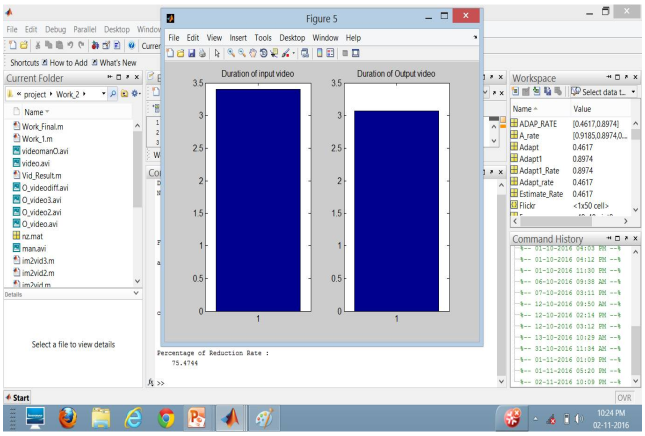

Fig8: Duration of input and output file based on the refresh rate

Using this result make an output video. That video consume low power compare than original video.

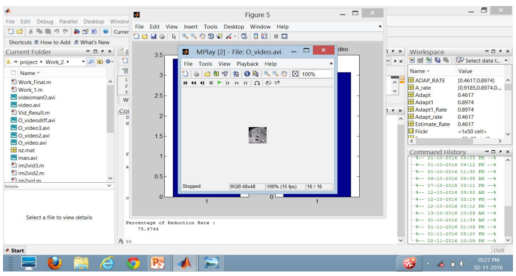

Fig 9: output video

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Based on the these result using analysis the original, processed and estimated process.

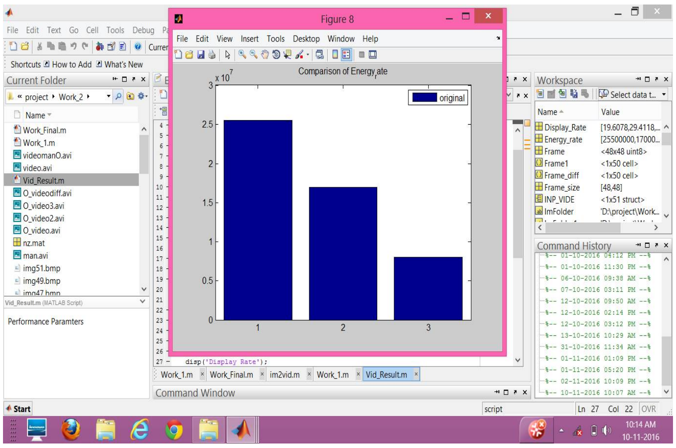

Fig10: Comparison

VI. CONCLUSION

This paper proposed a refresh rate and update catch content reduce management system to reduce power ingestion effectively without causing decline in the graphic quality of mobile devices. In this paper, only the content which is not having similar families has been updated. So that the power consumption has been reduced.

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