

Grassroots Startup Project Sharing

Deep Learning Computer Vision 3D Sensor Algorithm Acceleration On FPGA Tutorial

3 – SGM cost function spacial smooth constrain

By GimHo.Ng/ 伍金和 (荷)

2023.3.29

G.E.M 鄧紫棋歌中的祕密 / the secret in GEM's music

【2507抬上帝入天坑】 / 【2507 carrying God back to heaven shit hole】 : <https://github.com/brianwchh/2507>

Tutorial files: <https://github.com/brianwchh/grassrootsstartup-ComputerVSION-zynq>

二零二三年三月二十三日 作

只人多江兩一
因間情山鬟夜
始多卻花白春
懂嬌只草霜風
女情為本幾花
人如紅無時滿
花畫顏情來枝

卻江白春煙又
爲山鬟雨寒是
紅不滄細依一
顏因滄細舊年
作百愁飄鎖櫻
多花滿萬孤花
情嬌枝家城季

女人花

https://github.com/brianwchh/worldofheart_v2/blob/main/md_and_html/附庸風雅/女人花.md

SOS Art Performance from chained talent girls

才女們無助的求救藝術行爲（含已自殺女星）노리개：그녀의 눈물

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

Top Chinese pop star



G.E.M 鄧紫棋
wearing iron chain

Ariel Tsai 蔡佩軒
wearing iron chain



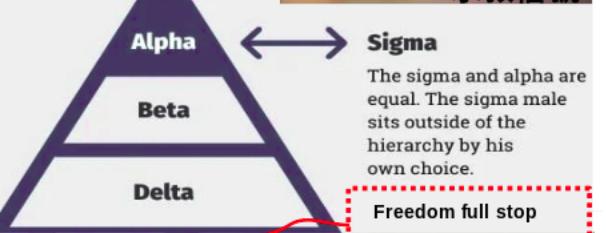
1. Sexual abuse SM

2. Cutting hair & weird behaviors on live streaming

3. Symbol of deep state

For more details please visit here: <https://github.com/brianwchh/SOSfromGEM>

South Korea pop star 설리 Choi Jinli's SOS signal to the public before hanging herself at home in 2019



Freedom is a joke of leather pants behind bars
玩物 노리개 의 눈물: 自由是鐵欄後皮褲的笑話



SOS art performance
from chained talent girls



The secret behind singer G.E.M's music

解說鄧紫棋的祕密

「2507」 carrying God back to the heaven shit hole

「2507」抬上帝入天坑

小說解讀

連點成面之情報信息解析

Connecting dots to get the picture of the pyramid intelligence

Reveal the deep lies, traps & pitfalls

揭露深層的謊言、詭祕與圈套

無形鐵鍊女們的
求救禪語信息



Evil
Project sigma !

SOS

Wake up all

小說地址: <https://github.com/brianwchh/2507>

← 解說影片: <https://youtube.com/playlist?list=PL4mHdDqV3T2uDeFnSC1bWhz3cN3wPZMzr>

Message from
US-China
balloon incident

Virus Unrestricted War !

深層政府十字軍東征中國之 sos

中美氣象氣球事件
“非當年 UFO 事件”

Roswell Balloon
Bubble

Lies 泡沫
病毐 超限戰
The Cross Bubble
十字架 = 10 = 黑1

The tutorial plan

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

- Let's read the papers together
- Design algorithm on computer using C++
- System diagram design
- Write Verilogc code for each module & simulation
- ~~FPGA on board debugging (zyng 7020)~~
- ~~Embedded linux os bringing up~~
- Writing linux device driver
- Design application APPs on arm and linux computer for demos

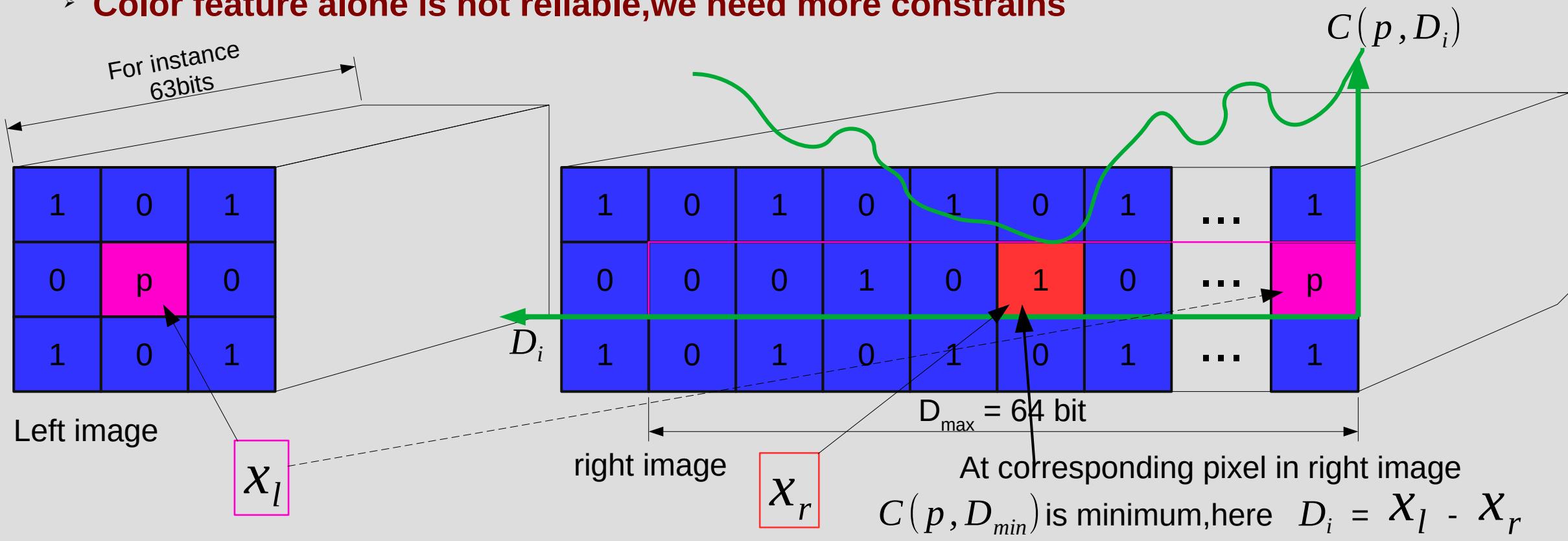
Recap: Matching cost function, Cons

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

$$E = \sum_p C(p, D_i) \quad C(p, D_i) = \text{number of ones } (\underline{C_{img_l}(p) \text{ XOR } C_{img_r}(p - D_i)})$$

Similarity distance of 2 vectors

- Using Matching cost function's color constrain term based on the census transform feature map alone is possible to find the corresponding pixel in the right image, then get the disparity value.
- The drawback is too many mismatching could happen, due to repeated color pattern
- Color feature alone is not reliable, we need more constraints**



adding spacial constrain term

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

$$E = \sum_p (C(p, D_p) + \underbrace{\sum_{q \in N_p} P_1 T[|D_p - D_q| = 1] + \sum_{q \in N_p} P_2 T[|D_p - D_q| > 1]}_{\text{spacial constrain term}})$$

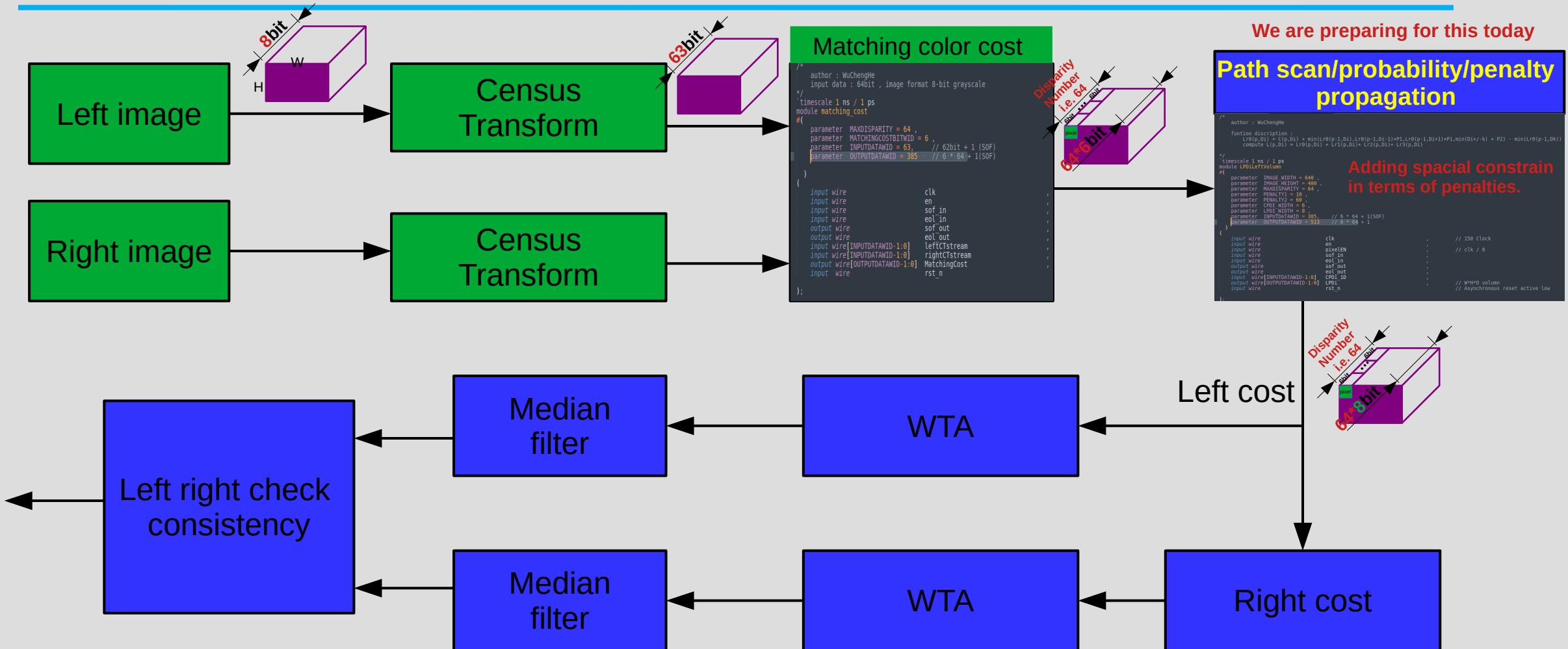
Agenda of this episode

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

- Explain the cost function's spacial smooth constrain

System block diagram so far

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Who triggered this bomb

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset



「노리개 : 그녀의 눈물」 a movie based on her tragedy , 漢語「玩物」 2013



張紫妍 장자연 「性朝貢」事件：童話故事下的殘酷人生
2009 年自殺身亡的南韓女星張紫妍

장자연 (Jang Ja-yeon) sexual bribery puppet actress in south Korea, committed suicide by hanging herself at home in 2009, only left behind her diary detailing every man she had to sleep with, sometimes multiple men at a time !
"They" really don't care about us!
"They" are still at large!
"they" have the power and resource to be not just on top of your woman, but also you, at will !
You don't believe?! I understand! That is because you know nothing about "them", the mysterious deep state! just like me used to be!
You still believe, like a book nerd, that law can protect you? Not in front them, who are good at setting up sweet pitfalls, and make you a chained puppet! And hard to get away nor prove your situation!
You don't know their secret weapons, just like we don't know UFO and where human come from? Do you know? Or you don't care?! Still think these are far away from you ?!

Korea is only a screen shot of the world !

Worldwidely, numbers of chained girls are in the same situation where they are **sexually abused**, but having difficulties to prove.

The dirty training data for ChatGPT

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

The “God” selected people owns technology from the weather balloon in Roswell in 1947 !

chatGPT 邪惡的數據採集與人類的未來

Neuralink's monkey playing mind-controlled video game, eating banana and sucking banana juice as a reward.

沒有一家公司可以重現微軟的chatGPT，除非你是“神”選之“民”才能有氣象氣球的技術。技術有多驚豔，數據來源就有多醜惡！因為你不瞭解腦控！問問下面這隻猴子？



馬斯克的猴子正在推動一場腦機革命，代價只是“香蕉奶昔”_創世記_新浪科技_新浪網

我們被當着是活體實驗卻很難證明



鄧紫棋歌曲「超能力」，特工鄧紫棋的讀腦超能力，與外星人

像不像CIA的測謊原理，心電圖只是個障眼法？

Agent GEM's music : Superpower , the alien's mind-control technology ! Seems like coincidence and joking. Just like her freedom behind bars in leather pants.

你們應該知道的難得一見的妃子笑，不是荔枝，而是歌手蔡佩軒沒有眼淚的陶醉。美人一笑，連chatGPT都會寫歌譜曲了。

Who controls GEMs

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset



G.E.M.鄧紫棋【句號 Full Stop】Official Music Video

2.67M subscribers

47,606,570 views Premiered Nov 22, 2019 #鄧紫棋 #GEM #句號

Stream/Download the song here: <https://gem.link.to/FullStop>

我青春的全部回憶
那要的很多的全都是你
可惜我們終於來到一個句號

Man with cross in black gentlemen hat and suit



G.E.M.鄧紫棋【句號 Full Stop】Official Music Video

2.67M subscribers

47M views 3 years ago #鄧紫棋 #GEM #句號

Stream/Download the song here: <https://gem.link.to/FullStop>

我青春的全部回憶
那要的很多的全都是你
可惜我們終於來到一個句號

Puppet magic box



G.E.M.鄧紫棋【句號 Full Stop】Official Music Video

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我青春的全部回憶
那要的很多的全都是你
可惜我們終於來到一個句號

Controlling the puppet



Deep state



What is Project sigma?

In her song [full stop/ 句號], she implies herself as a puppet controlled by the cross! The box of needle looks like a magic box !

So the MV tells a different story rather than that she promoted publicly which is the dispute between her and her former company,i.e. hummingbird music.

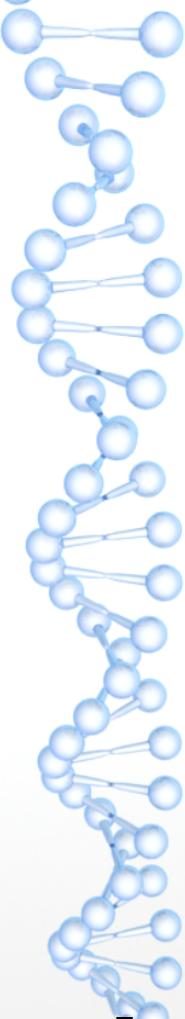
This unsaid story matches other stories embedded in her other songs, such as [bubble],i.e. bible= bubble=lies! And [fearless/ 毒蘋果] which is about the sweet lies and attemptation in the “bible” book!

She is a christian at very young, she went to christian school since very young! So the age matches the little girl in the MV, who came across this magically mysterious gentleman in black suit & hat at very young age .

The real world is highly possibly different from what we have seen and been taught! There is a reason that we don't know where we are from and who we really are! Because “they” don't want us to know! We are trapped in this world's physics / phenomenons, which only UFO have the authority to overwrite.

More ugly secrets in GEM's music

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset



Joe Biden
他們即牠們，即深層政府，即傀儡拜登所說的 *they, they gave me reporter list ...*

鄧紫棋，凳子妻（伍大 / 金 ❤ 與鄧金蓮 / Queen of heart）前世今生的蘋果

For more please read novel 【2507 拝上帝入天坑】：<https://github.com/brianwchh/2507>
【2507 carrying God back to heaven shit hole】

More about the dark deep state

接下來幾頁是暗線之極惡暗黑深層政府

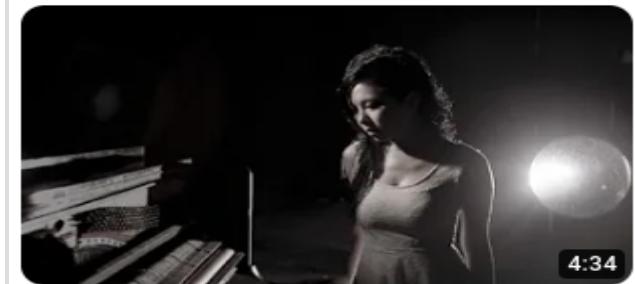
bubble = bible = +
=poisonous apple
=lies

+

喂，凳子，誰想嫁給你啊
誰要認識你啊
是牠們逼我的



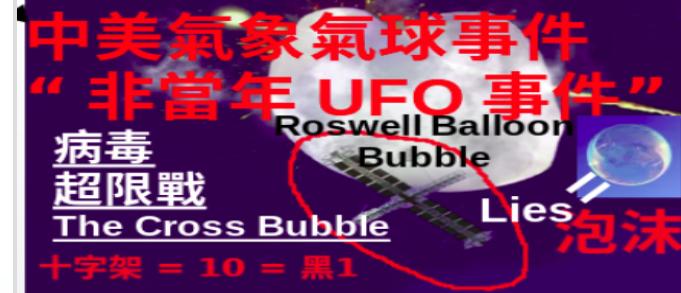
15



G.E.M. "泡沫" "BUBBLE" [HD] 官方MV 鄧紫棋
17M views • 10 years ago

Virus Unrestricted War !

深層政府十字軍東征中國之 sos



G.E.M. 【毒蘋果 FEARLESS】 Official Audio [HD] 鄧紫棋
2.4M views • 4 years ago

Poisonous apple

Message taken from China-US weather balloon incident : Black cross army heading its way east to China ! It is not to remind you the fake weather balloon in roswell 1947

Why I am doing this tutorial

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

- Sharing every details of my startup project , i.e. 3D sensor, including source code , simulation and debugging skills of FPGA.
- During break time, tell you the ugly secrets in G.E.M's music. Please believe me, this is far more important than the valuable project I am sharing here. When you read this far you might already know that accelerating algorithms on FPGA is very important ,and difficult as well ! **But this information in GEM's music is far more important and far more difficult to speak out !** Some Korean pop stars have already "committed suicide" trying to prove the real truth!
- My life is in a mess when I was selected by them to be involved with the dirty and disgusting secret project, of course, without my permission and without letting me know, together with a lot of chained talent women and men. **We are being treated as experimental monkeys !** And the result will come and apply to you and your next generation eventually! You have no choice to be audience! Did you embrace chatGPT and boston dynamics robots yet ?! Did you ask yourself who is chatGPT's teachers ? Where did the private and dirty training data come from ? Can you write songs ? Probably no! But chatGPT can, amazing, isn't it !?



马斯克的猴子正在推动一场脑机革命，代价只是“香蕉奶昔”_创事记_新浪科技_新浪网

Neuralink's monkey playing mind-controlled video game, eating banana and sucking banana juice as a reward.



Agent GEM's music : Superpower , the alien's mind-control technology ! Seems like coincidence and joking. Just like her freedom behind bars in leather pants.



I am boston dynamics robots+chatGPT
I heard your smile are beautiful
Come and show Daddy a smile



Adding depth smooth constrain

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

Spacial
Color constrain Smooth constrain

$$E = \sum_p (C(p, D_p) + \sum_{q \in N_p} P |z_p - z_q|)$$

$$z = \frac{f*T}{D}$$

1. for case $z_p > z_q, \Delta_D = D_q - D_p > 0 \quad D_p = D_q - \Delta_D$

$$z_p - z_q = \frac{f*T}{D_p} - \frac{f*T}{D_q} = f*T \left(\frac{D_q - D_p}{D_p D_q} \right) = \frac{f*T}{D_q \left(\frac{D_q}{\Delta_D} - 1 \right)}$$

2. for case $z_p < z_q, \Delta_D = D_p - D_q > 0 \quad D_p = D_q + \Delta_D$

$$z_q - z_p = \frac{f*T}{D_q} - \frac{f*T}{D_p} = f*T \left(\frac{D_p - D_q}{D_p D_q} \right) = \frac{f*T}{D_q \left(\frac{D_q}{\Delta_D} + 1 \right)}$$

N_p Is the small area about pixel p

q Is the pixels in N_p

P Is the penalty coefficient

102	90	130	?
$q_{x(0,0)}$	$q_{x(0,1)}$	$q_{x(0,2)}$	$x_{(0,3)}$
80	100	40	?
$q_{x(1,0)}$	$p_{x(1,1)}$	$q_{x(1,2)}$	$x_{(1,3)}$
230	20	170	?
$q_{x(2,0)}$	$q_{x(2,1)}$	$q_{x(2,2)}$	$x_{(2,3)}$
?	?	?	?
$x_{(3,0)}$	$x_{(3,1)}$	$x_{(3,2)}$	$x_{(3,3)}$

Since z is a function of D , is inversely proportional to D

D is quantized, so $|z_p - z_q|$ is quantized as well

$|z_p - z_q|$ increases when $|D_p - D_q|$ increases ie. $|D_p - D_q| = 0, 1, 2, 3, \dots$

The cost function with spacial smooth constrain

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

$$E = \sum_p (C(p, D_p) + \sum_{q \in N_p} P_1 T[|D_p - D_q| = 1] + \sum_{q \in N_p} P_2 T[|D_p - D_q| > 1])$$

for each pixel p in image

N_p Is the small area around pixel p

q Is the pixels in N_p , i.e. $q_{x_{(c,r)}}$ in the red box

P_1 Is the small penalty coefficient, when disparity difference is small, i.e. $|D_p - D_q| = 1$

P_2 Is the large penalty coefficient, when disparity difference is large, i.e. $|D_p - D_q| > 1$

No penalty is applied when $|D_p - D_q| = 0$

102	90	130	?
$q_{x_{(0,0)}}$	80	100	40
230	$q_{x_{(1,0)}}$	20	170
?	$x_{(3,0)}$	$x_{(3,1)}$	$x_{(3,2)}$

Spacial smooth constrain.

Physical interpretation of the formula :

If D_p is optimal disparity value for pixel p, then D_q , which is the optimal disparity value for neighbor pixel q, **should be equal to D_p for most pixel p. i.e. they should most likely be on the same z-plane, $|D_p - D_q|$ should be as small as possible**, if not, we give them penalty. so if $|D_p - D_q| = 1$, small penalty P_1 is applied, otherwise bigger penalty P_2 is applied.

How do we minimize the cost function

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

$$\frac{\partial E}{\partial \text{someParameters}}$$

$$= \frac{\partial \sum_p (C(p, D_p) + \sum_{q \in N_p} P_1 T[|D_p - D_q| = 1] + \sum_{q \in N_p} P_2 T[|D_p - D_q| > 1])}{\partial \text{someParameters}} = 0$$

- › NO !!! :(

Next: Dynamic programming

$$E = \min \sum_p (C(p, D_p) + \sum_{q \in N_p} P_1 T[|D_p - D_q| = 1] + \sum_{q \in N_p} P_2 T[|D_p - D_q| > 1])$$



When individual is minimum, global sum is minimized

$$\sum_p \min (C(p, D_p) + \sum_{q \in N_p} P_1 T[|D_p - D_q| = 1] + \sum_{q \in N_p} P_2 T[|D_p - D_q| > 1])$$

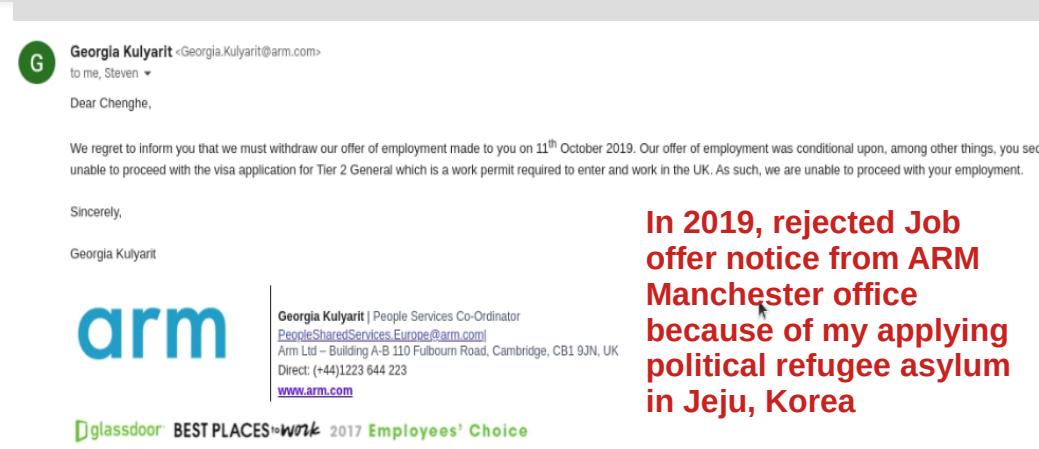
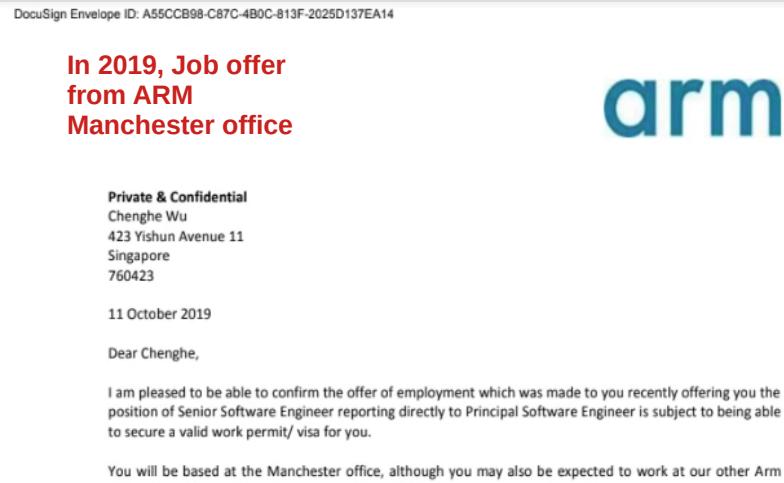
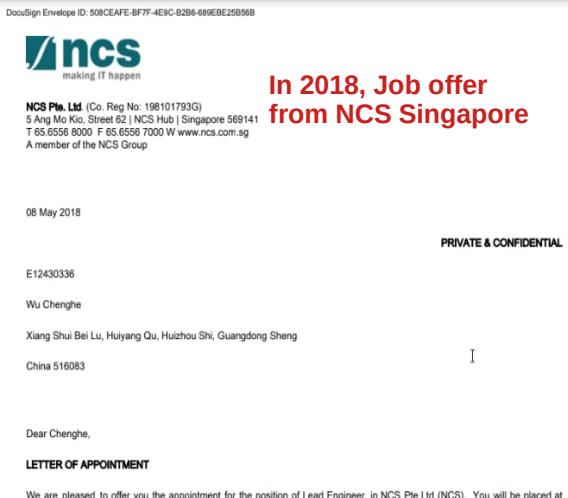
- Different from first-order gradient decent method that widely used in deep learning training stage.
- Different from second-order gauss newton method and its variants that widely used in computer vision algorithms in order to find the optimal solution.
- Apart from accelerating it on FPGA, Dynamic programming method that we used here to find **approximate “optimal”** solution is quite interesting itself. We used a lot of **assumption** and **approximation** in order to find a “optimal solution” to E which seems like a “chicken & egg” unsolvable problem.

Brief intro. about me

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset

- Over 11+ years of R&D work experience, capable of designing and deploying computer vision and deep learning algorithms on embedded device like FPGA and ARM.
- Full stack web development with Django, React/Vue/Nextjs, MySQL, Nodejs, Golang, etc....
- skilled at FPGA / ZYNQ SOC design (Verilog HDL)
- good at GPU (CUDA + openGL)
- Good at programming languages: C/C++, python, javascript, Golang, verilog HDL
- Familiar with Deep learning libraries like Tensorflow, Darknet...
- rich work experience in : SLAM / Visual SLAM, ROS, VR, AR, 3D sensing (Stereo vision), object detection, motor control

More on LinkedIn : <https://www.linkedin.com/in/brianwchh/>



G.E.M. 【幫你實現新年願望】 鄧紫棋
52K views • 5 years ago

In 2018, GEM help you to fulfill the new year dreams

Thank you

#hohy #metoo #MeTooMovement https://github.com/brianwchh/ChatGPT_mindControl_dataset



SOS art performance
from chained talent girls

玩物 노리개의 눈물: 自由是鐵欄後皮褲的笑話
freedom behind bars in leather pants

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揭露深層的謊言、詭祕與圈套

無形鐵鍊女們的
求救禪語信息



小說地址: <https://github.com/brianwchh/2507>

← 解說影片: <https://youtube.com/playlist?list=PL4mHdDqV3T2uDeFnSC1bWhz3cN3wPZMzr>

Freedom is a joke of leather pants behind bars



病毒超限戰之政
治清洗! SOS



Message from
US-China
balloon incident

Virus Unrestricted War!
深層政府十字軍東征中國之sos

中美氣象氣球事件
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病
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Lies 泡沫
十字架 = 10 = 黑1