



香港大學民意研究計劃

Public Opinion Programme, The University of Hong Kong



Electronic Voting and Civil Referendums in Hong Kong

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Public Opinion Programme, The University of Hong Kong

November 2014

Contents



- Design of an electronic voting system
 - Voting interfaces
 - Protections in place
- Impact of 6.22 Civil Referendum



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Electronic Voting System

- Voting platform for mass engagement
- To construct a civil society by promoting civil participation
- To demonstrate an electronic voting system

PopVote 普及投票

English | 中文

主頁 投票活動 捐助支持 民間全民投票研究 查詢

6.20-29 民間全民投票 Civil Referendum

焦點活動



PopVote
全民投票
Civil Referendum

最新消息

- 「6.22民間全民投票」結果 (30/6/2014)
- 「6.22民間全民投票」初步結果 (29/6/2014)
- 傳媒採訪邀請 (27/6/2014)
- 「6.22民間全民投票」公布6.29正規及附屬票站名單及初步結果發布安排 (26/6/2014)
- 「6.22民間全民投票」接近五萬市民到站投票 (22/6/2014)
- 「6.22民間全民投票」電子平台運作暢順 (21/6/2014)
- 「6.22民間全民投票」電子平台負隅頑抗 (20/6/2014)
- 「6.22民間全民投票」計劃最新進展 (19/6/2014)
- 「6.22民間全民投票」應變措施正式啟動

IT Advisory Group



Established since Jan 2013. 11 IT Professionals from the IT industry.

- Mr. S.C. Leung, Convenor of IT Advisory Group (Director, Internet Society Hong Kong)
- Dr. K.P. Chow (Department of Computer Science, The University of Hong Kong)
- Dr. Joe CK Yau (Department of Computer Science, Hong Kong Baptist University)
- Dr. Ricci Ieong (Director, Cloud Security Alliance HK & Macau Chapter)
- Mr. Henry Ng (Head of Consulting Service of an international consultancy firm)
- Mr. Vincent Ip (Council Member of Information Security and Forensics Society)
- Mr. Eric Fan (Vice Chairperson, Professional Information Security Association)
- Mr. Chester Soong (Chairperson, Internet Society Hong Kong)
- Mr. Ben Cheng (Vice Chairperson, Convenor, Startup Working Group, Internet Society Hong Kong)
- Mr. Sang Young (Director, Education; Convenor, Security & Privacy Working Group, Internet Society Hong Kong)
- Mr. Ken Lam (Director; Convenor, Internet Application Development Working Group, Internet Society Hong Kong)

Voting Channels



Website

HKID number
SMS verification



Mobile App

HKID number
SMS verification



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普及投票 PopVote



和平佔中
OCCUPY CENTRAL WITH
LOVE AND PEACE

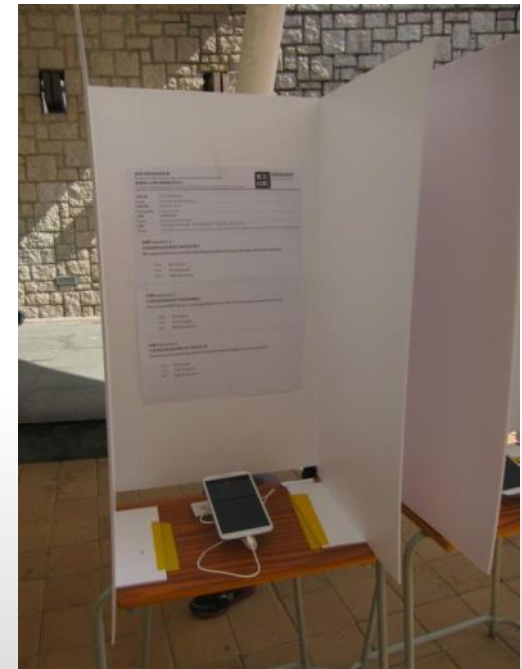
請選擇語言
Please select a language

中文

English

Polling Stations

HKID card verification
Tablets



Three Large-Scale Events



1st

3.23 Civil Referendum

March 23-24, 2012

Mock CE Election

Web	66K
App	71K
<u>Station</u>	<u>85K</u>
Total	222K

(valid votes)

2nd

New Year Civil Referendum

January 1, 2014

Express views on the principles of CE Election

Web	19K
App	40K
<u>Station</u>	<u>3K</u>
Total	62K

(valid votes)

3rd

6.22 Civil Referendum

June 20-29, 2014

Constitutional reform proposals

Web	235K
App	486K
<u>Station</u>	<u>70K</u>
Total	792K

(valid votes)



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System Design

Interface of POPVote system



0. Download POPVote mobile app



1. Read the terms

2. Input HKID & mobile number

3. Send an SMS to POPVote system

4. Cast your vote

SMC HK 20:55 82%



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普及投票 PopVote



請選擇語言
Please select a language

中文

English

Interface of POPVote system



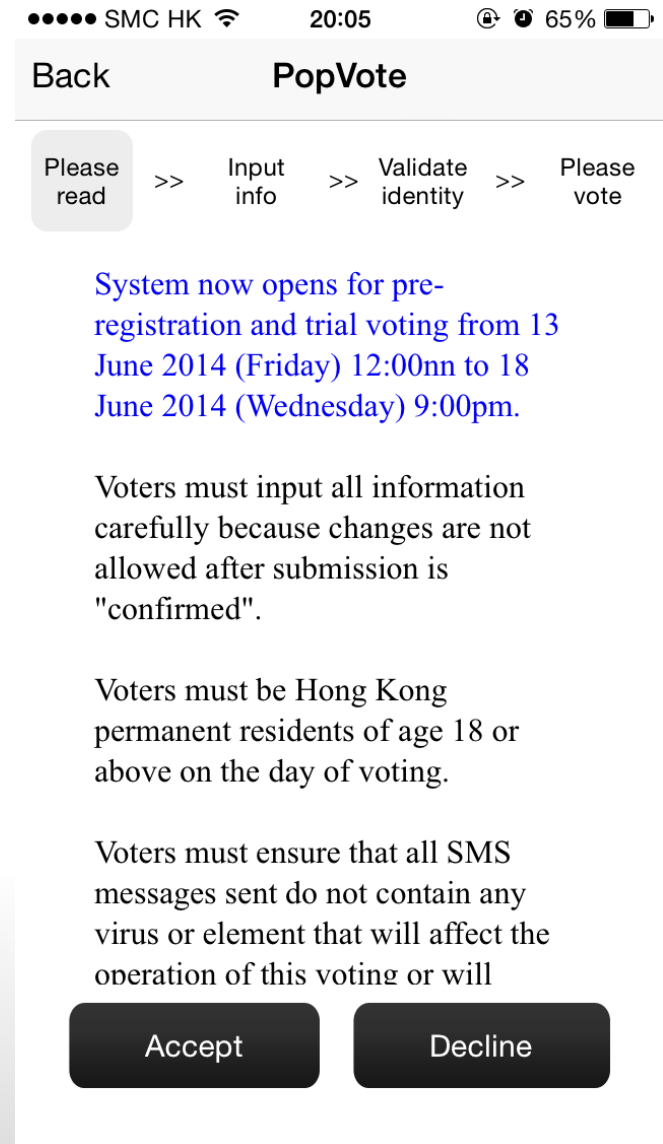
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Interface of POPVote system



0. Download POPVote mobile app

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The screenshot shows the POPVote mobile app interface. At the top, the status bar displays signal strength, SMC HK, Wi-Fi, time 20:05, location, and 65% battery. The app header includes a 'Back' button and the title 'PopVote'. Below the header is a progress indicator with four steps: 'Please read', 'Input info' (highlighted in grey), 'Validate identity', and 'Please vote'. The main form contains three sections: 1. 'HKID:' with three input fields (the first has one dot, the second has six dots, and the third has one dot in parentheses). 2. 'Cell phone:' with a single input field containing seven dots. 3. 'HK perm. resident aged 18 + ?' with two radio buttons, 'Yes' (selected) and 'No'. At the bottom is a large black 'Submit' button.

Interface of POPVote system



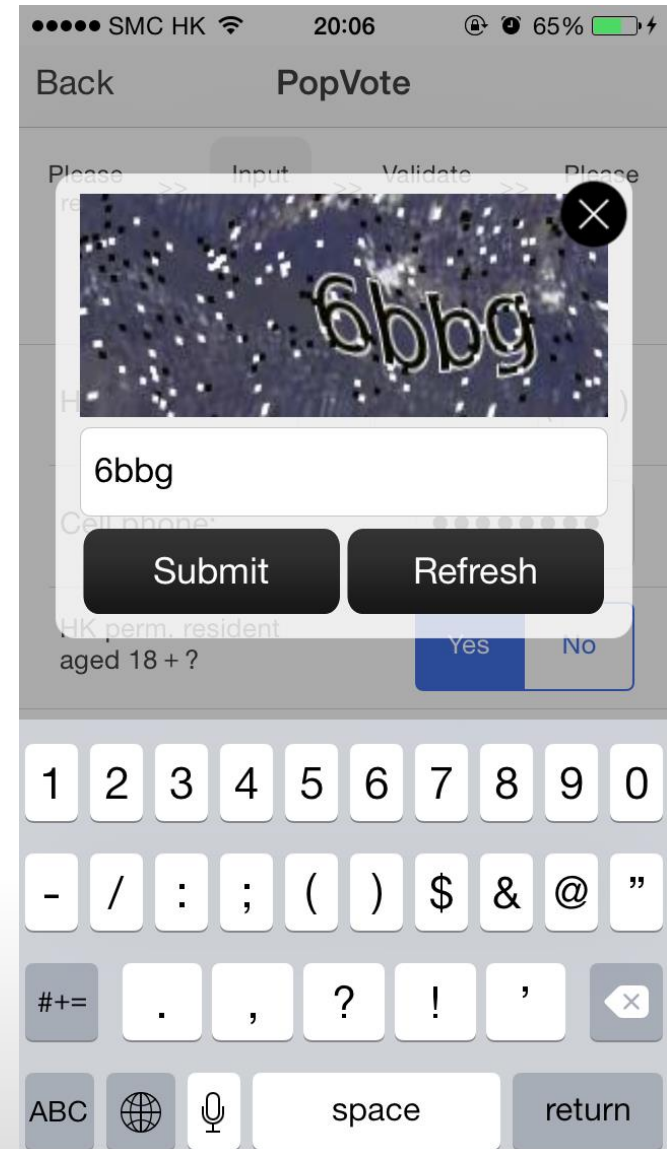
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Interface of POPVote system



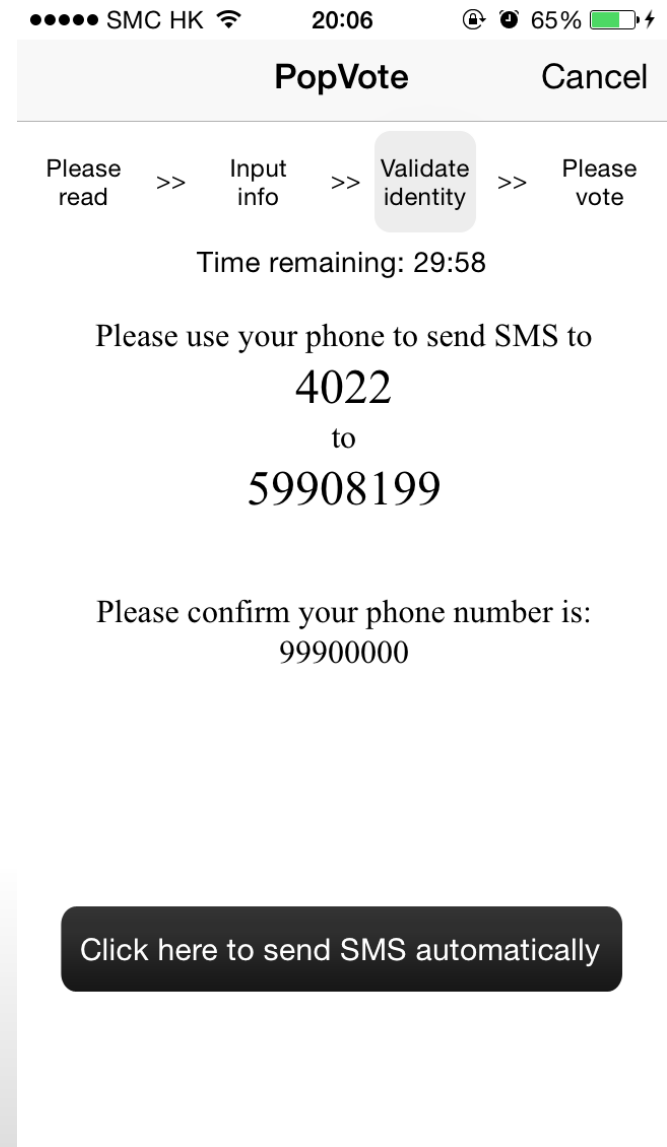
0. Download POPVote mobile app

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4. Cast your vote



Interface of POPVote system



0. Download POPVote mobile app

1. Read the terms

2. Input HKID & mobile number

3. Send an SMS to POPVote system

4. Cast your vote

●●●● SMC HK 20:07 66%

PopVote Cancel

Time remaining: 09:55

For the Budget of 2047, I hope to see the following colour used in the book cover:

- 1. Orange red like that of an egg yolk
- 2. Bright lemon yellow
- 3. Deep navy blue
- Abstention

If that Budget cannot satisfy the demands of the general public made known well in advance, LegCo should veto it. My stance is:

- LegCo should veto
- LegCo should not veto
- Abstention

Submit Ballot



Polling Station

Local Area Network



- Electronic voting - using tablet devices
- Voters can vote at any polling station
- Can be disconnected from Internet
- Data are hashed and encrypted



POPVOTE 普及投票

HKID ()

Language 中文 English

Voting Machine Status ✔ Voting Machine: idle
Last online time of voting machine 2014-04-30 12:52:12

#	Reg. Time	Action
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POPVOTE 普及投票

剩餘時間: 09:51

就2017特首選舉，本人支持「和平佔中」向政府提交以下方案：

- 1. 橙紅似蛋黃顏色
- 2. 鮮黃檸檬顏色
- 3. 深藍顏色
- 棄權

如果政府方案不符國際標準讓選民有真正選擇，立法會應予否決。本人表示：

Snapshots – 3.23 Civil Referendum



Snapshots – 3.23 Civil Referendum



Snapshots – New Year Civil Referendum



Snapshots – 6.22 Civil Referendum





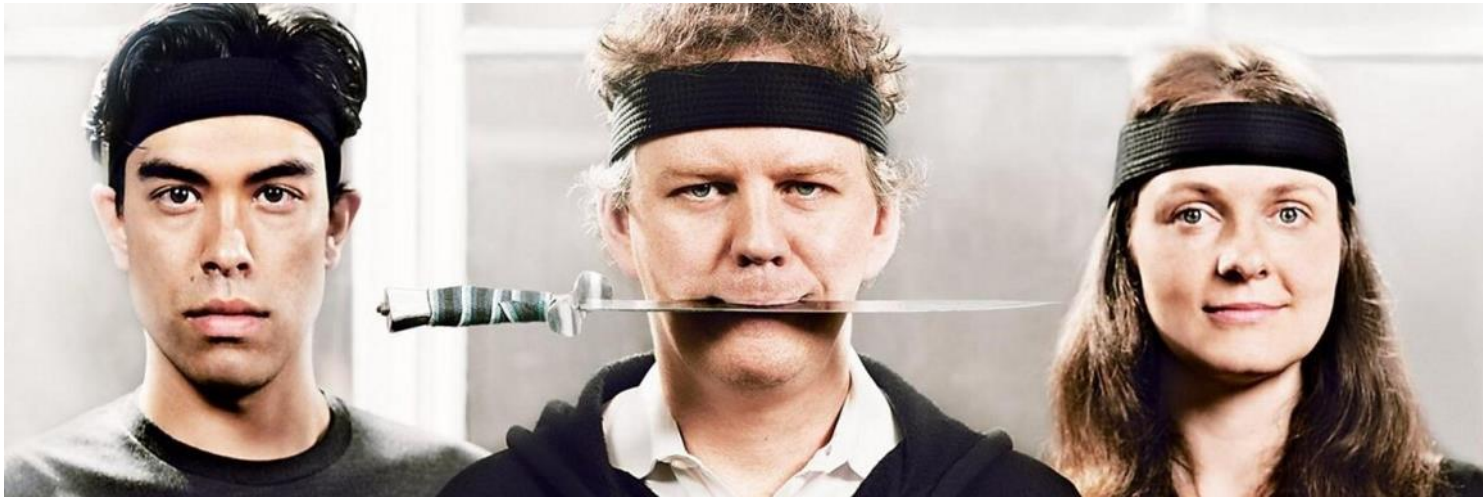
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Protection

Cyber attack – 6.22 Civil Referendum



Matthew Prince
@eastdakota



 Segui

Battling 300Gbps+ attack right now. Knew it was coming so well prepared. Helluva story someday.



CLOUDFLARE

Protection



Shielded by CloudFlare Firewall

Whole AWS infrastructure is isolated from the public, using AWS Security Groups



Captcha to protect API endpoints



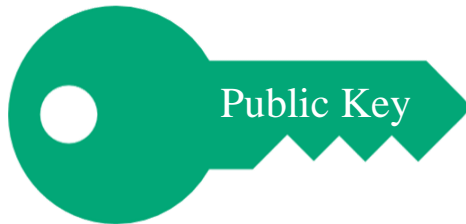
All transmitted data are SSL encrypted

Protection



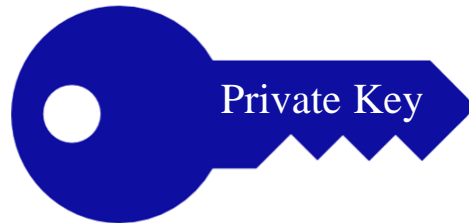
f12443ffa921ea97dca00811744
f8784f3e8b494736d1164b3898
c5892b0f6a27c9895b175e651d
8214c4825027f47e74ae422d80
e05c712bce18f0cda6d878c

All HKID and Phone numbers are hashed



All ballots are encrypted using PKI

Protection



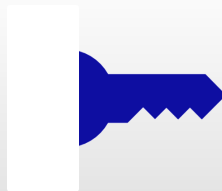
Private key is divided into 3 and held by 3 non-technical workers



Redundancy is added to avoid the corruption or loss of the key



Gathering the portion from at least 2 holders is required to merge a private key for decryption





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Impact of 6.22 Civil Referendum

Promotions

普及投票
POPVOTE



6.20-22
全民投票
POPVOTE.HK

June
20

手機程式
PopVote

網站投票

<http://popvote.hk>



蘋果日報

Polling stations





PopVote 普及投票

- 1 Please read terms
- 2 Input information
- 3 Validate identity
- 4 Please vote

Time remaining: **08:49**

Cancel Voting

For CE Election 2017, I support OCLP to submit this proposal to the Government:

- 1. Alliance for True Democracy Proposal
- 2. People Power Proposal
- 3. Students Proposal
- Abstention

If the government proposal cannot satisfy international standards allowing genuine choices by electors, LegCo should veto it. My stance is:

- Legco should veto
- Legco should not veto
- Abstention

Submit

- A historical 792,808 people participated, by either voting online or attending physical polling stations.

- Voting result:

- Motion 1

	No of votes	Vote share
Proposal 1	331,427	42.1%
Proposal 2	82,003	10.3%
Proposal 3	304,319	38.4%

- Motion 2: If the government's proposal fails to meet international standards, then Legislative Council:

	No of votes	Vote share
Should veto	696,092	87.8%
Should not veto	59,897	7.6%
Abstention	31,294	3.9%

- Source: <https://www.popvote.hk>



NEWS • HONG KONG • ELECTORAL REFORM

More than 500,000 vote in Occupy Central's electoral reform poll: organiser

Voting began in online poll on reform plans for 2017 chief executive election at noon on Friday; voting system subject of one of the largest cyberattacks in history, experts say

Jeffie Lam
jeffie.lam@scmp.com

PUBLISHED : Friday, 20 June, 2014, 11:58am
UPDATED : Sunday, 22 June, 2014, 2:26pm

Home Voting Projects Donate Now Research on Referendums Enquiry

6.22 民間全民投票 Civil Referendum



Highlight Events



- News
- Contingency Plan Invoked for "6.22 Civil Referendum" (18/6/2014)
 - Mock Voting System of "6.22 Civil Referendum" under Severe Attack (16/6/2014)
 - Mock Voting for "6.22 Civil Referendum" Running Smoothly (15/6/2014)
 - Voting Drill and Pre-registration for "6.22 Civil Referendum" Mobile Application "PopVote" (12/6/2014)
 - 6.22 Civil Referendum (12/6/2014)
 - Result of "Constitutional Reform Deliberation Day" Voting (Chinese only) (6/5/2014)
 - Preliminary result of "Constitutional Reform Deliberation Day" Voting (Chinese only) (6/5/2014)
 - IT Technicians WANTED (15/4/2014)
 - Results of "New Year Civil Referendum" (11/1/2014)

SHARE

488 Likes
488 Shares
155 Tweets
3 LinkedIn Shares

How to pass on your ambition as well as your wealth >>

FOLLOW SCMP

SCMP View on Instagram

Most Popular

VIEWED SHARED COMMENTED

1 Victim's relative sheds light on identities of corpses found in British banker's flat

Reactions from pro-China camp

- Mainland officials and newspapers called the civil referendum "illegal", claimed that Occupy Central was motivated by foreign "anti-China forces" and would damage Hong Kong's economy and its image.
- In August 2014, the pro-China camp launched a petition campaign and claimed to have collected over a million signatures from citizens to support their stance of anti-Occupy Central movement.



China's decision on 8.31



- China's (NPCSC) decision on 8.31 in response to constitutional reform consultation in 2014:
 - imposes the new standard of “*loves the country and Hong Kong*” for CE candidates
 - a nominating committee will be formed to nominate **2 to 3 candidates**, each of whom must receive **>50% support** of the nominating committee.
 - the basic framework of nominating committee would be unchanged, i.e. **to keep 1,200 committee members to represent** over 5 million voters.
- => Set strict restrictions on universal suffrage**

Reactions from HK public

- Students on strike since 9.22



Umbrella Movement



Summary



- Equivalent to a fifth of the registered electorate participated
- All 800K votes can be counted within 5 mins
- Remove duplicated votes automatically
- More accurate than manual counting
- Future trend for collecting public opinions



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普及
投票
POPVOTE

Thanks for listening.

Q & A