

Si vis pacem, para bellum!

or Using Machine Learning to save lives

A Zimmermann, SML '08, Traben-Trarbach

Outline

- Point A
- Point B
 - Subpoint b
- Point C
- Point D

Outline

- Point C
- Point B
 - Subpoint b
- Point A
- Point D

Outline

- Point C
- Point B
- Point A
- Point D

Outline

- Point C
- Point B
- Point D
- Point A

Outline

- Point C
- Point B₁
- Point B₂
- Point D
- Point A

Outline

Doing Things w/ML

- Catch credit fault
- Minimize loan risk
- Optimize advertisement schemes

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= Making Money

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- Develop drugs in silico
- Medical decision support
- Disease prediction

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Doing Things w/ML

- Catch credit fault
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= Making Money

- Develop drugs in silico
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= Saving Lives & Making Money

Replacing What?

- All been done before
 - By human experts
 - Using intuition and experience
- Formalizing underlying mechanisms

Other such fields

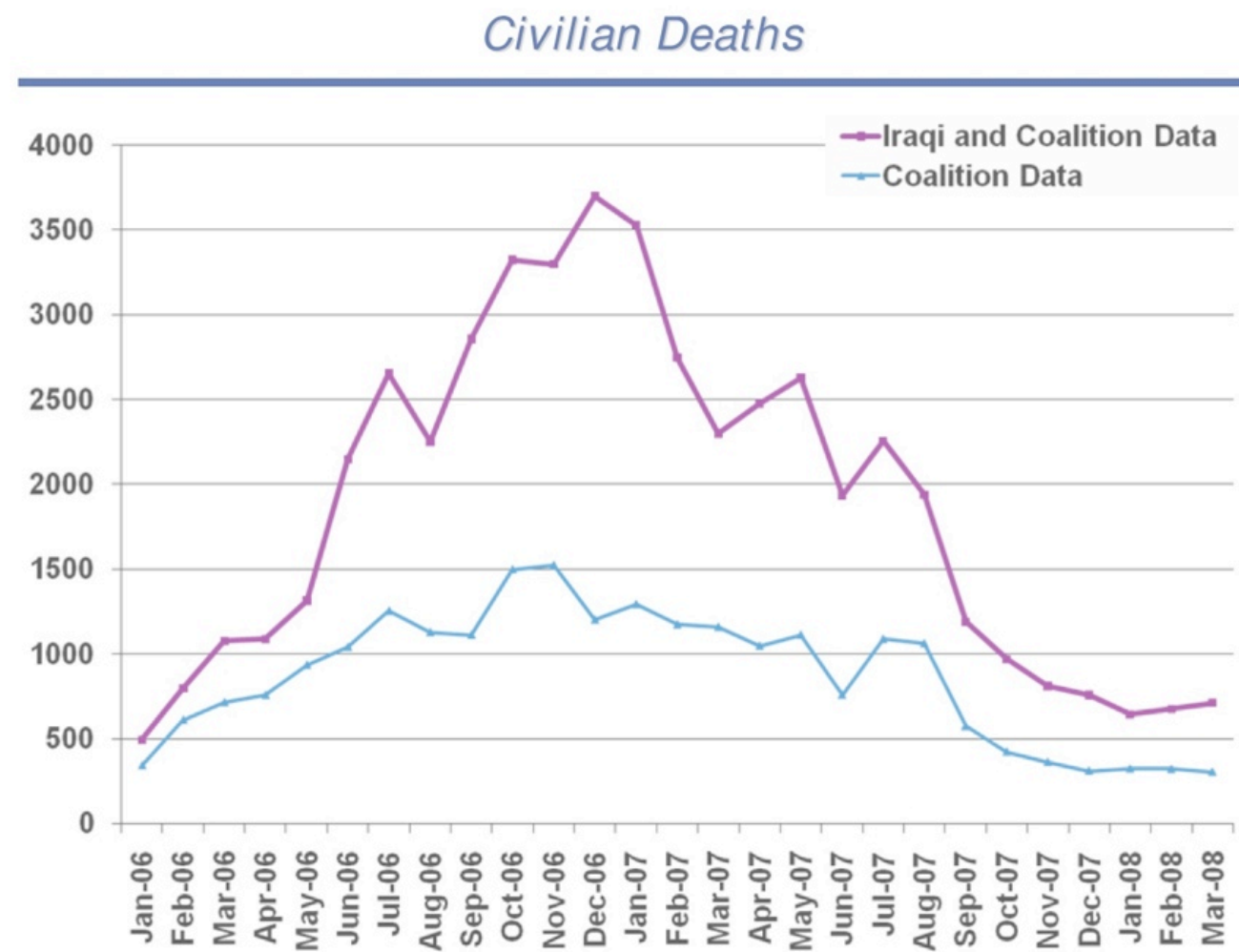
Other such fields

- Urban planning
- Government

Other such fields

- Urban planning
- Government
- WAR!

Motivation

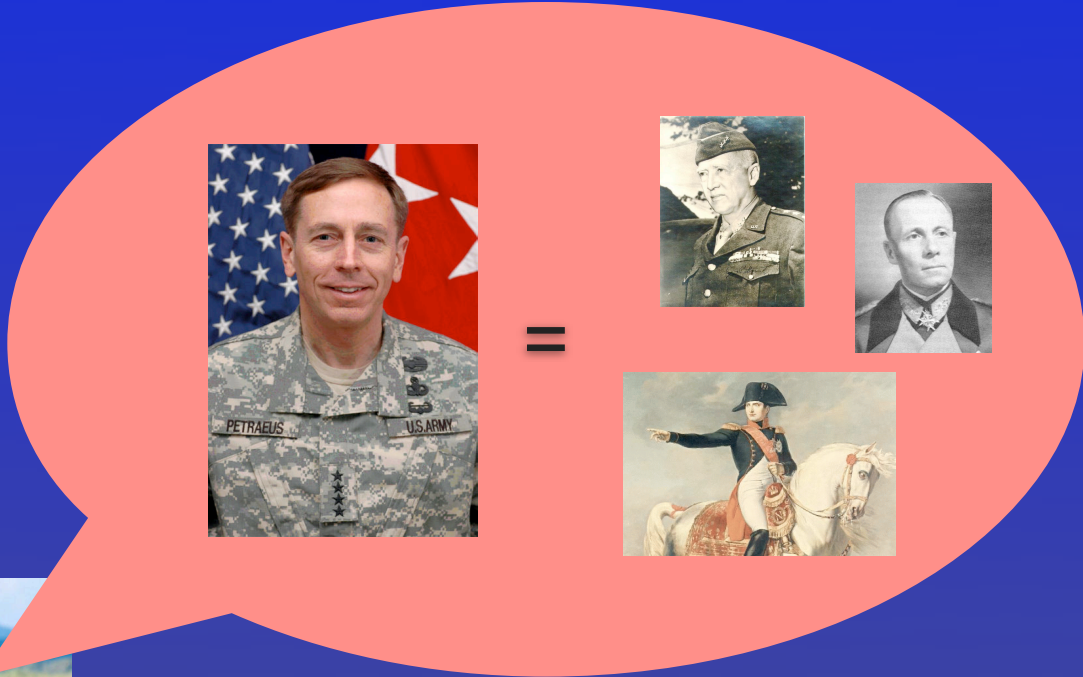








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“The Surge”

Strategy for Iraq: Increase # Troops

“The Surge”

Strategy for Iraq: Increase # Troops



* 132,000



“The Surge”

Strategy for Iraq: Increase # Troops



* 132,000



* 152,000

“The Surge”

Strategy for Iraq: Increase # Troops



* 132,000

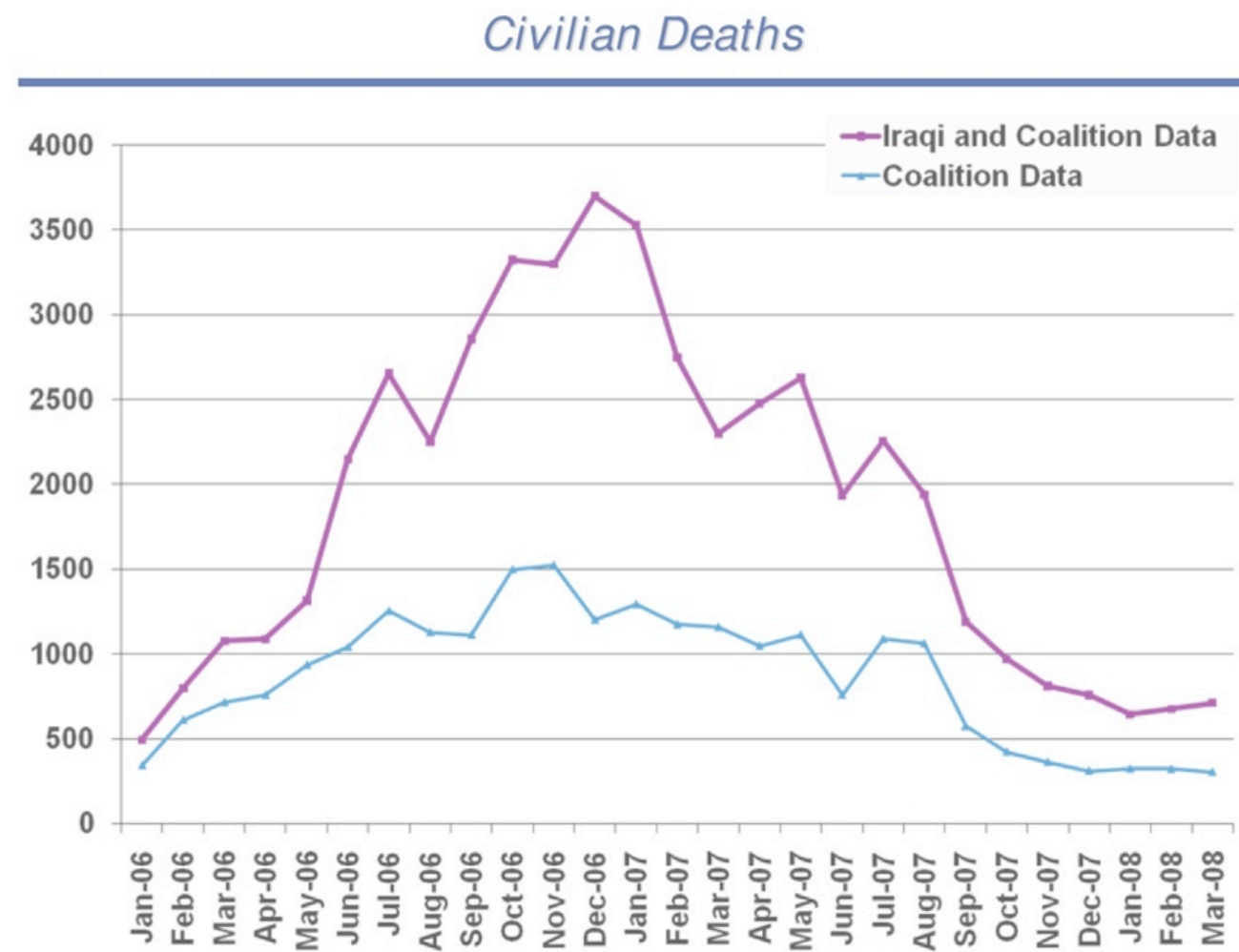


* 152,000

Goal: To reduce violence, stabilize Iraq

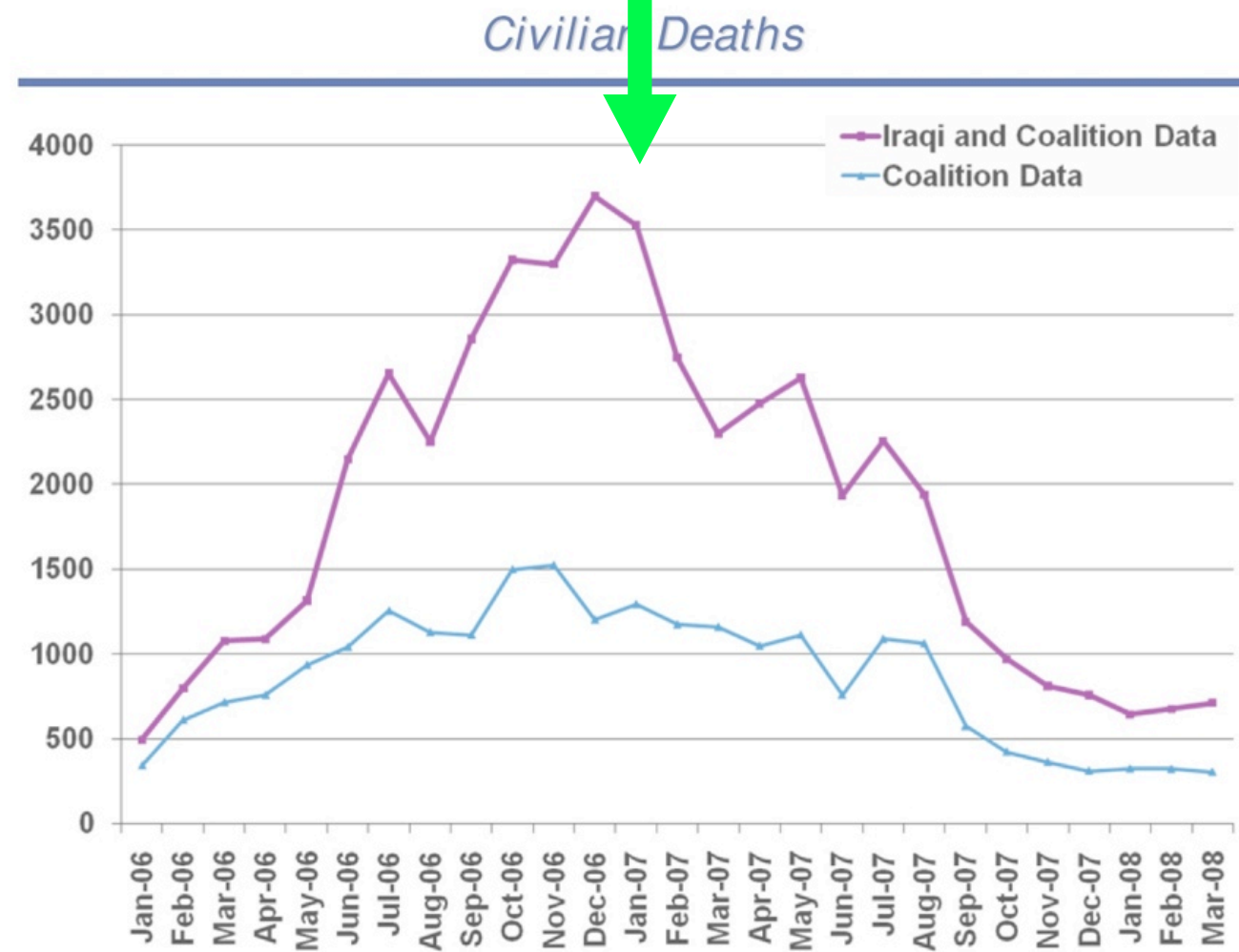
Finished: March 2007

It Worked!



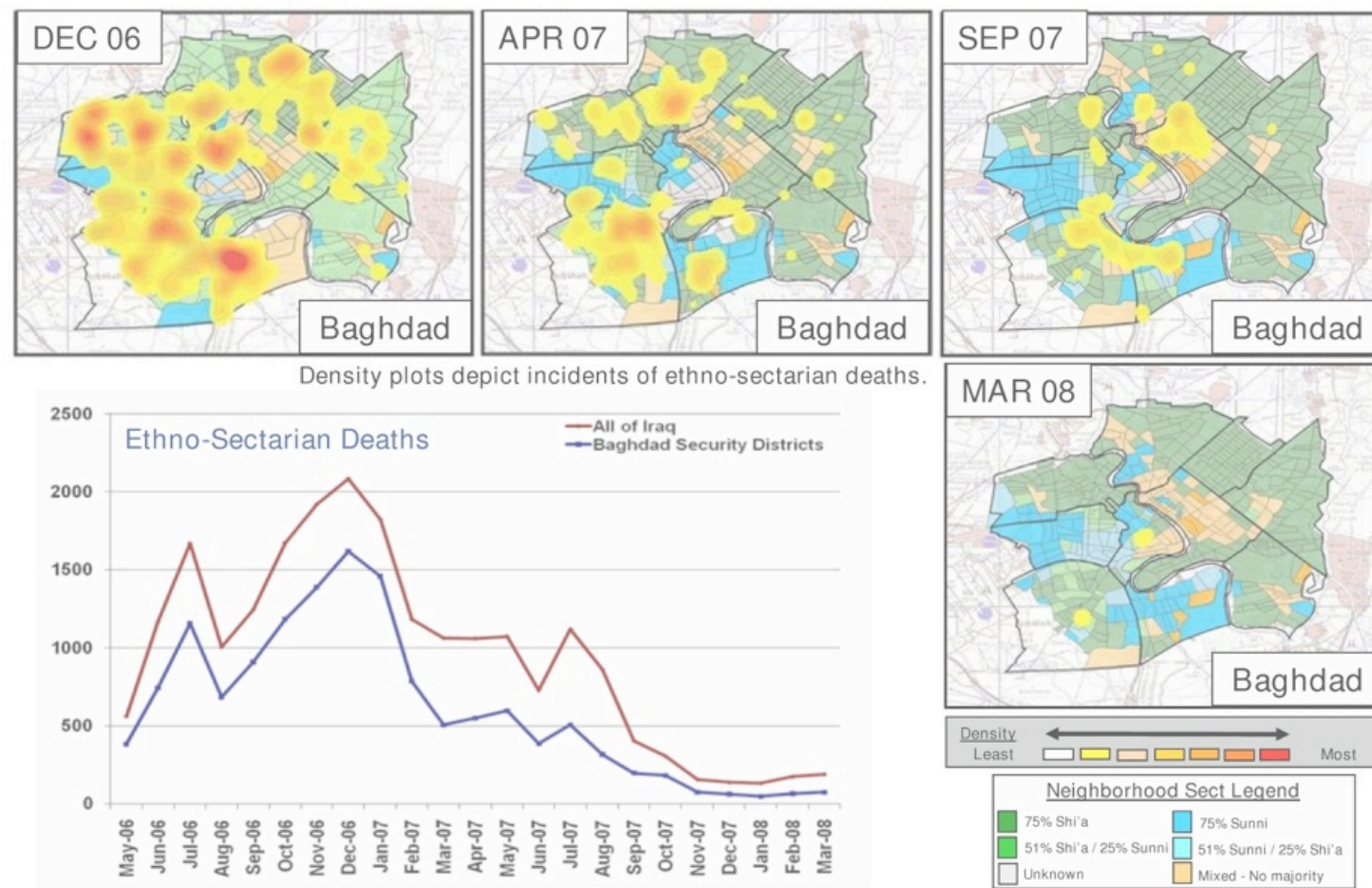
It Worked!

Begin of “The Surge”



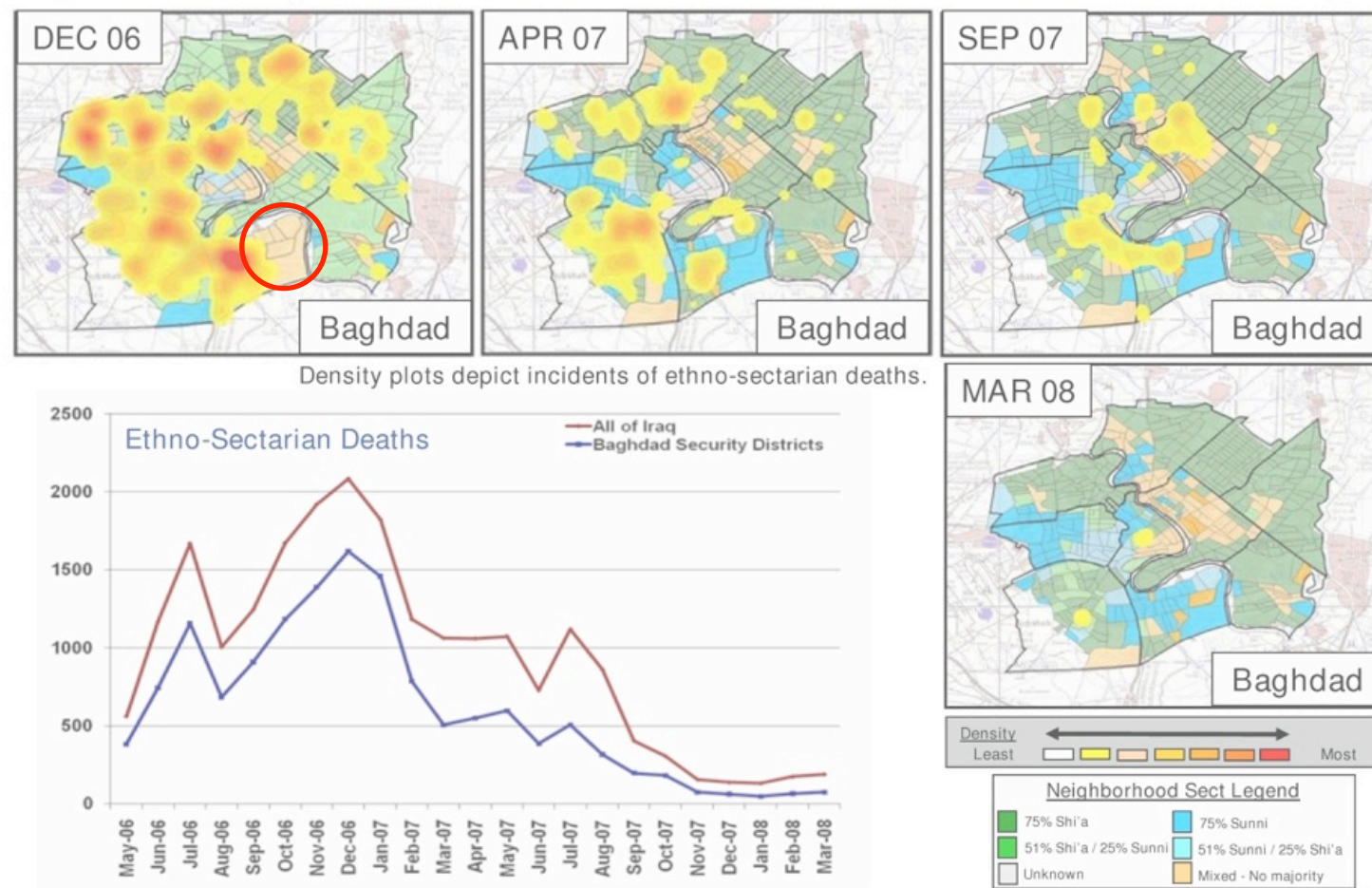
Or Did It?

Ethno-Sectarian Violence



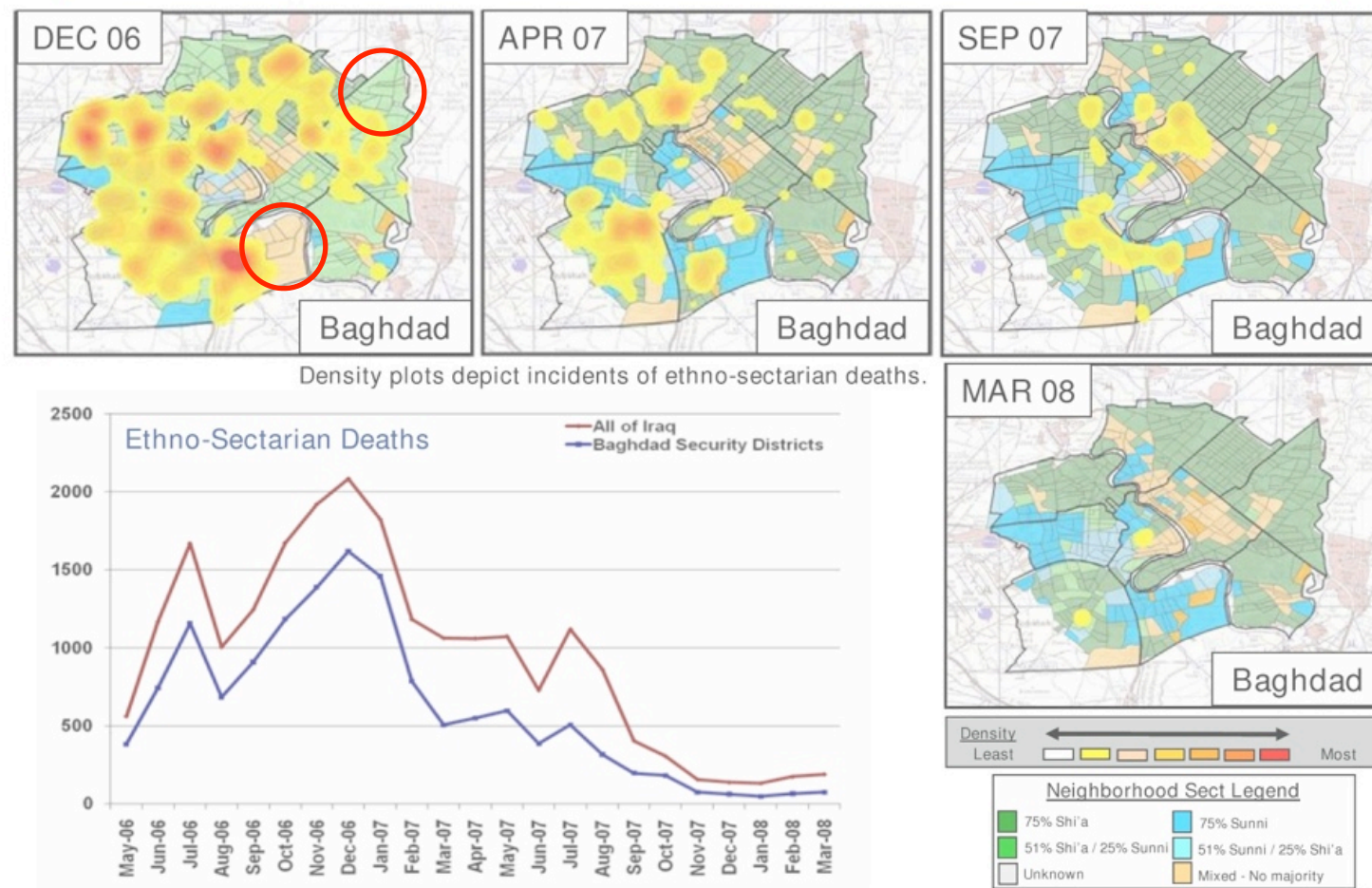
Or Did It?

Ethno-Sectarian Violence



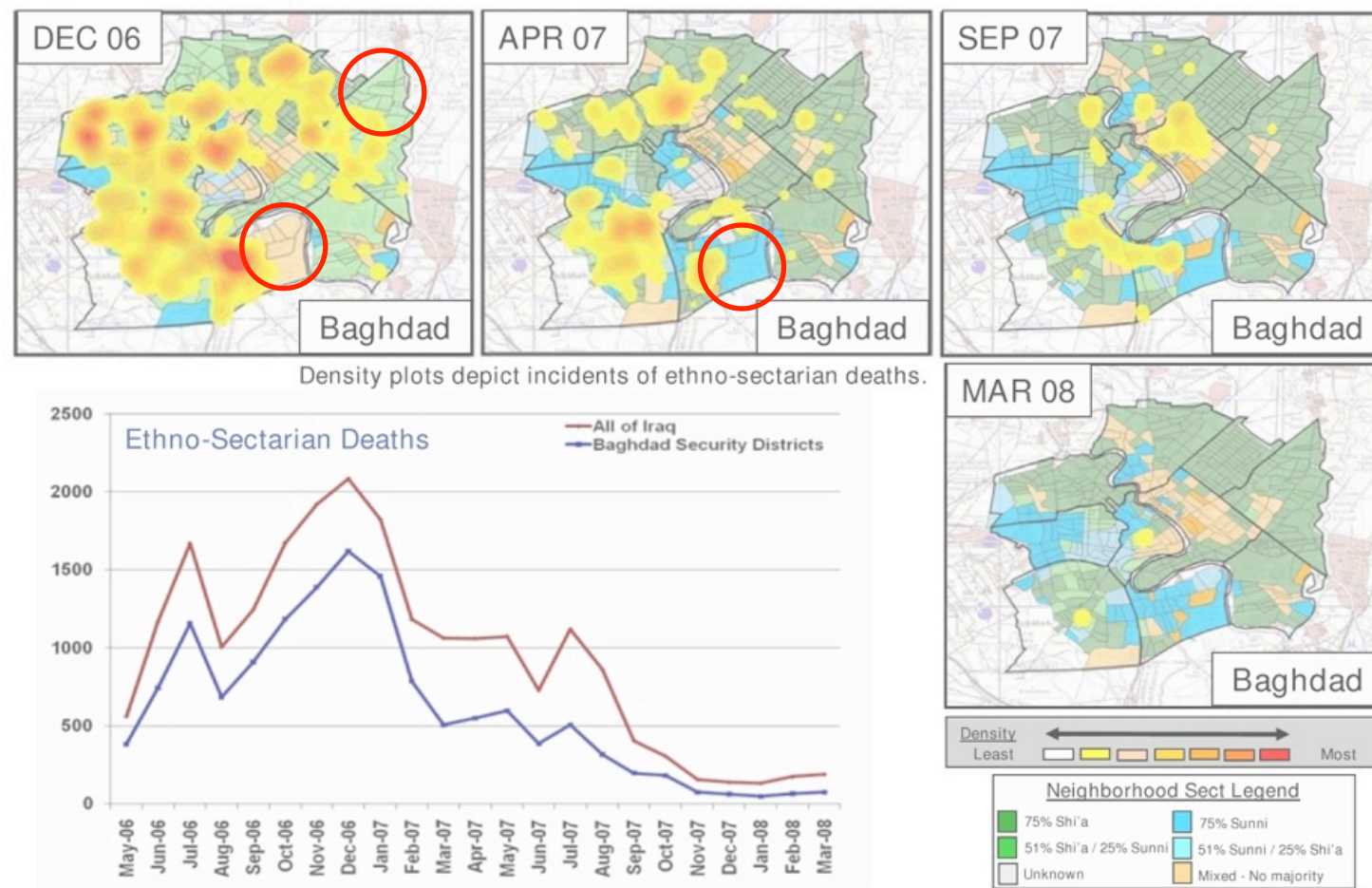
Or Did It?

Ethno-Sectarian Violence



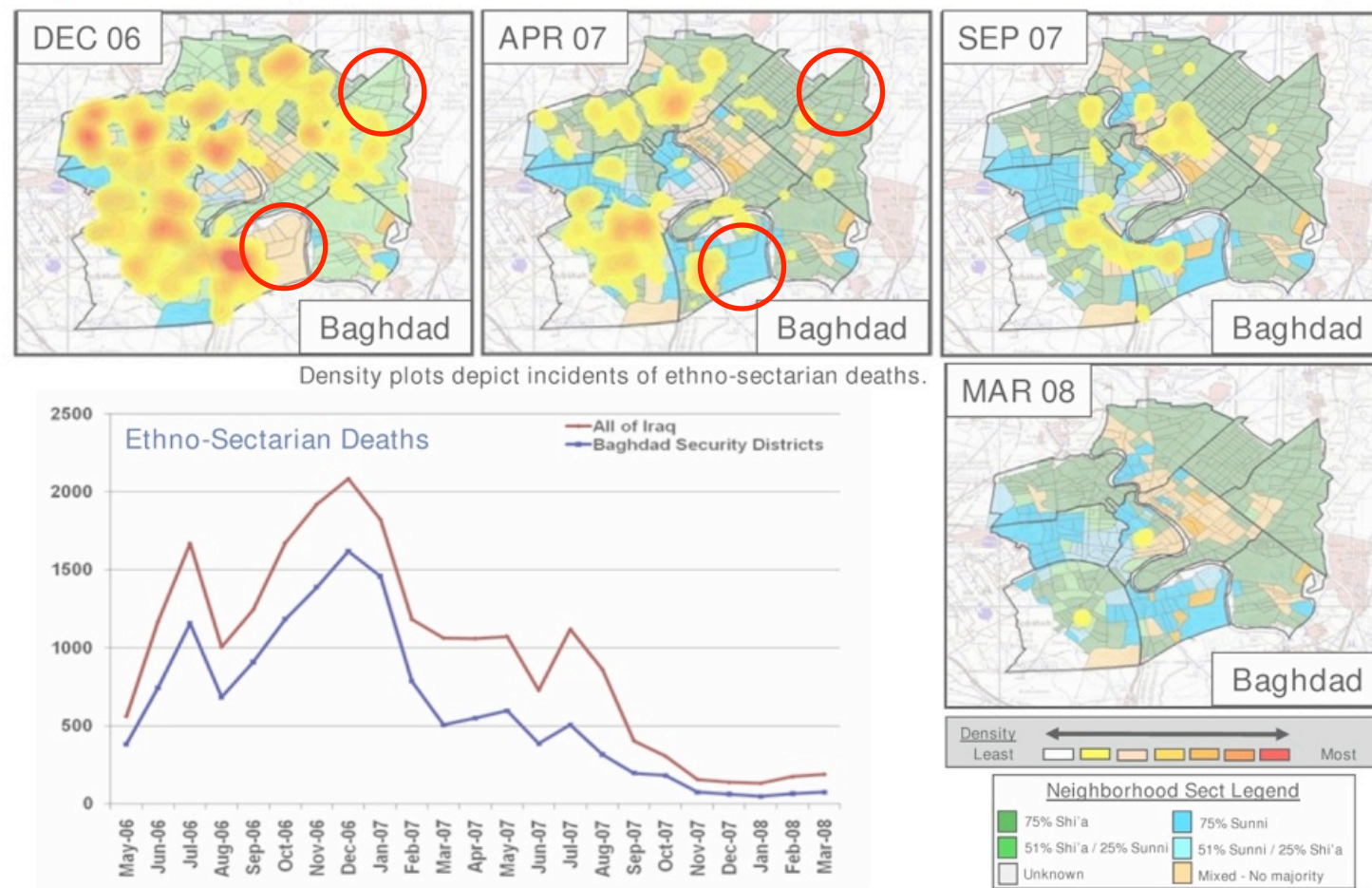
Or Did It?

Ethno-Sectarian Violence



Or Did It?

Ethno-Sectarian Violence



A Model?

A Model?

- Why not? 

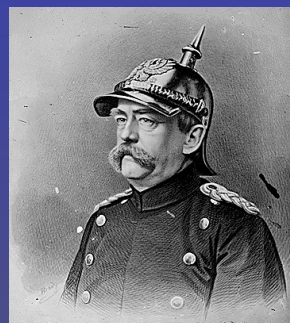
A Model?

- Why not? ✓
- Military strategy & operational control
 - Experience
 - Reasoning



A Model?

- Why not? ✓
- Military strategy & operational control
 - Experience
 - Reasoning
- Geostrategy
 - see above



Precedents

Precedents



Precedents

- Juffi:
 - Digging for Peace
 - Knowledge Discovery in International Conflict Databases
 - Searching for Patterns in Political Event Databases



More Examples



- Insurgencies **never** defeated by more troops
- Rome: Germanic Wars
- Germany: WWII
- US: Vietnam

More Examples



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More Examples

- Auxiliary troops turn on you
 - Rome: Arminius
 - Countless examples from the age of imperialism
 - US: Northern Alliance



Results

- Thousands dead
- Unwinnable wars started
- Empires lost
 - Preventable
 - Can be learned from

Back To “The Surge”

- Objective model to bolster argument
- Collect characteristics of the conflict
- Model dependencies

My dimensions

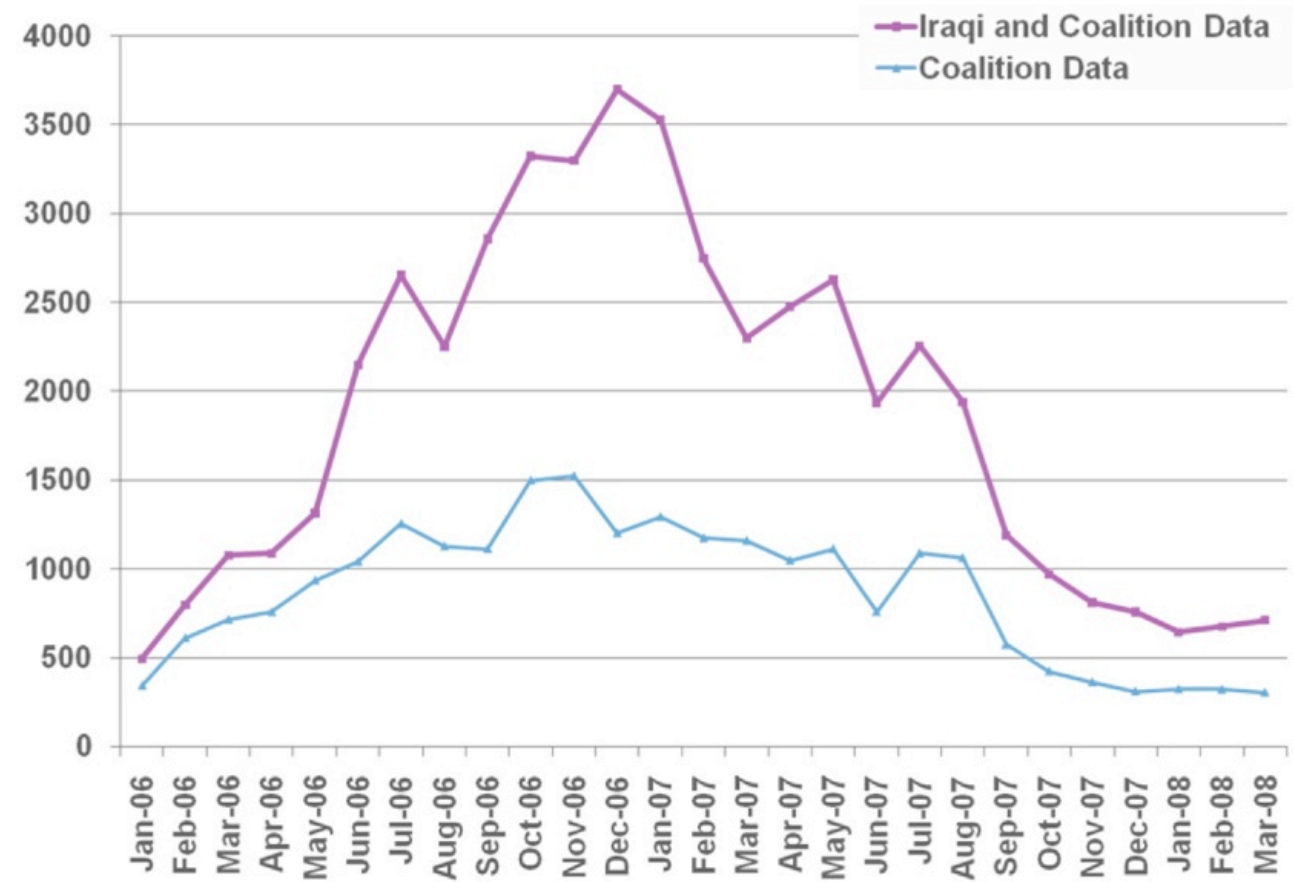


- Obvious:
 - Number of US troops on the ground
 - Date (more fine-grained than months)
 - Captures/killings/executions of big names (Saddam Hussein, his sons, Zawahiri, ...)

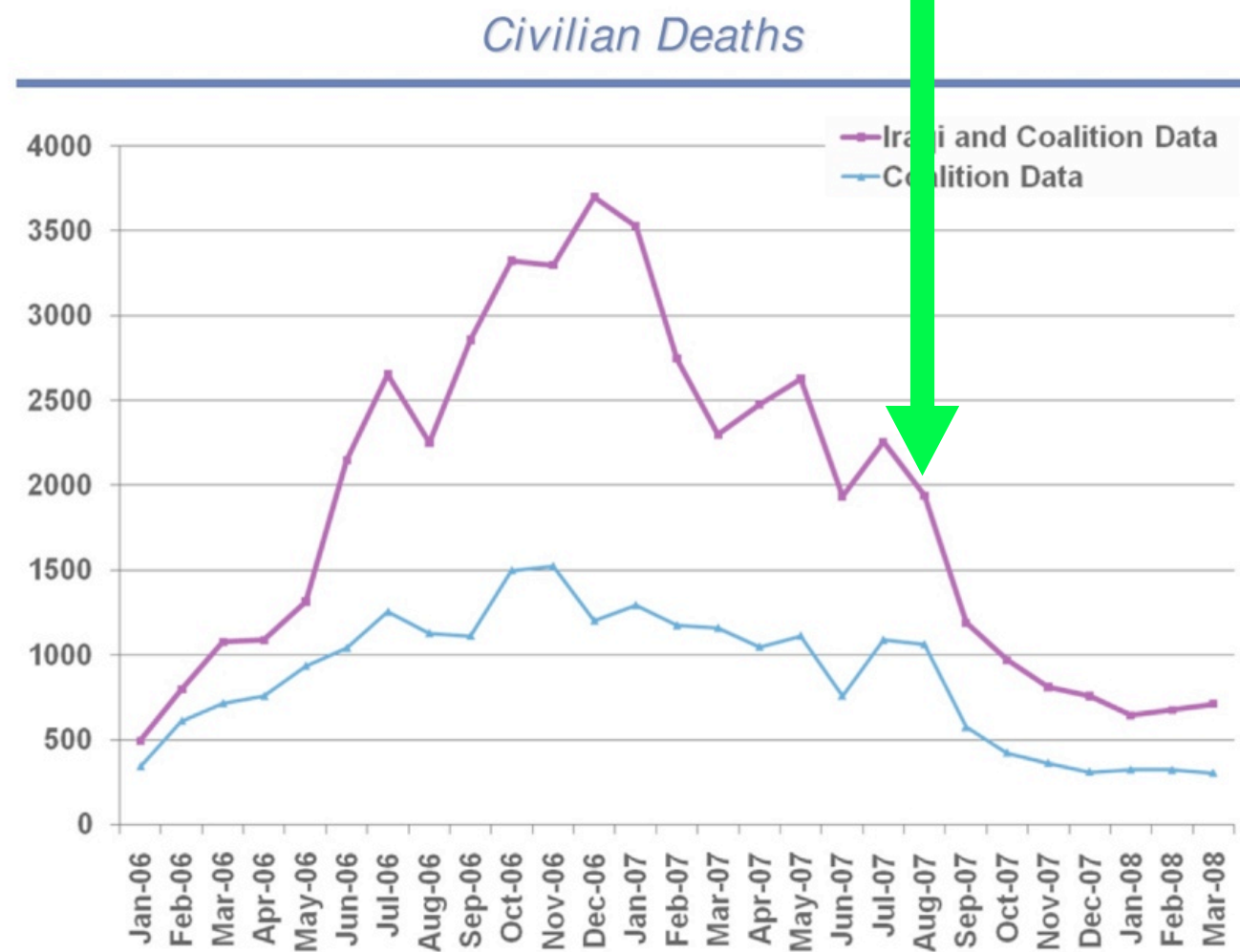
Cont.

- Internal:
 - Offensives (Fallujah, Basra)
 - Cease fires/alliances
 - Elections (?)

Civilian Deaths



Muqtada al-Sadr declares cease fire



Cont.

- Arab/Islamic:
 - Ramadan
 - Sectarian religious celebrations
 - Violence/conflicts/elections in Israel/
Gaza, Saudi-Arabia, Iran, Syria, Pakistan



Cont.

- Global:
 - Visits
 - Elections/Campaigns
 - Reviews of directives
 - Oil price



External help

- Brain storming on my blog:
 - More fine-grained description of actors
 - Displaced persons indicates ethnic cleansing
 - Temperature?

The Goal

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Predict number of ¹ dead (regression)

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Model dimension ² dependencies

The Goal

Predict number of ¹ dead (regression)

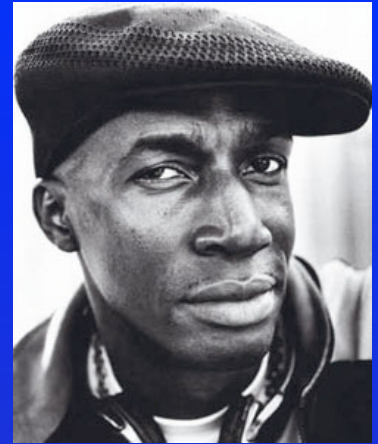
Model dimension ² dependencies

Support arguments, decisions ³

Problems

- How to gather (reliable) data?
- Which techniques?
- Seems not to be done:
 - Too difficult?
 - Too inconvenient?

The Message



- Specific: wanna go through w/this
- General: Too much gut feeling in **important** fields
 - War, energy, food, water...
- Can save many lives, has to be accepted though
- Has to start with us

Suggestions?

Comments?

Something Sunnier



This week on Zero Punctuation, *Condemned 2: Bloodshot* and the phrase "errant turds."

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