Using Software to Model Cultural Change and Political Violence

http://manoa.hawaii.edu/ccpv/
Contemporary collective political violence is by and large ethno-communal in origin. Conflict forms around identity boundaries described by ascriptive characteristics – race, religion, language, and region of origin, often nested within each other. But these identity boundaries are dynamic; conflict often triggered by “new” or transformed ethnicities. We need to understand the forces shaping these boundaries and causing them to become fault lines. By incorporating such causes well as more proximate causes of conflict into operational models, we may be able to intervene to prevent future large-scale violence. To have an effect on policy-making, such models must be incorporated into readily usable packages for non-experts.
Project Objectives

- Generate simulation and decision support software technologies for long term predictions of the boundaries and level of ethno-communal political violence internationally, as well as the effects of structure-altering policy interventions.
- Translate social science models of cultural change and collective action into algorithmic form suitable for agent-based simulation.
- Develop novel methodologies that identify and encode qualitative content, particularly online content, into data usable to populate model parameters.
- Test both the a priori assumptions of models and their predictions using a combination of experimental and statistical methods.
Four Subteams

• Theoretical Social Science

• Empirical (Experimental) Social Science

• Area Studies

• Computer Science
Theoretical Social Science

• Specification of Individual and Structural Attributes
  – Major cultural attributes and general assumptions about cultural change among individuals and groups in interaction with political and economic structure.

• Cultural Change, Action, and Structural Effect Model
  – General assumptions about relationship between culture, political and economic structure, and decision-making.

• Network and Content Model for Web Analyzer
  – Social network models and content analysis-based crawling methodology to determine the boundaries of virtual communities, as well as the social dynamics and shared ideological content of such communities.
A Priori Experimental Validation of Identity Frameworks

- Experiments within the UH Laboratory for the Computer-Mediated Study of Culture will examine the basic assumptions behind the cultural models by examining interactions between members of different identity groups and/or the effect of forms of interaction on induced value and belief change.

Retrospective Testing of System Predictions

- The predictions of the simulation/decision-support system will be tested by using historical event datasets. Results of this testing will be used to refine methods of data collection and coding.
Area Studies

• Case Studies of Ethnic Conflict
  – Write exploratory qualitative case studies, operationalizing theoretical variables developed by the model and suggesting additional variables and/or relationships that must be included.

• Ethnic Group Dataset
  – Creation of a new culture/ethnicity dataset for populating the parameters for our ethnic identity and conflict models. Include data on "latent" cultural groups that share ascriptive characteristics but have not engaged in political actions.

• Validation of Web Analysis Output
  – Output of the web crawler used to determine values for cultural attributes of groups will be subject to face validity tests by subject matter experts, and where they fail alternative methods of mining cultural variables will be suggested.
• Design of Simulation System Architecture
  – Develop an agent-based simulation based upon the models provided by the theoretical team, with variables populated by the data provided by the area studies team.

• Design, Testing, and Enhancement of User Interface
  – Human-computer interaction optimized to ensure that the system provides simple and convenient ways for users to specify the political scenarios they wish to examine, and obtain the depth of information that they required.

• Coding and Testing of Web Analyzer
  – Coding of the crawling and content analysis models provided by the theoretical team.
Theoretical Social Science

Sun-Ki Chai
Leonard Andaya, Mooweon Rhee, Jang Hyun Kim, Ming Liu
Concepts and Assumptions of Coherence Model

• Expected Regret: Subjective probability-weighted difference between maximal utility possible in a particular state of the environment and the utility provided by a chosen set of actions.
• Coherence: Expected regret of zero.
• PREFERENCE AND BELIEF ASSUMPTIONS OF MODEL
  – Meta-optimization
  – Environment constrains Beliefs
  – No “Yogic Utility”
• Parametric form, but not parametric values, determined by exposure to social communication.
• Forms considered in order of message prevalence of communications describing such forms, but parameter weightings can be accepted or rejected.
Coherence (preference-based): adjustment of $g, h$ to minimize $d$

Expected Regret (single-period, individual form):

$$d = \int_s \left( u(s, a^*(s)) - u(s, a) \right) p(s) \, ds$$

where

$$a^*(s) = \arg\max_{a \in A} u(s, a)$$

$$a = \arg\max_{a \in A, s \in S} \int_s u(s, a) \, p(s) \, ds$$

$s$ states of the environment, $a$ actions, $u$ utility function, and $p$ subjective probabilities
Actors are engaged in a collective process of constructing their own identities.

This process is aimed at creating an individual and collective sense of self that is both positive and consistent.

Preferences and beliefs are not mere precursors to action, but there is a mutually causative relationship between these entities.

The generation of self is a collective process in which communication plays a crucial factor.
Some Implications of the Coherence Model and Rational Choice for Ethnic Boundaries

• Boundaries of conflict will be based on ascriptive criteria that surround rather than cross-cut existing primary group boundaries, e.g. language, religion, race, or region of birth, or a combination of those attributes.

• A share of power resources in the main arena of social interaction that are close to a minimum winning coalition will increase a boundary’s selection potential, as will similarity of structural economic and political position by individuals within a boundary.

• Collective action within a particular set of boundaries will cause them to become “sticky” due to commitment/

• Once collective action with boundaries has occurred, new boundaries will more readily encompass or subdivide than cross-cut them. c.f. Chai 1996, 2005.
Empirical (Experimental) Social Science

Katerina Sherstyuk
Sun-Ki Chai, Dolgosuren Dorj, Quincy Edwards, Ming Liu, Olga Moulton
Group Identity and Discriminatory Preferences

• Research question:
  – Do people behave differently towards those in the in-group and the out-group (e.g., own and other nationality)?

• Previous studies comparing behaviors towards own/other ethnic group are scarce (Bernhard et al 2006, Chuah et al 2007)

• Approach:
  – Compare people’s actions in social dilemma, trust and bargaining games when matched with in-group member (own nationality) and out-group member (other nationality)
• Research question: can people’s cultural attributes be changed to induce more cooperation and less conflict?
  – Theoretical basis: Coherence model (Chai 2001) predicts that people may become more cooperative through changing social identity
  – Previous experimental evidence: Communication and joint work on tasks improve cooperation
  – Approach: Create conditions in the laboratory that are predicted to change group identity and improve cooperation, and study their effect on people’s behavior
Area Studies

Sun-Ki Chai
Leonard Andaya, Karim Khan, Kiran Sagoo, Cecilia Noble, Quincy Edwards
Case Studies of Ethnic Group Formation, Change and Conflict Boundaries

• Malay Peninsula – Defining “Malay” Identity
  – boundary markers: religion alone in most states, religion and country of origin in states with large Islamic majority (i.e. Kelantan), inclusion of Orang Asli in states with Islamic minority

• Karachi – Salient Ethnic Boundaries
  – pre-1947: Hindu vs. Muslim
  – 1980s: Sindhi vs. Muhajir
  – late 1990s-2007: Sunni-Shi’ite

• Cape Town – Salient Ethnic Boundaries
  – pre-1948 Afrikaaner, British, Non-White
  – 2000 on: White, Xhosa, White-Xhosa, Cape Malay
The Moro and its layers of ethnic identities

Pan-Muslim global identity based on the affiliation to the Ummah (hence they can appeal to Muslim Arabs for external support to the Muslim world). Muslim vs. Non-Muslims

Indo-Malay Muslim regional identity (shared heritage with Muslims of Southeast Asia) religious identity as moderate Muslims

“Muslim Filipino” socio-political identity and situational ethnicity). It is not a national identity. Muslim Filipinos vs. Christian Filipinos

Local/geographic/cultural ethnic identity: 13 Moro ethnolinguistic groups
1) Maranao
2) Maguindanao
3) Tausug
4) Yakan
5) Cotabato

*they go their separate ways if they differ in POLITICS.

Moro is a socio-political identity based on symbolic ethnicity rooted on the fight for the Bangsamoro nation. It is an ethnic resource used by the Moro National Liberation Front, Moro Islamic Liberation Front & Abu Sayyaf Group to pursue its goals.

Individual identity based on situational ethnicity

Ethnicity based on resources and economic self-interest; used and transformed over time within a broad range of socio-economic and political environments. CCPV
Generating an Ethnicity Dataset for Studying Boundary Change

• To study ethnicity action over the long run, where boundaries are socially constructed and boundary change can occur, it is important to study latent as well as active ethnicities, including sub- and pan-ethnicities.

• Because of the difficulty of obtaining information on latent ethnicities, multiple sources of qualitative data must be “mined” to populate dataset.
  – Subject matter expert judgment
  – Incorporation of local census and other data
  – Partially automated coding of ethnographies and histories; possible role for partial automated coding
  – Coded content from derived virtual communities using specialized crawler
Example: Malaysia
CCPV dataset

• Traces the formation of Malayness from the colonial to post colonial period
  – Nine sub-ethnic groups listed under “Malay” (1891): Aborigines, Achinese, Boyanese, Bugis, Dyaks, Javanese, Jawi Pekan, Malays, Manilamen
  – Events dataset traces the factors that affected boundary formation, eg Chinese and Indian immigration in the 1930s.
Example: South Africa
CCPV dataset

• Traces the formation of whiteness in South Africa from the British colonial period to the post-apartheid period.
  – Census data, especially figures on religion, enable distinctions to be made between the Afrikaners and English
  – Events dataset traces factors that contributed towards cooperation / tension between the Afrikaners and English.
Computer Science

David Chin
Sun-Ki Chai, Scott Robertson, Leo deCandia, Robert Puckett, Kar-Hai Chu, Dong-Wan Kang, Evan Yazawa
Agent-Based Simulation

- Agents populated by ascriptive attributes
- Correlations among attributes accepted
- Birth/death & in/out migration rates
Simulation Inputs

• Environment
• Ideologies
  – English/Afrikaner/Black vs. Pan-White/Black
  – Boundary of Malayness
• Relevant historical choices affecting groups
  – Popular alternatives and their likelihood of success
  – Utility weights of success/failure states per ideology
  – Used to calculate expected regret per ideology
• Interventions
  – Effect on group/grid social params, economics, etc.
Simulation Outputs

- Predicted ethnic boundaries over time
- Likelihood of ethnic violence over time
- Effect of interventions
- Suggest interventions
- Sensitivity analyses
  - Parallel simulations
  - Which factors matter?
Intelligent agent software for examining social structure of world wide web that identifies, records and analyzes virtual communities around particular subject of interest

• Methods for Determining Virtual Community Boundaries
  – “on the run” bi-directional centrality vis-à-vis existing community
  – match with shared distinct keyword phrases of community determined through comparison with web corpus

• Methods for determining Virtual Community Culture
  – density indicates groupness, link reciprocity indicates gridness
  – proximate community ideology determined by content analysis of distinct phrases
Web Analysis Operation

1. selection of "seed sites" and / or identifying keywords
2. selection of crawling algorithm - some version of links-in and/or links-out-based centrality and keyword matching for "admittance score" of linked sites
3. selection of intrasite filtering and overall halting criteria intrasite - depth of crawl, exclude cgi overall halting - size of dataset
4. let it run - it incrementally expands set, generates new keywords
5. draws information from crawls of sites, available registration info, search engines, online databases
6. analyze downloaded dataset
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Boycott Action News

Co-op America's "tell it like it is" information about corporations that need to be made more accountable.

Society / Issues / Business / Corporate Accountability, News / Current Events / Business and Economy / Business and Society / Business Ethics


Web Analysis Network Output
Subtasks and Dependencies

- A Priori Experimental Validation of G/G-Coherence -Empirical
- Cultural Change, Action and Structural Effect Model -Theoretical
- User Interface Design -Computer Science
- Development of Simulation System Architecture -Computer Science
- Network and Content Model for Web Analyzer -Theoretical
- Coding and Testing of Web Analyzer -Computer Science
- Validation of Web Output From Ethnographic Data -Area Studies
- Ethnic Group and Structure Dataset -Area Studies
- Retrospective Testing of System Predictions -Empirical
- Case Studies of Ethnic Conflict -Area Studies
- Individual and Structural Attributes -Theoretical