From speech acts to document acts: an ontology of institutions

Barry Smith
Overview

• Military examples
• The basic strategy
• The biological success story
• Extending the strategy to institutions
• The de Soto thesis
• Document acts
• Massively planned social agency
NCOR: National Center for Ontological Research

Quick start: For Researchers For Government For Businesses For Students

About NCOR

The National Center for Ontological Research (NCOR) was established in Buffalo in 2005 with the goal of advancing the quality of ontological research and development and of establishing tools and measures for ontology evaluation and quality assurance. NCOR draws on the expertise of ontologists associated with the University at Buffalo and of their collaborators in scientific, commercial and government institutions throughout the world.

NCOR serves as a vehicle to coordinate, enhance, publicize, and seek funding for ontological research activities. It provides coordination, infrastructure, and independent review to organizations employing ontologies in fields such as defense and intelligence, management, healthcare and biomedical sciences.

It provides researchers working in ontology-related areas with specialized support in seeking external funding and in assembling collaborative, interdisciplinary teams both nationally and internationally. It provides consultant services for ontology projects especially in the defense and security fields and in health care and biomedical informatics. NCOR also engages in training and outreach endeavors that are designed to broaden the range of institutions and individuals accepting the goals of high quality ontology in both theory and practice.
A business problem: too many silos

• (US) DoD spends more than $6B annually developing a portfolio of more than 2,000 business systems and Web services
• these systems are poorly integrated
• deliver redundant capabilities
• make data hard to access, foster error and waste

https://ditpr.dod.mil/ Based on FY11 Defense Information Technology Repository (DITPR) data
Some questions

• How to find data?
• How to understand data when you find it?
• How to use data when you find it?
• How to compare and integrate with other data?
• How to avoid data silos in the future?
US DoD Civil Affairs strategy for non-classified information sharing
Semantic Enhancement of the Dataspace on the Cloud

http://x.co/5HLRQ
Sources

• Source database **Db1**, with tables Person and Skill, containing person data and data pertaining to skills of different kinds, respectively.

<table>
<thead>
<tr>
<th>PersonID</th>
<th>SkillID</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>222</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SkillID</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td>Java</td>
<td>Programming</td>
</tr>
</tbody>
</table>

• Source database **Db2**, with the table Person, containing data about IT personnel and their skills:

<table>
<thead>
<tr>
<th>ID</th>
<th>SkillDescr</th>
</tr>
</thead>
<tbody>
<tr>
<td>333</td>
<td>SQL</td>
</tr>
</tbody>
</table>

• Source database **Db3**, with the table ProgrSkill, containing data about programmers’ skills:

<table>
<thead>
<tr>
<th>EmplID</th>
<th>SkillName</th>
</tr>
</thead>
<tbody>
<tr>
<td>444</td>
<td>Java</td>
</tr>
</tbody>
</table>
Ontology vs. Data Model

- The ontology provides a single synoptic view of the domain as opposed to the multiple flat and partial representations provided by the data models.
Index Contents without the ontology

Index entries based on native vocabularies

<table>
<thead>
<tr>
<th>Index Entry</th>
<th>Associated Field-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>111, PersonID</td>
<td>Name: Java</td>
</tr>
<tr>
<td></td>
<td>Description: Programming</td>
</tr>
<tr>
<td>333, ID</td>
<td>SkillDescr: SQL</td>
</tr>
<tr>
<td>444, EmplID</td>
<td>SkillName: Java</td>
</tr>
</tbody>
</table>

If an analyst is familiar with the labels used in Db1 and thus knows to enter Name = Java, his query will still return only: person 111. Salient information will be missed.
# Indexed Contents with the Ontology

<table>
<thead>
<tr>
<th>PersonID</th>
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</tr>
</thead>
<tbody>
<tr>
<td>111</td>
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<td>SQL</td>
</tr>
<tr>
<td>444</td>
<td>Java</td>
</tr>
</tbody>
</table>
Benefits of the tagging approach

• Does not interfere with the source content
• Enables the content to evolve in a cumulative fashion as it accommodates new kinds of data
• Can be developed in an incremental and distributed fashion
• If you do it right, allows computational reasoning across the data

How to do it right?
Aristotle (384 – 322 BCE)

Constitution of Athens
– part of a (lost) database of 158 constitutions
Aristotle's Constitutions
Aristotle’s *Categories*

Hierarchy from Porphyry’s Introduction
Linnaean Hierarchy
Ontology reborn after Darwin

1990: Human Genome Project
1999: The Gene Ontology (GO)
2005: Open Biomedical Ontologies (OBO) Foundry

A new golden age of classification
Old biology data

Preprophase:
- Centriole
- Intranuclear condensation of chromosomes

Prophase:
- Mitotic spindle
- Individualization of chromosomes, initiation of mitotic spindle, rupture of nuclear envelope

Metaphase:
- Chromosomes arranged in equatorial plane, spindle completed, disappearance of nuclear envelope and nucleolus

Telophase:
- Nuclear restitution, nuclear envelope and nucleolar formation, end of cell division

Late anaphase:
- Aggregation of chromosomes at the poles, beginning of cell division, initiation of cleavage furrow

Early anaphase:
- Longitudinal splitting of chromosomes and migration to poles
New biology data
How to do biology across the genome?

MKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS LLAFAGPRQRNVYVDDTRRIQLYTDYKNGSSEPRLKTLDGLDTSDFYFYFVTLRQMICALGNSYDAFNHDPWM DVVGFEDPNQVTNRDISTRIVLSYMFLNTAEGCLVEYATFRQYMRELKNIAPQLNFREMRQGLIALGRHCVGSR FETDLYESATSLMANHVQTGRNIYGVDFSLTSVGTTATLLQERASERWIQLWGLGESYHCFSSTRNAEDVM KKVSDRRKFKEKANFDEFESALNNKNDELVHCPSITLFESEIPTEVRSFYEDSGLIKVVKFRTGAMDRKRSFEKV VIS VMVGKVNKKFLTFVEDEPDFQGGPSIKYLIKPKINLMVYTLFQVHTLKFKNRKYTDLSFLYNRGGYYNELSFRVLER CHEIASARPNDSTMRTFTDFVSAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELISFASYQASLPGEKVDTERL KLKRDLCPKPIEIKYFSQICNNDMMNNKDDRLGDILHILRACALNFAGPRGGAGDEEDRTSITNEEPIPSVDEHGLKVC KLRSPNTPRRLRKTLDAVKALLVSSCACTARDLDIFDDNNGAMWKIWILYHEVAQETTLDYSRITLVPSSDGIS
how to link the kinds of phenomena represented here
or here?
Answer

Create an ontology: a controlled logically structured consensus classification of the types of entities in the relevant domain

Use the same ontology aggressively to tag data
fragment of the Gene Ontology (GO)
http://geneontology.org
tagging with common ontologies allows navigation between databases

MouseEcotope

glycolipid transporter activity

GlyProt

DiabetInGene

GluChem
GO amazingly successful

but covers only three sorts of entities:

– cellular components
– molecular functions
– biological processes

does not provide representations of diseases, symptoms, anatomy, pathways, ...

→ Open Biological Ontologies (OBO) Foundry
<table>
<thead>
<tr>
<th>RELATION TO TIME</th>
<th>CONTINUANT</th>
<th>OCCURRENT</th>
</tr>
</thead>
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<tr>
<td>GRANULARITY</td>
<td>INDEPENDENT</td>
<td>DEPENDENT</td>
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<tr>
<td>ORGAN AND ORGANISM</td>
<td>Organism (NCBI Taxonomy)</td>
<td>Anatomical Entity (FMA, CARO)</td>
</tr>
<tr>
<td>CELL AND CELLULAR COMPONENT</td>
<td>Cell (CL)</td>
<td><strong>Cellular Component</strong> (FMA, GO)</td>
</tr>
<tr>
<td>MOLECULE</td>
<td>Molecule (ChEBI, SO, RnaO, PrO)</td>
<td><strong>Molecular Function</strong> (GO)</td>
</tr>
<tr>
<td>ORGAN AND ORGANISM</td>
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<tr>
<td>---------------------</td>
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<td>Organ Function (FMP, CPRO)</td>
</tr>
<tr>
<td><strong>CELL</strong> (CL)</td>
<td><strong>CELLULAR COMPONENT</strong> (FMA, GO)</td>
<td>Phenotypic Quality (PaTO)</td>
</tr>
<tr>
<td><strong>MOLECULE</strong> (ChEBI, SO, RnaO, PrO)</td>
<td><strong>Molecular Function</strong> (GO)</td>
<td>Molecular Process (GO)</td>
</tr>
</tbody>
</table>

**Environment Ontology (EnvO)**
<table>
<thead>
<tr>
<th>RELATION TO TIME</th>
<th>CONTINUANT</th>
<th>OCCURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRANULARITY</td>
<td>INDEPENDENT</td>
<td>DEPENDENT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLLECTIONS OF ORGANISMS</td>
<td>Population and Community Ontology (PCO)</td>
<td>Anatomical Entity</td>
</tr>
<tr>
<td>ORGAN AND ORGANISM</td>
<td>Organism (NCBI Taxonomy)</td>
<td>Phenotypic Quality (PaTO)</td>
</tr>
<tr>
<td>CELL AND CELLULAR COMPONENT</td>
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<td>Cellular Component (FMA, GO)</td>
</tr>
<tr>
<td>MOLECULE</td>
<td>Molecule (ChEBI, SO, RnaO, PrO)</td>
<td>Molecular Function (GO)</td>
</tr>
</tbody>
</table>

Population and Community Ontology (PCO)
https://code.google.com/p/popcomm-ontology/
How extend the Population and Community Ontology (built by biologists working on non-human organisms) to *institutions*?

<table>
<thead>
<tr>
<th>Population and Community Ontology (PCO)</th>
<th>Environment Ontology (ENVO)</th>
<th>Infectious Disease Ontology (IDO*)</th>
<th>Biological Process Ontology (GO*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Ontology (CL)</td>
<td>Cell Component Ontology (FMA*, GO*)</td>
<td>Phenotypic Quality Ontology (PATO)</td>
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</tr>
<tr>
<td>Subcellular Anatomy Ontology (SAO)</td>
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<td></td>
</tr>
<tr>
<td>Sequence Ontology (SO*)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein Ontology (PRO*)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GO provides a controlled system of terms and definitions for use in tagging biological data

- species-neutral, disease neutral, discipline-neutral,
- contributing to the cumulativity of scientific results obtained by distinct research communities

Compare use of kilograms, meters, seconds

...
How to create an interdisciplinary science of institutions

Create a controlled system of terms and definitions (an ontology) for use in tagging data about institutions that is:

• culture-neutral, legal, economic, and political system-neutral

• contributing to the cumulativeness of scientific results obtained by distinct research communities
Needed branches of this ontology (back of envelope list)

- Economics, property rights, money, finance …
- Emotions, sentiments …
- Social acts, speech acts, documents, …
- Law, administration, command and control, crime and punishment …
- Territorial, boundaries, jurisdictions, real estate, war …
- Anthropology, history …

...
<table>
<thead>
<tr>
<th>Granularity</th>
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</tr>
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<tbody>
<tr>
<td><strong>Organ and Organism</strong></td>
<td>Independent</td>
<td>Dependent</td>
<td>Biological Process (GO)</td>
</tr>
<tr>
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The Financial Industry Business Ontology
(FIBO)

Demystifying Financial Industry Semantics
March 13 2012

http://www.edmcouncil.org/financialbusiness
The Emotion Ontology

subjective emotional feeling

http://bioportal.bioontology.org/ontologies/49078
Emotion Ontology

Emotion process

mental process
physiological response to emotion

Emotion Ontology
John Searle: start with biology, add speech
The Searle Thesis

Through the performance of speech acts (of promising, marrying, accusing, excluding) we bring into being

- claims,
- obligations,
- relations of authority,
- relations of membership,

... = the entities making up the ontology of the social world
How, on this view, can institutional entities, endure through time?

• in the local case: through beliefs, memories, desires – planning a weekly coffee morning with your friends ...

• But what about the global case (where there is no face-to-face contact, where there are many cheaters, where beliefs conflict ontologically)?
Hernando de Soto
Institute for Liberty and Democracy, Lima, Peru

Bill Clinton:
“The most promising anti-poverty initiative in the world”
The de Soto thesis:

documents and document systems are the mechanisms for creating the institutional orders of Western capitalism

*The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else,*
Common beliefs about the African village

- no individual property rights
- regime of ‘community property’
- land cannot be bought and sold, because it is sacred ...
- no legal and economic institutions
- law is confined to what is legislated (= big-city top-down, colonial law)
What really exists in the African village?
Adjudication

Elders engaged in dispute resolution in Kisongo (Tanzania) dealing with conflicts about family matters, parcel boundaries and other property issues. Evidence is brought from witnesses and community members.
Documentation of the resolution of a dispute over land in the Arusha area and of the property rights established
Property right

• The difference between a piece of land and property is that property can be set out in a written document with determinate meaning. This document creates and establishes the right, which ties owner to physical asset in an enduring way.

• The system of such documents creates a new abstract order
Registration

The Mwenyekiti (or democratically elected village chairman) keeps records of births deaths, contracts ..., provides written and unwritten proof of customary rights of occupancy, participates in real estate transactions as witness
Registration

• the registrar oversees the ways in which records are subjected to amendments, e.g. when assets are used as collateral for loans.
Registration

• Paper documents serve as **filaments that bind** different elements of social and institutional reality in a way which leads to the creation of new types of value
Extralegal will filled out “in the name of the Republic of Tanzania”
With the invention of documented claims and obligations

- a new dimension of socio-economic reality comes into existence:
  bank accounts, stocks, shares, bonds, mortgages, credit cards
- these form enduring social networks – document systems – of entirely new types
- debts become information entities analogous to digital artifacts
From speech act theory to document act theory

Generalizing the de Soto thesis: documents and document systems are the mechanisms for creating all institutional orders of modern civilization
Identity

Name: Karatu
Account Number: 6813000516
Branch: Karatu
Name: KUNDAU CHA NANGI
Address: Ngorongoro

Signature
Witnessed
N. B. C.
Karatu
SA. 105

Signature
Witnesed
N. B. C.
Karatu
SA. 105

NATIONAL MULTIBANK LTD

Sahihi iliyoishinisha NMB
NMB authorised signature

Date
7/1/2002
NM 067790
Nambari ya kitabu
Passbook number

Waweza akiba wanambwa wajulishe benki kwa wewe mabadiliko ya awili zako.
Depositors are requested to notify the bank of any change of address.

Amana za fedha zikabidhiwe kwa Mashika Fedha ambaye ndiye ofisaa pekee mwenye duhama ya kufikia.
Deposits should be handed to the cashier, who is the only officer authorised to receive them.

KITABU HIKI KINA KURASA 20
THIS BOOK CONTAINS 20 PAGES
An extralegal standardized sales contract for a one-acre parcel in the outskirts of Arusha, including the involvement of witnesses in the preparation of the document and the use of fingerprints to ensure the authenticity of the document.
Standardized documents

• allow standardized transactions
• improve the flow of communications
• allow assets to be described using standard categories, so as to enable comparisons
• allow the transition from ad hoc narratives (as in ancient title deeds) to structured representations
• communication is advanced because signals are abbreviated
• supports the creation of more effective registries
It is a profoundly erroneous truism, repeated by all copy-books and by eminent people when they are making speeches, that we should cultivate the habit of thinking what we are doing. The precise opposite is the case. Civilization advances by extending the number of important operations which we can perform without thinking about them.
Standardized documents enable

– new types of distributed ownership through stocks, shares, pensions, ...
– currency notes
– new types of legal accountability
– new types of business organization
– new types of massively planned social agency
– democracy
– the state
– law ...
Scope of document act theory

• the social and institutional (deontic, quasi-legal) powers of documents
• the sorts of things we can do with documents
• the social interactions in which documents play an essential role
• the enduring institutional systems to which documents belong
The ontology not only of

- capital, bankruptcy, stock market ...

but also of

- the Holy Roman Empire
- the Swedish language
- the United Nations
- the internet
- a symphony concert
- urban planning
- mathematicians

is to be understood in terms of the different sorts of documents which these phenomena involve
How to do things with words (speech act theory)

1. We represent how things are:
   record, report, description, assertion ...

2. We try to get people to do things:
   request, order, command ...

3. We commit ourselves to doing things
   promise, agreement, ...

4. We bring about changes in the world through utterances
   congratulating, blessing, forgiving ...
How to do things with documents (document act theory)

1. We represent how things are:
   *map, chemical diagram, x-ray image, ...*

2. We try to get people to do things:
   *blueprint, musical score, plan of battle ...*

3. We commit ourselves to doing things
   *contract, planning agreement, flow chart ...*

4. We bring about changes in the world through document acts
   *organigram, act of parliament, license, diploma ...*
From speech acts to document acts

Documents can be copied, modified, stored ...

Documents can be aggregated (attachment of liens ...) 

Documents can be meshed together (for example into plans and sub-plans – as in a musical score, plans for a military operation)

Documents can be algorithmically executable (Turbotax ...)
John Searle: Directions of fit

- **world-to-mind**: I promise I will mow your lawn tomorrow
- **mind-to-world**: I see that my lawn has been mowed
- **automatic mind-to-world-and-world-to-mind**: I say “I promise to pay you $100 dollars” and thereby make it true that *I promise to pay you $100 dollars*
Directions of fit for documents

• **world-to-mind**: a plan is formulated to change the world (to make it conform to the mind of the planner ...)

• **mind-to-world**: a report is published evaluating the success of the execution of the plan

• **automatic mind-to-world-and-world-to-mind**: Act of Parliament is published declaring that such-and-such is the law and such-and-such is the law
(musical) directions of fit

• **world-to-score:** the score tells the world how to shape itself to create a performance that is in conformance with the score

• **score-to-world:** the score, when the performance is completed, serves as a record of the performance

• **automatic score-to-world-and-world-to-score:** Berlioz completes the score and thereby brings into being a work that is precisely in conformance to the score
Individual performers may use their scores in different ways

1. they may mark up their copies of the score to add specific instructions for their own use
2. they may mark up their copy of the score to record errors in their own performance
what begins as a plan, ends as a record
Blueprint

what begins as a plan
ends as a record
• of process
• of product
From speech acts to document acts

Searle, Tuomela, Gilbert, Bratman deal with simple local interaction of cooperative agents communicating by speech

“Would you like to dance?”
“Let’s lift this table”
“Shall we cook dinner together?”
“Waiter, bring me a beer!”
...

Scott J. Shapiro, “Massively Shared Agency”, 2013

[Bratman, Searle ...] ‘are unable to account for the existence of massively shared agency.

they ‘have largely concentrated on analyzing shared activities among highly committed participants. The working assumption has been that those who sing duets or paint houses together are all committed to the success of the activity.’
Shapiro: To adapt standard theory of collective agency to deal with massively shared actions we need to add **authority**

Authorities are ... “mesh creating” mechanisms. When disputes between participants break out with respect to the proper way to proceed, authorities can create a mesh between the subplans of the participants by demanding that both sides accept a certain solution.

Basic for Shapiro’s theory of the nature of law
Conclusion

Documents, as much as authority, are what make possible the sorts of massively shared agency we find in business corporations, universities, organized religions, governments, legal systems, standing armies.