**POSI Overview**

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**Motivation for FRDCSA**

Zero Marginal Cost (ZMC) enables free software to deliver benefits to large numbers of users, only cost is development.

How do we maximize the benefits?

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**General Problem Solving**

Computers as theorem provers  
How do we maximize solution space?

- Turn out no program can solve all mathematical problems  
- But we can find a sequence of programs, each more complete than the next  
- This sequence does to eventually increase in size, otherwise cannot fit the information required  
This is the goal of the FRDCSA

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**Maximizing Software Capabilities**

Creating more sophisticated, capable software  
Write it ourselves  
Or, gather and index existing software  
FRDCSA takes both approaches

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**Indexing Existing Software**

RADAR/Package/Architect (the Cluster/Study/Apply (CSA) of FRDCSA)  
Make packages of all software  
Create a comprehensive ontology (a database of facts) about all free software

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**Writing Our Own Software**

Indexing is necessary, however insufficient  
Must write our own software  
Many areas (especially “humanitarian”) that needed software

- Doctor software (Krispe)  
- Meal planner

Bus planner, Task Manager (Verber/PSE), etc  
In all, > 90 internal, > 50 minor codebases
Solve Problems That Affect People

How can we be of the most assistance:
- Help people achieve their goals
- Index their goals
- Find out what skills they want to learn
- Help them to work collaboratively to complete their goals

Started new meta-project to address these issues

POSI (POS: Open Source Initiative)

POSI Collaboration Group, Software and Services

POSI is a group that wants to help members achieve their goals through improved collaboration on shared goals and projects

Map out many of the goals of POSI members, their abilities, and their interests, and connect members with others who have the interest and ability to complete shared goals

Mainly meet online

Hanging Out

IRC
VOIP Conferencing
Web UIs
Shared servers
Screen “kbitzing”

Daily IRC meetings
Ad-hoc team assembly
Occasional productivity “competitions” or POSIthons

Simple Example of Goals, Interests and Abilities

Person A
Goals:
- Learn Java
- Purchase new laptop

Abilities:
- Python
- Shell scripting

Interests:
- Biology

Person B
Goals:
- Develop for Android

Abilities:
- Acting
- Java

Interests:
- Teaching; Java

Simple Example of Goals, Interests and Abilities (GIAs)

In reality user probably asserts hundreds or thousands of goals, same for interests and abilities

The software looks at the constraints and helps to start ad-hoc teams to solve problems that are critical to the entire group and also problems that are critical to individual members

How GIAs are Added

Example: IRC Interface

User enters:
- “Goal: install quassel on a Win”
- “Learn: RDF, OWL-S, Android Development”

Other possible key words (so far):
core asset skills suggestion feature poll policy goal
skill learn: project maker interest note question study

Flows naturally in conversations:
18:09:54 andis: what time?
18:10:25 andis: hmm I don’t have all your contact info...
18:10:50 andis: Goal: periodically update the contact info of new contacts to all different platforms: Facebook, Google+...
**GIAs are Stored in a Knowledge Based System (KBS)**

- AndrewD@usinAvsdlblsfyficsbbase.
- Attentional corpus & sender PSE: X + 4, d = 100
- k g i x
- Starting Tic Tac... 

  `Get a new laptop`
  `('ready' '107405' '107406')`
  `('depends' '107407' '107405')`
  `('ready' '107405' '107406')`
  `('depends' '107407' '107405')`
  `('cost' '107405' '8420')`
  `('goal' '107405')`
  `('prefer same' '107405' '107408')`

  `Install PROCESA on my new laptop`
  `('depends' '107407' '107405')`
  `('present at Pupplin')`
  `('ready' '107406' '107405')`
  `('goal' '107405')`
  `('prefer same' '107405' '107408')`
  `('efficiency concern' '107408' 'evangelism')`

**Priority System Editor Sample Interface**

**Have a Priority System GUI Editor**

- Show completed goals as darkened out
- Enable full text search
- Display down menus on right click
- Allow persons to lodge disputes about the utility or purpose of a goal
- Real time updating across multiple clients
- Enforce goals as being subgoals of larger goals
- Enable linking goals with various predicates

**Goal of Collaboration**

- Identify shared goals, both automatically and by the user
- Calculate the relative importance of each goal to the group as a whole, calculated by how much it enables the group to satisfy other goals
- Calculate the relative importance of each goal to each member
- Still need to work out the exact logic

**Illustration of Identifying Shared Goals**
**Illustration of Identifying Shared Goals**

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**Illustration of Identifying Shared Goals**

**Identifying Shared (or Repeated) Goals**

Goals are expressed in a Natural Language (NL) eg. English: “Install FRDCSA on my new laptop”

Can be translated into logic (not very well yet):

- **small:** we can mine the projects of members by mining those sites
- **we (X)**: mine (e5, x1, x2), project (e5); off (e2, x1)
- **member (e5), by (e5, e6), temp (e5, x1, x4), site (e5)**

Recognizing Textual Entailment (RTE) identifies goals with the same meaning

**Recognizing Textual Entailment**

RTE asks, given two texts, if we assume the first one is true, must the second one also be true?

Example sentence pair:

1. Some plants grow really well in a hydroponic environment but others do not.
2. Plants are grown in water or in substances other than soil.

In this case, the answer is YES - a entails b
**Determine Who Can Solve Which Goals**

We need to:
- Figure out who is competent in what skills
- Who is interested in what subjects
- Who works well with whom

Turns out all of this can be done with Social Network Analysis (SNA)

SNA involves looking at organizations or groups and measuring their characteristics

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**Experience Modeling System (EMS)**

Need to figure out members' abilities

- Directly ask members (web forms, chat bots)
- Have members actively assert them
- On IRC
- Determine abilities from available data

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**EMS Gathers Information About Member's Abilities**

Pre-formatted or extracted ability data
- Resumes and cover letters
- Online skill profiles

Inferred ability data
- Automatically analyze text (emails, status updates, tweets/facebook, IM/IRC chats, web pages, documents, calendars, etc)
- Other methods (please suggest)

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**Ability Extraction from Text**

Use Wikipedia, Library of Congress subject hierarchy, subject ontologies, resume and position datasets, skills inventories, etc, to develop a model of what terms are used in which area

Use Bayesian inference or other techniques to figure out which skills the user is probably familiar with based on which terminology they use

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**Planning for Collaboration**

POSI has an advanced Project Management system

Based on the FRDCSA systems Verber/PSE

All these constraints on who knows what, who is interested in what, who has what goals, deadlines, duration of events, members calendars are fed into a temporal planner, and the resulting possible choices are returned

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**Verber Domain and Problem Specs**

![Diagram](image-url)
**Verber/PSE vs. Bug Tracker**

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due dates</td>
<td>Verber has</td>
</tr>
<tr>
<td>Task status</td>
<td>Temporal planner</td>
</tr>
<tr>
<td>Assigned</td>
<td>Logic and rules</td>
</tr>
<tr>
<td>Project</td>
<td>Verber will have</td>
</tr>
</tbody>
</table>

**Concerns with POSI in General**

HUGE privacy concerns

All this information can and will be used against members, if they do not secure the information

Solution:
- distribute the POS code to each user, anonymize it,
- set up privacy controls, and so on
- put users themselves in control of the data (on their local machines) and use peer to peer, encrypted, deidentified techniques

**Conflict Resolution**

Develop sophisticated techniques for resolving resource conflicts, identifying false conflicts

Allow people to dispute goals (i.e. that marginalize them for instance)

**FRDCSA Revisited**

FRDCSA is the middleware that runs POSI

Consists of over 90 internal (relatively major) codebases and maybe 50 minor, along with hundreds of external codebases (acquired from the web)

10 year old project with lots of cumulative development

More info:
- [http://frdcsa.org](http://frdcsa.org)
- [http://frdcsa.onshore.net/frdcsa](http://frdcsa.onshore.net/frdcsa)

**Verber**

More information is available from:
- [http://frdcsa.org/-andrewwdo/writings/semweb.odp](http://frdcsa.org/-andrewwdo/writings/semweb.odp)
- [http://frdcsa.org/-andrewwdo/writings/semweb.pdf](http://frdcsa.org/-andrewwdo/writings/semweb.pdf)

**Job-Search**

One of the FRDCSA internal codebases

Helps free software developers be financially stable and thus able to work on free software

Spidered Craigslist, resume XML generation

Will use Experience Modeling System when that’s complete

Developed a resume matcher that matches users with jobs they can perform, also will suggest in-demand skills they can learn
**POSIC**

Job-search was a popular software/service, decided to turn it into a consultancy
Hence POSI Consultancy = POSIC
POSIC is therefore a business which supports POSI and free software in general
POSI is free software, hence POSIC and others can use it
Help developers find projects that pay them to extend their projects

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**Intelligent Tutoring Systems**

Long tradition of research in developing automated tutors for subjects
Develop fine-granularity models of exactly what the person knows
Based on what they know and what they want to know, compute a lesson plan

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**System-X Intelligent Tutor**

POSI helps connect learners with teachers, or if none exist, teach the subject with System-X
Develops a large library (mainly using text summarization of existing online learning resources) of learning materials
Uses CLEAR to read learners the texts
Assesses understanding through tests
Records results in Experience Modeling System

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**Conclusion**

FRDCSA is a 10 year old project developing Friendly Artificial Intelligence
POSI is a group that tries to identify and satisfy fine-grained goals of it members through collaboration and ad-hoc team creation

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**Availability**

POSI uses FRDCSA as the middleware
Unfortunately, FRDCSA has not been released
Need to clean it up (license compliance, personal information removal) before release
Is available to checkout on GIT for people interested in using it/helping to clean it up
Very capable system
10 GB without datasets, 100 GB with

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**Ways to Succeed with POSI**

Get an account on posithon.org (has copy of FRDCSA)
Visit website (http://posithon.org) and read up
Join #posi channel (on irc.freenode.net) and record statements about what you'd like to learn, your skills, goals, and interests
Join mailinglist (link on website)
Record intentions about how to improve POSI to meet your needs and talk to existing members
Ways to Succeed with POSI

If you are a developer, consider:
- Work on the remaining bugs with RC bots
- Developing software for extraction of skills
- Develop Java or otherwise (perhaps Processing?)
- GUI for Shared Task Management & Priority System
- Editor

Figure out how to use POSI software to meet your own software development needs
Suggest new development projects

POSI-Chicago Meeting (Immediately following this talk)

We will be meeting at the POSI/FRDCSA booth after this talk (10:50 am)

Come see what’s going on and/or sign up to the mailing list

The End - Questions?

More information is available online at:

http://positionh.org
http://frdcsa.org

Thank you !!!