Charters for Self-Evolving Communities

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Motivation
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- e-communities to evolve like human communities
- adapt to members' character traits
- self-evolving IT tools to replace the numerous rigid systems
- adapt to the evolving aspiration/needs of community members
- adapt to a community's environmental influences
- empower community members
Proposal

Defining human communities:

- Mission Statement
- Bylaws
- Standard Operating Procedures
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- Mission Statement
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Charters for defining self-evolving IT communities:

- Goals
- Norms
- Interaction Models
Charters for defining self-evolving IT communities:

- **Goals**
- **Regimented Norms**
- **Enforced Norms**
- **Interaction Models**

**Requirements:**

- Specification
- Satisfaction Check
- Specification
- Regimentation Verification
- Specification
- Enforcement
- Specification
- Execution
Real World Application

Helpful Communities: The uHelp app
Goals Example

uHelp’s Goals:

G1. To ensure the community’s needs for services are being addressed
G2. To ensure the satisfaction of requesters (quality of service)

uHelp’s Goals*

\[
\langle G1, \exists R' \subseteq R \cdot (\forall r \in R' \cdot \exists m \in M \cdot \text{volunteer}(r) = m \\
\quad \land \text{majority}(R', R)) \rangle
\]

\[
\langle G2, \exists R' \subseteq R \cdot (\forall r \in R' \cdot \exists m \in M \cdot \text{volunteer}(r) = m \\
\quad \land \text{pstvRate}(m, r) \land \text{majority}(R', R)) \rangle
\]

* Specified in first order logic

Goals’ Syntax

\[\langle GId, GSpecification \rangle\]
uHelp’s Regimented Norms:

RN.3. Volunteers can live outside uHelp community area and join uHelp to join in activities and help those who live in the uHelp community area.

uHelp’s Regimented Norms

\[ \langle \text{RN.3, permissible, member}(V), \text{volunteer}(V, \text{Task}), \text{live\_outside\_uhelp\_area}(V) \rangle \]

* Specified in first Prolog style

Regimented Norms’ Syntax

\[ \langle \text{NormId}, \text{NormType}, \text{Agents}, \text{Action}, \text{Condition} \rangle \]

* Norms copied from Camden’s Time Bank community rules.
Norms Example

uHelp’s Enforced Norms:

EN.1. Volunteers are penalised by losing credit if they do not fulfil their duties on time.

uHelp’s Enforced Norms*

\[\langle EN.1, obligatory, \text{volunteer}(V), \text{fulfil\_duty}(V, Task), \text{assigned\_duty}(Task, V), \text{gain\_points}(Task), \text{lose\_points}(Task), \text{deadline}(Task)\rangle\]

* Specified in first Prolog style

Enforced Norms’ Syntax

\[\langle \text{NormId}, \text{NormType}, \text{Agents}, \text{Action}, \text{Condition}, \text{Reward}, \text{Punishment}, \text{Deadline}\rangle\]
Interaction Models Example

uHelp’s Sample Interaction Model:

States at which the new charter may be adopted

Evolution related interactions
Self-Evolution Cycle

1. Goal satisfaction check initiates evolution

2. Evolution agreed on by members

3. Automated verification of regimented norms

4. Interaction runs, following new charter
Details of evolution to be specified by the charter’s IP:

- When does evolution take place?
- How does the system trigger evolution?
- Which community members are allowed to suggest evolution?
- What is the minimum number of people required to discuss evolution?
- Who can suggest changes?
- How is evolution discussed and agreed upon?
Conclusion

Proposal

1. **Roadmap** for self-evolving IT communities
   - **Building blocks:** goals, norms, and interaction protocols
   - **Basic technologies:** goal satisfaction check, norm verification, norm enforcement, and interaction protocol execution
   - **Self-evolution cycle:** the interrelation between the building blocks and their technologies that helps drive self-evolution

2. **Basic approach** for each building block and its required technologies, helping build an initial prototype for self-evolving communities

Future Work

1. Consider research on emergence/self-organisation for driving evolution
2. Consider semantics as part of a charter
Thank you!