Implementing a patient-clinician interface for biomedical templates

PRIMES Report by Ian Balaguera
Mentor Dr. Gil Alterovitz
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Agenda

- Goal and Context
- Reformatting/Standardizing Templates
- Template Interface
- Suggestion Programs
Goal and Context
Project by Neil Malur, Benjamin Chen, Hari Narayanan

- Scraped data from clinical trials
- Processed into 58 templates
- Facilitate patient-trial connection
Goal

→ Configure templates to be code-compatible
   ◆ Standardized universal format

→ Template interface
   ◆ Clinicians formulate criteria using dropdown UI
   ◆ Existing criteria can be optimized
Reformatting/Standardizing Templates
Initial Templates

Patients must have:
“Platelets >=
VARIABLE1 = {“100,000”, “75,000”, OTHER}
/mcL
VARIABLE2 =
{
  EMPTY,
  “ obtained <=
  VARIABLE3 = {“21”, “14”, “30”, OTHER}
  days prior to registration
  VARIABLE4 =
  {
    EMPTY,
    “(transfusion independent, defined as not receiving platelet transfusions for at least
    7 days prior to enrollment)”
  }
}”

➔ Variables for mutable values
➔ Nested variables
➔ Nonstandard format
Initial Templates

“Fasting cholesterol must be
VARIABLE1 <= \{300\} mg/dL
and triglycerides must be
\leq VARIABLE2= \{2.5\} \times IULN
VARIABLE3 = \{EMPTY, “obtained within
VARIABLE4 = \{28\} days prior to registration”\} VARIABLE5 = \{EMPTY,
“patients may be on lipid lowering agents to reach these values.”\}

➔ Nonstandard format
➔ Inconsistencies
◆ Quotations
◆ Spacing
◆ Formatting
Restructured Templates

➔ JSON

➔ Structure containing
  ◆ All data potentially needed
  ◆ Compatibility with recursive searching

➔ Centralized database
"name": "Platelets",
"English": {
    "content": [
        {
            "type": "text",
            "content": "Patients must have: Platelets >= "
        },
        {
            "type": "dropdown",
            "content": [
                {
                    "type": "text",
                    "content": "100,000"
                },
                {
                    "type": "text",
                    "content": "75,000"
                },
                {
                    "type": "text",
                    "content": "OTHER"
                }
            ]
        },
        {
            "type": "text",
            "content": "/mcL"
        }
    ]
}}
Expediting the Process

- 58 templates
- Manual conversion -> Errors
- Visual template builder
Expediting the Process
Template Interface
Direct Access

- Interact directly with templates
- Dropdown interface
- Search feature
- Edit resulting text
Suggestion Programs
Desktop/Web application

Built with Electron
- Desktop app written in JS, CSS, HTML
- Cross-platform, same code base

NLP (Natural Language Processing) software
- Co-written by Jason Zhou
- Uses templates to suggest changes to text
Desktop/Web application
Microsoft Word Add-in

➔ Using Office JS API

➔ Pros
  ◆ More accessible
  ◆ No auxiliary application download required
  ◆ Right within Word

➔ Cons
  ◆ No access of template dropdown
Summary

- Formatted templates
  - Current 58
  - Easy to format new ones
- Dropdown UI to interact with templates
- Suggestion programs for existing criteria documents
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Questions