



LSDIS

Large Scale Distributed Information Systems



University of Georgia
Computer Science Department

OntoVista

Ontology Visualization



OntoVista

- Can visualize RDF and OWL
- Provides nested view of classes and instances
- Powerful navigation capabilities
- Provides Fisheye zooming
 - Zoom-in and Zoom-out feature in shrimp view
- Visualization of ontology can be done using the layouts
 - Spring layout
 - Tree layout
 - Radial layout



OntoVista

- Hierarchical Tree
 - Shows classes and instances
 - Can navigate to the ontology node by selecting the class or instance in the tree
- Can filter properties



OntoVista

- Enhanced search options
- Filtering/Unfiltering the results in search space
- Filtering of relationships
 - Property tree
 - Filtering relationships
 - Property and its sub properties
 - Filtering its sub properties



OntoVista

- Browsing the ontology
 - Selecting an instance & visualizing its neighborhood (n-hops)
- Display of Glycan
 - Uses ontology information to generate glycan images
 - Based on the residue types in the ontology the tool automatically creates different residue shapes and colors
 - Eg all residues of type *Manp* are represented as *green circle*, *GlcNAc* as *blue square*



Search and navigation

- Instance/Class search
 - Regular expression and case sensitive
 - Navigation to the specific class/ instance in ontology
- Relationship search
- Description search
- Triple search
- Semantic search



Search and navigation Capabilities

- Triple Search
 - Search for subject instance/class (given property and object)
 - Search for subject instance/class (given property and object class)
 - Search for object instance/class (given property and source instance)
 - Search for object instance/class (given property and source class)
 - Navigation to specific region in ontology upon selection of class/instance in the result list
- Semantic Search



Search continued

- Description Search
 - Rdf comment search
 - List all classes and instances that contain this “description string”
 - Navigation to specific region in ontology upon selection of class/instance in the result list
- Relationship search
 - List all classes and instances that contain this relationship
 - Navigation to specific region in ontology upon selection of class/instance in the result list



Filtering/Unfiltering option

- Jambalaya allows the filtering of single nodes or collections of nodes.
- User can select one or more retrieved results and filter them out from the display.
- Unfilter option was added to retrieve the filtered node, in case user decides of not removing it
- This option is closely attached to the graphical visualization



Property Tree

- Property Tree
 - It contains property with its respective sub properties
 - The user would be able to filter the property & its sub properties or just its sub properties
 - The tree is linked to the visualization so that the arc or relationships filtered can be visualized



Glycan imaging

- Uses ontology information to generate images of Glycans
- Based on the residue types in the ontology the tool automatically creates different residue shapes and colors
 - Eg all residues of type *Manp* are represented as *green circle*, *GlcPNAc* as *blue square*
- Demo of the Glycan display



Image generation is generalized

- Will use property file and would create clusters (Instance level) based on the relationships provided (similar to glycan imaging)
- The shapes and colors of each instance (residue) types would be provided in the properties file
- Position of nodes in layout (to and from nodes) are determined by the type of link or relationship that connects them
 - Properties file would contain this information
 - For example if the link type is 4 then the source node would be aligned to the left
- This would provide ability to generate images



Visualization of Glycans

Glyco_7-24-05_wy Protégé 3.1 (file:\C:\GlycoOntology\Glyco_7-24-05_wy.pprj, OWL Files (.owl or .rdf))

File Edit Project OWL Code OWL Code Window Tools Jambalaya Help

OWLClasses Properties Forms Individuals Metadata Jambalaya

Classes
owl:Thing

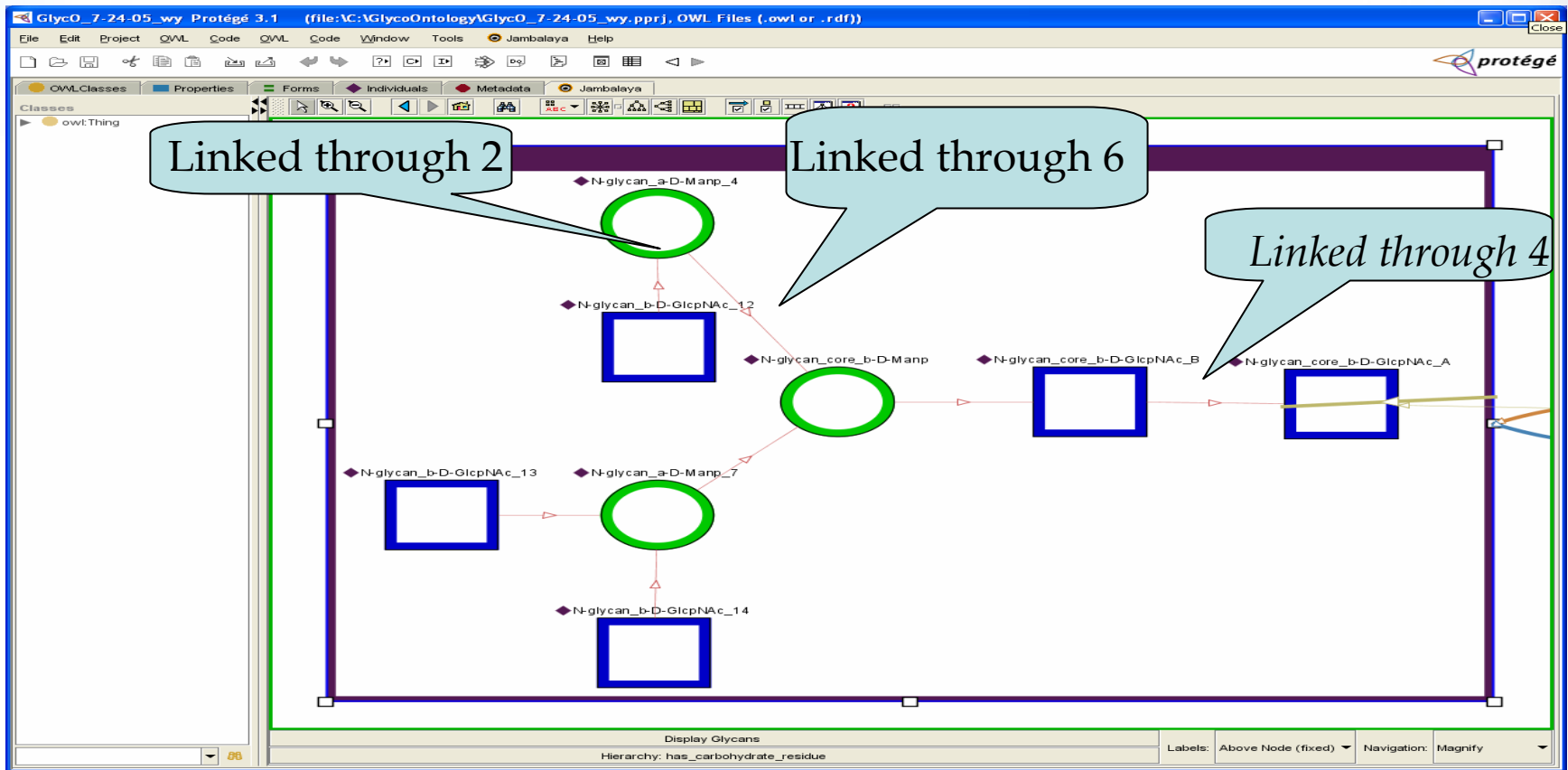
N-glycan_00020 N-glycan_00021

User clicks on *Display Glycans*

Display Glycans
Hierarchy: has_carbohydrate_residue
Labels: Above Node (fixed) Navigation: Magnify



Glycan image of N-Glycan





Turning on the display mode

The screenshot shows the Protégé 3.1 interface with the following elements:

- Window Title:** GlycO_7-24-05_wy Protégé 3.1 (file:\C:\GlycoOntology\GlycO_7-24-05_wy.pprj, OWL Files (.owl or .rdf))
- Menu Bar:** File, Edit, Project, OWL, Code, OWL, Code, Window, Tools, Jambalaya, Help
- Toolbars:** Standard Protégé toolbars for navigation and editing.
- Left Panel:** 'Classes' pane showing 'owl:Thing'.
- Main Canvas:** A diagram titled 'N-glycan_00020' with nodes like 'N-glycan_a-D-Manp_4', 'N-glycan_b-D-GlcpNAc_12', 'N-glycan_core_b-D-Manp', 'N-glycan_core_b-D-GlcpNAc_B', 'N-glycan_core_b-D-GlcpNAc_A', 'N-glycan_b-D-GlcpNAc_13', 'N-glycan_a-D-Manp_7', and 'N-glycan_b-D-GlcpNAc_14'. Nodes are connected by red arrows.
- Bottom Right:** A control panel with a 'Turn Off' button highlighted by a blue speech bubble containing the text 'Click on turn-off'. Other controls include 'Labels: Above Node (fixed)' and 'Navigation: Magnify'.



Glycan display mode turned off

The screenshot shows the Protégé 3.1 interface with the following components:

- Title Bar:** GlycO_7-24-05_wy Protégé 3.1 (file:VC:\GlycoOntology\GlycO_7-24-05_wy.pprj, OWL Files (.owl or .rdf))
- Menu Bar:** File, Edit, Project, OWL, Code, OWL, Code, Window, Tools, Jambalaya, Help
- Toolbar:** Standard Protégé navigation and editing tools.
- Classes Panel:** Shows 'owl:Thing' under 'owl:Classes'.
- Main Canvas:** Displays a graph for 'N-glycan_00020' with nodes like 'N-glycan_a-D-Manp_4', 'N-glycan_b-D-GlcNAc_12', 'N-glycan_core_b-D-Manp', 'N-glycan_core_b-D-GlcNAc_B', 'N-glycan_core_b-D-GlcNAc_A', 'N-glycan_b-D-GlcNAc_13', 'N-glycan_a-D-Manp_7', and 'N-glycan_b-D-GlcNAc_14'. The glycan structures are represented by empty boxes.
- Control Panel:** Located at the bottom, it includes a 'Display Glycans' section with 'Turn On' and 'Turn Off' buttons, and a 'Labels' section with 'Above Node (fixed)' and 'Navigation: Magnify'.



Triple search

- Get all classes and instances that has property `has_carbohydrate_residue` and property range `carbohydrate_residue`
- Get all object instances that are connected by `has_carbohydrate_residue` from the subject instance `N-glycan_00020/N-glycan_00021`.



Semantic search

- Get all instances of type *person* who is an Entrepreneur/Singer
- Get all instances of type *person* who has some relationship with the context class
 - Get all instances of type *person* who has some relationship (*lives-in*) with context class(State)



Semantic Search

- Get all instances that matches the pattern and has relationship with the context class
 - Get all instances that match the pattern “M” and has relationship lives_in with context class US
 - Find all n-glycan that are also of type complex_n-glycan
 - Get all instances that match the pattern “N-glycan” and has relationship has_carbohydrate_residue with the context class N-glycan_beta-D-GlcpNAc / N-glycan_residue(super class)



Visualizing the neighborhood

- Visualizing the neighborhood of a particular instance or class (limiting it to k-hops)
- Can restrict the properties
 - User can select the properties that connect the source instance upon which the BFS is done
 - Number of levels