Collaborative Working Platform for Precision Medicine Ontology Construction

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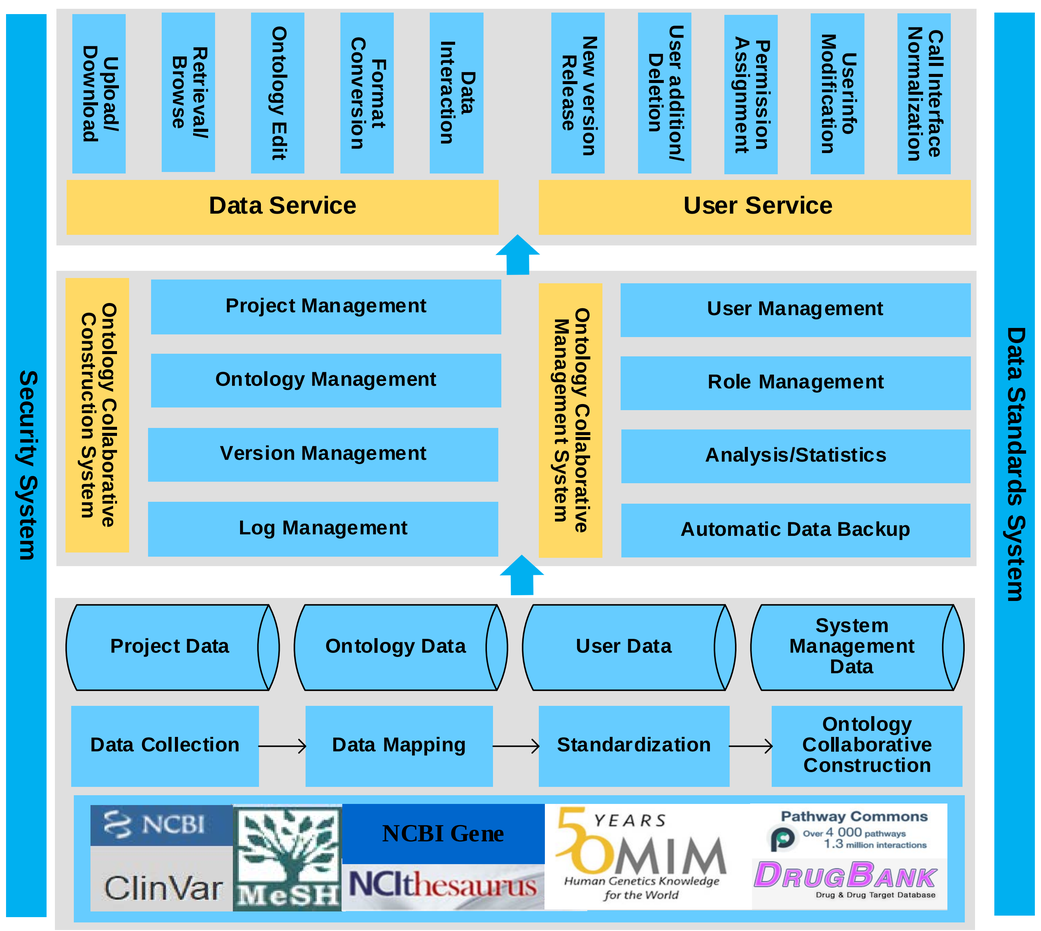
Introduction

- As large amounts of data accumulate in the field of precision medicine and the semantic relationships between biomedical entities become more and more complex.
- The construction of precision medicine ontology needs a lot of collaboration of experts in many areas.
- The collaborative working platform we built for precision medicine ontology construction is an interactive online application for collaboratively editing, browsing, and sharing of precision medicine ontology.

Methods

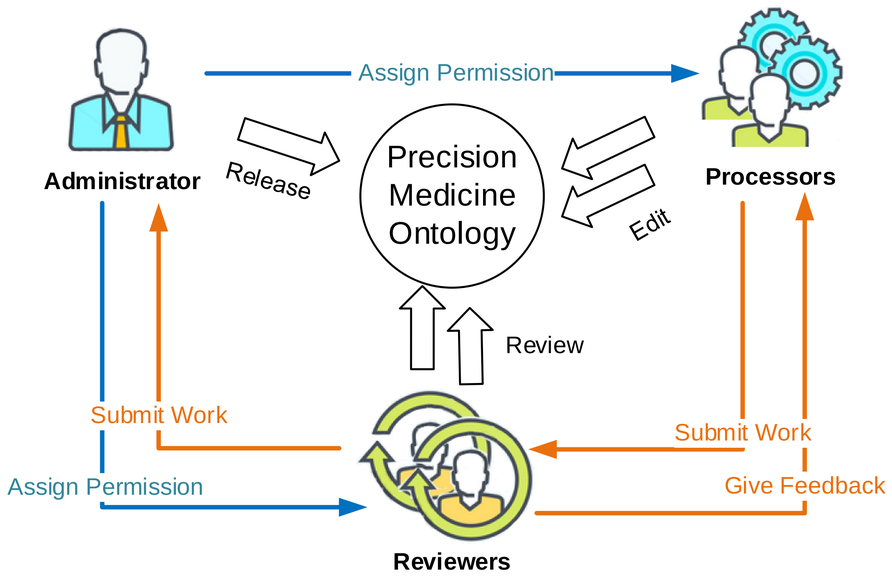
System architecture



Contain three layers:

- **Data Storage and Processing Layer:** Storing various data related to the platform, and processing the data from collection to ontology construction.
- **Management Layer:** Managing the functional systems of the back stage.
- **Application Layer:** Providing the bridge between the users and the platform for human computer interaction.

User workflow

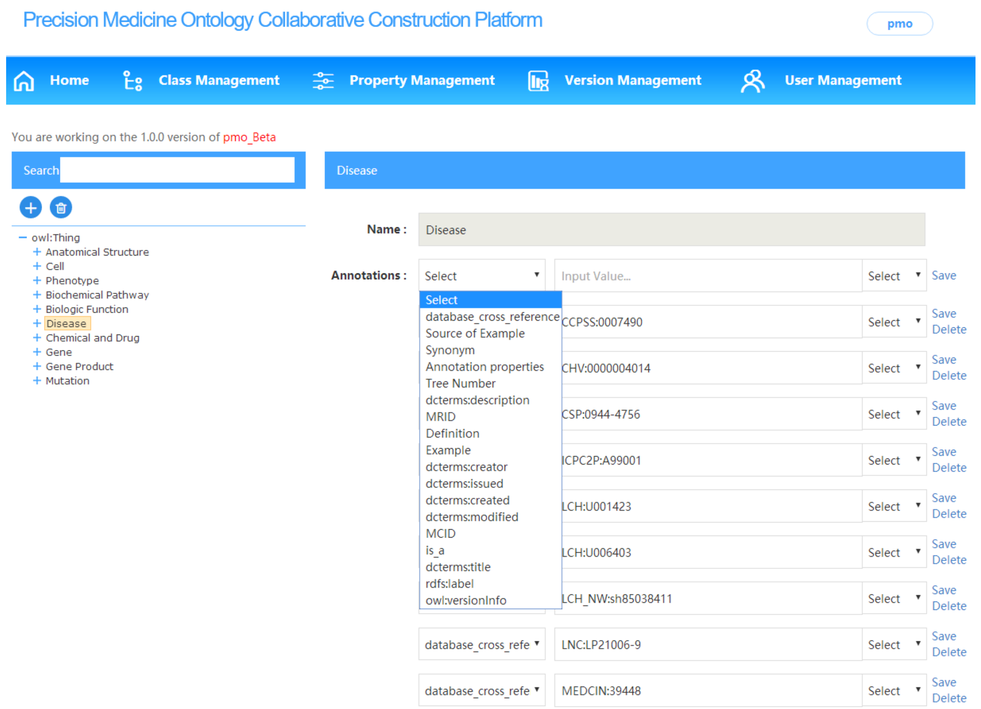


The processers and reviewers include experts in many areas such as biology, medicine, and ontology construction and so on.

Results

The platform has the following functions:

- Creating new projects or importing an existing ontology from the local computer.
- Distributing different functional roles to users, including administrator, reviewers and processor.
- Recording logs which keep track of all changes of a version and only the administrator can generate a new version.
- Downloading the ontology in RDF, OWL and XML format.



Conclusions and Future Work

Conclusions:

- The collaborative working platform guarantees the comprehensiveness and instantaneity in the process of ontology construction.
- The Precision Medicine Ontology (PMO) built upon the collaborative working platform contains 10 top classes in precision medicine domain and 93 semantic relationships between them, which also supports the knowledge base developed based on it.

Future Work:

- Extending the function of the system such as ontology mapping, and enhancing the quality control.
- Improving the automation of transformation from multi-source non-ontology knowledge resources to ontology.

References

[1] Huang L, Fernandes H, Zia H, et al. The cancer precision medicine knowledge base for structured clinical-grade mutations and interpretations[J]. Journal of the American Medical Informatics Association Jamia, 2016, 24(3).

Acknowledgments

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