Understand

1

goal: gather, observe, and research available information to find the needs of the user

artifacts: design requirements

generate

1) identify the challenge & users

Metabolism is a complex system.
Interpretation of experimental data requires consideration of the system.
Users are research investigators in domains of biotechnology, pharmacology, and medicine biology, who study metabolism.
Users have diverse backgrounds and variable expertise in metabolism and data analysis.

2) find questions & tasks

Users need information about biological entities and relations between them.
This information gives relevant context for experimental design and interpretation of experimental results.
This information is especially important for interpretation of large-scale data that cover metabolic system broadly.

3) check with users or explore data

Users have sets of metabolites of interest, such as those for which they have experimental data. These sets often transcend or traverse typical, common metabolic pathways. Users need to know how these metabolites relate to each other through chemical reactions. They also need to know the proteins (and their transcripts and genes) that mediate catalysis or transport. Users need to know properties. Data describe entity abundance,

4) brainstorm design requirements

Users need methods to select subsets of the metabolic system that are relevant to interest (such as an experiment). This selection process might involve many criteria and be complex.
Subsets of metabolic system can still be complex
Users needs methods to explore network, perhaps from multiple perspectives according to interest.
Users need methods to recognize trends in experimental data that depend on context of metabolic system.

evaluate

5) compare and rank design requirements

For the sake of scope and feasibility, this project (or prototype sub-project) will focus on Exploration Tasks.

Exploration Tasks

- Represent the subset selection of the network visually, maybe in multiple ways according to users interest and user specification.
- Position nodes and links by network topology in a free layout, without restriction.
- Position nodes and links with layout restriction according to property or properties.
  - Cellular compartment.
- Highlight on the network graph all nodes or links that have a specific property.
- Display additional information for nodes or links upon selection or hover
- Show or hide nodes or links by selection on network graph.