

## Robot Data Visualization

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## Component Specification

Component Specification:

- Software components. High level description of the software components such as: *data manager*, which provides a simplified interface to your data and provides application specific features (e.g., querying data subsets); and *visualization manager*, which displays data frames as a plot. Describe at least 3 components specifying: what it does, inputs it requires, and outputs it provides.
- Interactions to accomplish use cases. Describe how the above software components interact to accomplish at least one of your use cases.
- Preliminary plan. A list of tasks in priority order.

Software components:

- Data\_loader
  - Objective: Downloads dataset into “data” folder as a CSV file. Then, the dataloader should load the CSV file and provide a nice interface for requesting data.
  - Input: dataset to download
  - Output: filtered data for the use of the SLAM algorithm
- GUI
  - Objective: Provides a nice interface for the user to interact with the data.
  - Input: Dataset and SLAM algorithm selection
  - Output: Visualization of robot’s data in the world frame.
- SLAM algorithm
  - Objective: Generate global map and robot path.
  - Input: Time series robot data in the robot frame.
  - Output: robot pose and global map at current step in data

Interactions to accomplish use cases:

- Use case (Use the data to generate route/map) interactions:
  - Data\_loader to load data, cache it, and provide an interface for requesting the data.
  - User choose a button and GUI will connect to the functions used
  - When SLAM function is called in GUI, the SLAM algorithm will run and display the result in the viewing window

Preliminary plan:

- **Task 1: Due 11/13 (Hao and Robin):** Dataset and develop Data Loader
- **Task 2: Due 11/16 (Ken):** Generate GUI that displays robot data
- **Task 3: Due 11/23 (Hao and Robin + Ken):** Overlay google maps data and robot path data
- **Stretch Task 4: Due 11/26 (Ray):** Setup algorithms available in Python Robotics Library and implement SLAM