1. **Hardware Overview**
2. **Software Overview**
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   1. **Localization**
      1. **MuSHR Localization Node**
      2. **Options**
         1. **AI-IMU Dead-reckoning: https://arxiv.org/pdf/1904.06064.pdf**
         2. **Using Beacons and Kalman Filter Technique: file:///C:/Users/Elyes/Downloads/paperVisualLocalization.pdf**
         3. **An Accurate Dead Reckoning Method based on Geometry Principles for Mobile Robot Localization:** [**file:///C:/Users/Elyes/Downloads/AnAccurateDeadReckoningMethodBasedonGeometryPrinciplesforMobileRobotLocalization.pdf**](file:///C:/Users/Elyes/Downloads/AnAccurateDeadReckoningMethodBasedonGeometryPrinciplesforMobileRobotLocalization.pdf)
   2. **Visual Perception**
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      2. **Heuristic-based Methods**
         1. **Hybrid A\***
         2. **Rapidly-exploring Random Tree (RRT)**
         3. **RRT-A\***
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      3. **Graph Search-based Methods**
         1. **Search-Based Planning Library**
         2. **ARA\* planning algorithm**
      4. ***Reactive Methods (reactive = with obstacle avoidance):*** [***https://docs.google.com/presentation/d/1SL5zVclQy-PI55SdyWugdKtCU1E7OzxIu8Uuz6nfaWg/edit***](https://docs.google.com/presentation/d/1SL5zVclQy-PI55SdyWugdKtCU1E7OzxIu8Uuz6nfaWg/edit)
         1. ***Follow the Gap***
            * ***Naïve Follow the Gap***
            * ***UNC Follow the Gap***
            * ***F1/10 Follow the Gap***
         2. ***Bug Algorithms***
         3. ***TangentBug Algorithms***
         4. ***Artificial Potential Fields***
         5. ***Gradient Descent***
         6. ***NH-TTC: A generalized framework for anticipatory collision avoidance***
      5. **Multi-Agent Coordination Planner for Multi-Goal Tasks**
         1. **Enhanced Conflict-Based Search with Optimal Task Assignment (ECBS-TA)**
   3. **Behavioral Planner**
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         4. ***Unscented Kalman Filter (UKF)***
      3. **Global Mission Planner**
         1. ***Options Assessment***

For global path planning in the case of non-holonomic vehicles, we can classify the types of path planning algorithms into:

- Search-based algorithms such as Hybrid A\*

- Sampling-based algorithms such as: RRT, RRT\*,

* + - * + ***Hybrid A\****
        + ***Rapidly-exploring Random Tree (RRT)***
        + ***RRT-A\****
        + ***ABIT\****
* ***Reactive Methods for planning (reactive = with obstacle avoidance)***

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    1. **Behavioral Planner**
       1. ***Options Assessment***
          - ***Finite State Machines (FSMs)***
          - ***Extended Finite State Machines (EFSMs)***
          - ***Hierarchical Finite State Machines (HFSMs): Harel’s Statecharts***
          - ***Behavior Trees (BTs)***
          - ***Fuzzy Logic***
    2. **Local Re-Planner**
       1. ***Options Assessment***
          - ***CBB-RRT\****
          - ***Lattice-based Path Planner***
          - ***Optimal Control Improvement***
       2. ***Implementation***
    3. **Velocity Profile Generation**
       1. ***Options Assessment***
          - ***Trapezoidal Profile Generation***
          - ***Position Quintic Polynomial for Trajectory Generation***
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