Robot Navigation using OCaML: A Linguistic Approach

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Robot Navigation

Purpose:
- Area exploration
- Optimization (e.g. avoiding obstacles, target following)

Diverse Field
- Control Theory
- Platform Analysis
- Communications
- Programming
- Simulation & Implementations
Project Aims

- Establish serial communication using OCaML
- Describe a robot and its language
  - Khepera II robot
- Write routines for navigation
Robot Analysis

- The Khepera II Robot
  - Miniature wheeled robot
  - Highly agile and accurate
  - Appealing to use in control

- Motion Analysis
  - Motion Primitives
    - Turn in place
    - Move forward
  - "Any motion can be described by a countable sequence of motion primitives"

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\(^a\) The K-Team, Mobile Robotics: http://www.k-team.com/mobile-robotics-products/khepera-ii
Robot Language

- **Actions:**
  - "Turn in place" (t)
  - "Move forward" (m)
  - "Reset origin" (r)
  - "Do nothing" (ϵ)

- **Optimized FSA:**

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S
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States: S
Actions: t, m, r
Start state: S
Transitions:
- S → S (t)
- S → S (m)
- S → S (r)