

# Temporal Planning to Coordinate Actions in Disaster Environment

Automated Planning

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# Introduction

- Planning for coordinated actions
  - may increase the performance of the system
- Disaster Environment
  - Many victims
  - Rescuer Team
- Proposal
  - Explore Temporal Planning in coordinated actions of a rescuer team
  - Actions take time

# Scenario

- Team
  - Firefighter
  - Rescuer
  - Doctor
  - Victim
- Environment divided in zones
  - Red zone – dangerous zone (Firefighter/Victim)
  - Yellow zone – intermediate zone (Firefighter/Rescuer/Victim)
  - Green zone – safe zone (Firefighter/Rescuer/Doctor/Victim)

# Scenario

- Possible Actions
  - Look for victims
  - Move between zones
  - Transport a victim
  - Provide first-aid
  - Provide medical assistance
- Each action demands an amount of time
- Initial State: number of victims in the red zone
- Goal State: All the victims treated

# Technical Approach

- The domain contains multiple agents
- The agents share the same goal and execute actions concurrently
- Agents have different capabilities
- There are constraints over which actions can be performed simultaneously

# Technical Approach

- The time taken by an action will be used to coordinate the agents
- The planner Temporal Fast Downward will be used
  - Expansion of a well-known planner the Fast Downward
- The amount of time to save all victims must be minimized
- Evaluation by simulation of problem instances

# Project Management

- (1 week) – go deeper in temporal planning and temporal fast downward
- (1 week) – domain formalization
- (1 week) – problem instances formalization and define experiments
- (2 week) – perform experiments
- (1 week) – write the final report and prepare the presentation

# Conclusion

- Challenging in the sense I have never worked with Temporal Planning before
- Expect to increase the performance of the agents
- Agents knowing the current and next actions of one agent may be useful



# References

Patrick Eyerich, Robert Mattmüller, and Gabriele Röger. Using the context-enhanced additive heuristic for temporal and numeric planning, 2009.

Dana Nau, Malik Ghallab, and Paolo Traverso. Automated Planning: Theory & Practice. Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, 2004.