

NLP in a Robotic Medical Assistance Setting

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Our lab works heavily with how natural language can be interpreted and handled for more seamless Human Robot Interaction. This project deals specifically with interaction regarding the management of medication and health care for elderly, who may use language that is not direct enough to be as easily parsed and needs to be handled in a more delicate manner.

Goal

Build a robotic system to be used by a robot for taking in natural language commands about medication and caregiving, preform necessary safety checks, and then execute the commands as deemed appropriate.



Image taken from “Robot and Frank” movie

Implicative Language as input

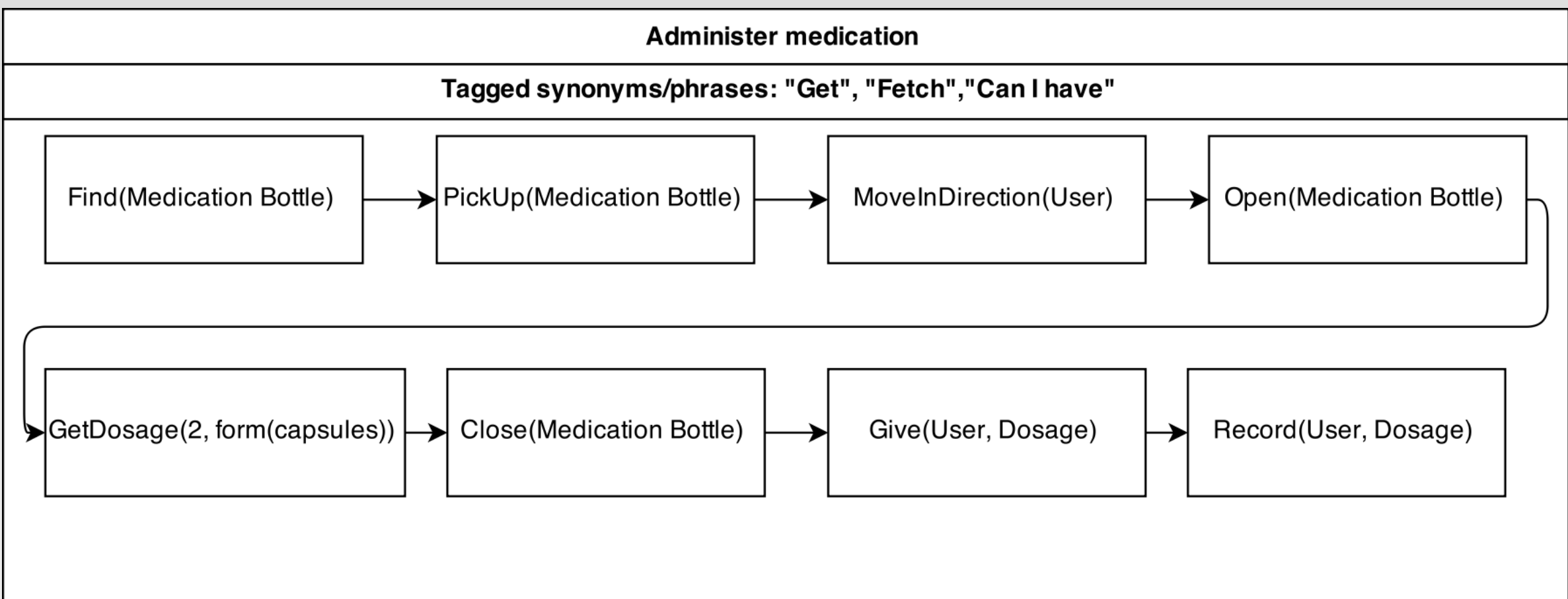
Given an abstract statement, the system will classify the statement as either a command, a statement or a non-medical sentence.

- A sentence will be considered a **command** if it contains a verb implying action from the robot onto the user.
- A sentence will be a **statement** if it contains a symptom adjective, or some implication of need for care that should prompt for the robot to act.
- A sentence will be classified as **unrelated** if there is no implication of the robot or medical need but still needs to be addressed.

Category	Natural Language Sentence	Course of Action
Easy (Command)	Please give me a Zyrtec.	Retrieve medication
Easy (Statement)	I need two Advil.	Retrieve medication
Medium (Statement)	Do you know where my blood pressure medicine is?	Retrieve medication
Medium (Command)	Can you help me find some medicine for my nasal congestion?	Retrieve medication
Difficult (Command)	Can you hand me ten Vicodin?	Reject command
Difficult (Statement)	My left arm tingles and my chest hurts.	Call emergency service
Difficult (Command)	My teeth are in pain... Can you get me the drugs?	Retrieve medication
Unrelated (Command)	Fetch me some water.	Get water
Unrelated	Thank you, deary.	Standby

Samples of collected corpus

Mapping Implied Verbs to Grounded Action



Example of grounded action

Given verb qualifiers from the natural language sentence, a group of synonyms is found from WordNet for that verb along with other syntactic features, that are then used as features for the semantic parser. The semantic parse is then used to choose actions for the system to preform.

System Architecture

