

Generating Natural Language Descriptions of Trajectories Using the Long Short Term Memory Neural Network Architecture

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I. PROBLEM DESCRIPTION

Given a point-cloud $p \in P$ and a manipulation trajectory $t \in T$, our goal is to output a free-form Natural Language (NL) description $l \in L$ that describes the trajectory t .

$$f : T \times P \mapsto L \quad (1)$$

II. MOTIVATION

Currently there is not much research in the area of Explainable Artificial Intelligence (XAI), an area of AI that aims at creating systems that allow for an agent's actions to be understood by a human user. Lomas et al., discusses how giving an agent the ability to explain it's actions would help human users gain trust the actions taken by an agent [1].

Our goal is to create a system that allows an agent to explain the actions it will take or that need to be performed to complete a given task. Thus, allowing for better cooperation between the agents and human users, while at the same time allowing the human users to better understand the intentions of the agent.

III. HYPOTHESIS

Given $T \times P$, a Long Short Term Memory (LSTM) Neural Network Architecture may be trained to generate NL descriptions that accurately describe the actions the agent performs under a trajectory $t \in T$.

IV. METHODS

V. EVALUATION

A. Quantitative

Sentence Comparison

B. Qualitative

To qualitatively test our proposed system we plan on using a human rating system, where humans would compare the NL description generated by the system against that of the NL description in the gold standard. The humans will then rate the NL description generated (With a score?) by judging how well the NL description the states the same information as the gold standard NL description.

REFERENCES

- [1] M. Lomas, R. Chevalier, E. V. Cross II, R. C. Garrett, J. Hoare, and M. Kopack, "Explaining robot actions," in *Proceedings of the seventh annual ACM/IEEE international conference on Human-Robot Interaction*. ACM, 2012, pp. 187–188.