Poster #39

A Systems Engineer's Virtual Assistant (SEVA)

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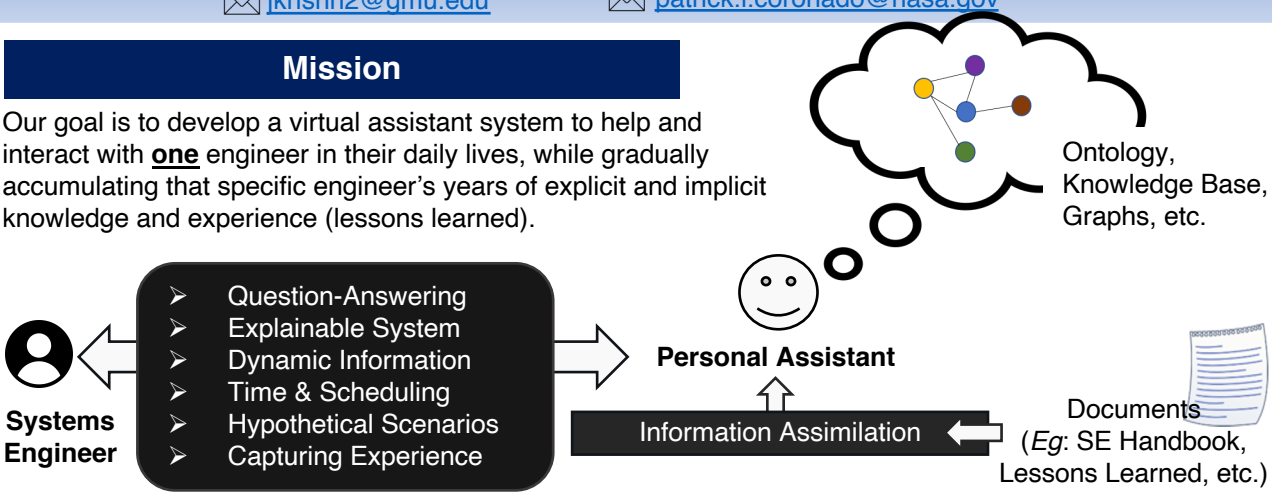
Mission

Our goal is to develop a virtual assistant system to help and interact with **one** engineer in their daily lives, while gradually accumulating that specific engineer's years of explicit and implicit knowledge and experience (lessons learned).



Motivation

- NASA currently lacks any personal assistant systems that are designed do trivial information management for systems engineers that deals with multitude of projects and disciplines.
- Although there exists knowledge engines and ontologies for the Systems Engineering domain such as MBSE, IMCE, and OpenCaesar, generic commonsense acquisition from raw text is rarely discussed; we aim to address this challenge.

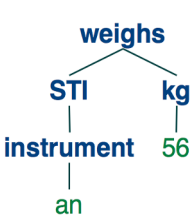
Our Current Goal

Extract knowledge from text to automatically construct knowledge graphs.

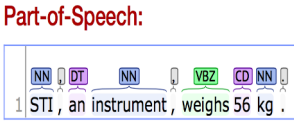
Open Information Extraction

Sentence: STI, an instrument, weighs 56 kg

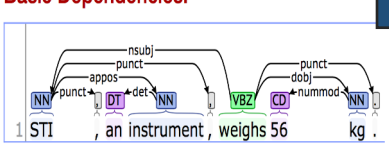
Dependency Parse Tree



Part-of-Speech:

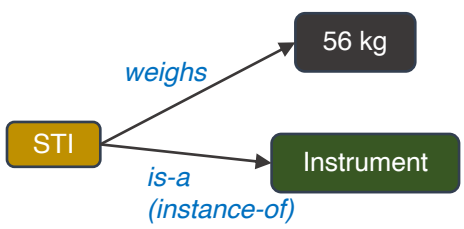


Basic Dependencies:



Tools: Stanford OpenIE, OpenIE by AI2, NLTK, Stanford CoreNLP, POS Tagger

Entities and Relations



Knowledge Graph (KG) Construction
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Entity Linking

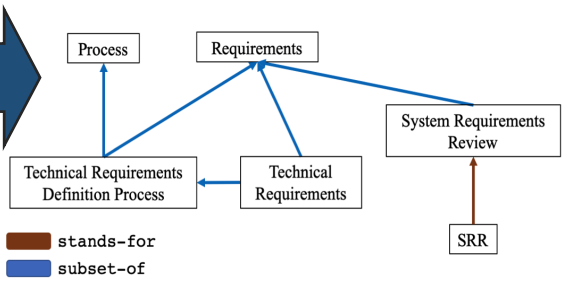
Concept Recognition

- **Concepts** are Systems Engineering domain-specific entities. Eg: '*Technology Readiness Level*', '*Project Manager*', '*Technology Maturity*', etc.
- **Goal**: Learn how to extract such entities from text.

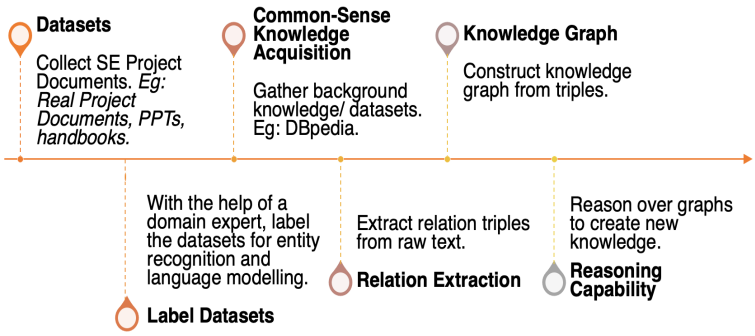
SEG is the art and science of developing an operable system capable of meeting requirements within often opposed constraints.

Abbreviation | System Concept | Operation Concept | SE Term

Sample KG Snippet



Future Work: Scalable + End-to-end



Conclusion

- SEVA: A framework to assist Systems Engineers in their daily activities.
- Commonsense knowledge acquisition and retaining lesson learned.
- From raw text to KGs (Entities and-Relations) using NLP.

Publications/Code/References: https://github.com/jitinkrishnan/NASA-SE