Visualizing the Execution of Command Patterns

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Overview

• Background
• Goal
• Solution
• Results
• Limitations and Future Work
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Background

Chemical Experiments

Cyber-Physical Systems (CPS)

Robotic Arm
C9 Controller
N8+Grippers+Probe

Lab Computer Running Python Scripts

Legend
- Ethernet
- Serial/USB

Solid Dosing
MT Quantos

Liquid Dosing
Dispersed from Tican Cuvro

Stirring/Heating
IKA Inegiate

Quantos z-axis control
Background

Chemical Experiments

Cyber-Physical Systems (CPS)

Timestamp: 2021-10-09
Module: C9
Command Name: MOVE
Arguments: Location(1,2,3)
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Goal

• Visualize the execution of command patterns.
• Similarity and differences between experiments.
• Understand the signatures of the commands for every experiment.
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Solution

• Tools : Python, Plotly and Dash
• Web Application
• Demo URL: https://drive.google.com/file/d/1b4Vhg43WhSadp8wNxU2hnIOyEaaUN5Fm/view?usp=sharing
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Results

• Three users ran the application and filled a survey.
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Limitations and Future Work

Limitations / Lessons Learnt:
• Users found it difficult to go back to the overall view.
• As the dataset increases, it will be difficult to show the overall view.
• Choosing the best tool according to the requirements in the start.

Future Work:
• Real-time execution of experiments.
Summary

• Visualized the command patterns for different experiments.
• Web application.
• Useful in understanding the comparisons between different experiments and the signature of each experiment.
• Overall, users found it easy to use and interactive.
Thank you!