Visualizing the Execution of Command Patterns

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- Goal
- Solution
- Results
- Limitations and Future Work

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Background Timestamp: 2021-10-09 Module: C9 Command Name: MOVE csv Arguments: Location(1,2,3) **Cyber-Physical** csv CSV Systems (CPS) Chemical **Robotic Arm** Experiments Legend C9 Controller Ethernet N9 • Serial/USB 0 N9+Grippers+Probe 0 Lab Computer Middlebox Running Python Scripts Running IDS Solid Dosing Liquid Dosing Stirring/Heating -1 MT Quantos Dispensed from Tecan Cavro \odot Quantos z-axis control

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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/1b4Vhg43WhSadp8wNxU2hnIOyEaa UN5Fm/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 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!

