**RESULTS NOTEBOOK**

* **Learning Jet Dynamics from Videos**

(Reference to Figure 2(a, b, c, d), Figure 3(a, b, c, d))

-Video data is the easiest and therefore most common data acquired in MEW process.

-Cameras used to capture the process range from 30 to 50 frames per second.

-Process is highly unstable and therefore needs to be monitored and quality of the print needs to be controlled at all times.

-Therefore real time video processing is essential.

-In Figure 2 four features of the jet are extracted in real time.

-In Figure 2a the fluctuation of the jet radius from nozzle tip to table through time is depicted. The jet radius stays the same through time with minor variations as implied by Zmayev et al., Mayadeo et al. etc

-In Figure 2b the fluctuation of the jet area from nozzle tip to table through time is depicted. The jet area undergoes significant variation, with spikes detected when the table reaches the end of each travel-path. Such area increases indicate unwanted volume/mass anomalies in the final print. Being able, with computer vision, to quantify those anomalies might enable, through further study, to take necessary precautions at the print part design phase.

-In Figure 2c the fluctuation of the jet angle with the vertical from nozzle tip to table through time is depicted. The jet angles undergo major variation. This phenomenon is fully explained by the table accelerations and decelerations at the end of each travel-path. Such variations result in major differences between the designed travel-path and the printed ‘part’ as proved by Dalton et al.

- In Figure 2d the fluctuation of the jet velocity from nozzle tip to table through time is depicted along the table axis. Again, major variations are detected when the table accelerates or decelerates at the end of each travel-path.

Find a way to explain why radius and jet lag are the most important features to monitor so that the flow of the paper can be restored.

- Being able to predict jet features using the minimum amount of data can extremely reduce processing time/ cost

- Some reference to Figure 8

- Why Gaussian Process Regression can help us understand the Physics behind MEW, theory of GPR.

- How Vjm was calculated (Zmayev model, PSO algorithm)

- Why decrypting the correlation between speed ration and jet lag is important and can empower us to design our prints using out of the box thinking

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* **Learning Jet Dynamics from Videos and Physics**

(Reference to Figure 4(a, b)

* **Active Learning of Jet Dynamics**

(Reference to Figure 5(a(i-vi), b(i-vi)), Figure 6(a, b, c, d), Figure 7(a, b, c, d)