



"Denoising"

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"Perfect"-ness

1 Introduction

To optimize σ , we need to consider factors in considering the "perfect" image I

Is I the image with the smoothest kinematic curve?

Or, is it the image with the greatest `brightContrast/darkContrast`? |



Smoothness

1 Introduction

- Dimensionless jerk (DLJ) can define smoothness but is unaccurate with heavy noise [1]
- Smoothness can be defined using the Spectral Arc Length (SPARC) measure [2]
- SPARC is an overall better metric but has falloffs in measuring smoothness in rhythmic or harmonic movement [1]
- Balasubramanian provides a Smoothness Python Library to quantify smoothness [1]

Measuring changes in Sigma

1 Introduction

Sample Code

```
for sigma in sigma_values:
    # Write new SIGMA value to the .env file
    with open(env_path, "w") as f:
        f.write(f"SIGMA={sigma}\n")

    # Load the updated .env file (override any existing values)
    load_dotenv(env_path, override=True)

    print(f"Running notebook with SIGMA={sigma}")

    # Execute the converted Python script
    exec(open("./denoisingnew.py").read())
```

Bibliography

2 Introduction

- [1] S. Balasubramanian, A. Melendez-Calderon, A. Roby-Brami, et al. “On the analysis of movement smoothness”. In: *Journal of NeuroEngineering and Rehabilitation* 12 (2015), p. 112. DOI: 10.1186/s12984-015-0090-9.
- [2] Austin J Scholp et al. “Spectral arc length as a method to quantify pharyngeal high-resolution manometric curve smoothness”. In: *Neurogastroenterology and Motility* 33.10 (2021), e14122. DOI: 10.1111/nmo.14122.



”Denoising” *Thank you for listening!*

Any questions?