

# Data Driven I-V Feature Extraction for PV modules

Paper presentation

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# Motivation

- Performance parameter extracted from I-V data set :  $P_{mp}$ ,  $V_{oc}$ ,  $I_{sc}$ ,  $R_s$ ,  $R_{sh}$ , FF are essential for diagnosing degradation of PV modules
- Data driven technique can be applied to a **large amount** of data in a **short time** in contrast with traditional fitting of diode equation
- Applied to 2.2 million real I-V datasets, took 3 hrs to complete
- No requirement of device parameter to be input from the researcher
- Applicable on non standard I-V datasets having **multiple steps**

# Method

- 1 **Fit smoothing spline** on raw I-V dataset (insufficient points near  $V_{oc}$ /unequal spacing) to get 500 equal spaced points in voltage
- 2 Regression performed on **moving window** of 5 consecutive I-V points
- 3 **Slope** of each regression line is used to identify either **step** or **MPPT**
- 4 **Identify the segments (steps)** : Steeper slope on the left than right
- 5 If step is found, I-V feature is extracted separately for both the parts



Figure: lion!!



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