

Evaluation verschiedener Fahrspurerkennungsalgorithmen

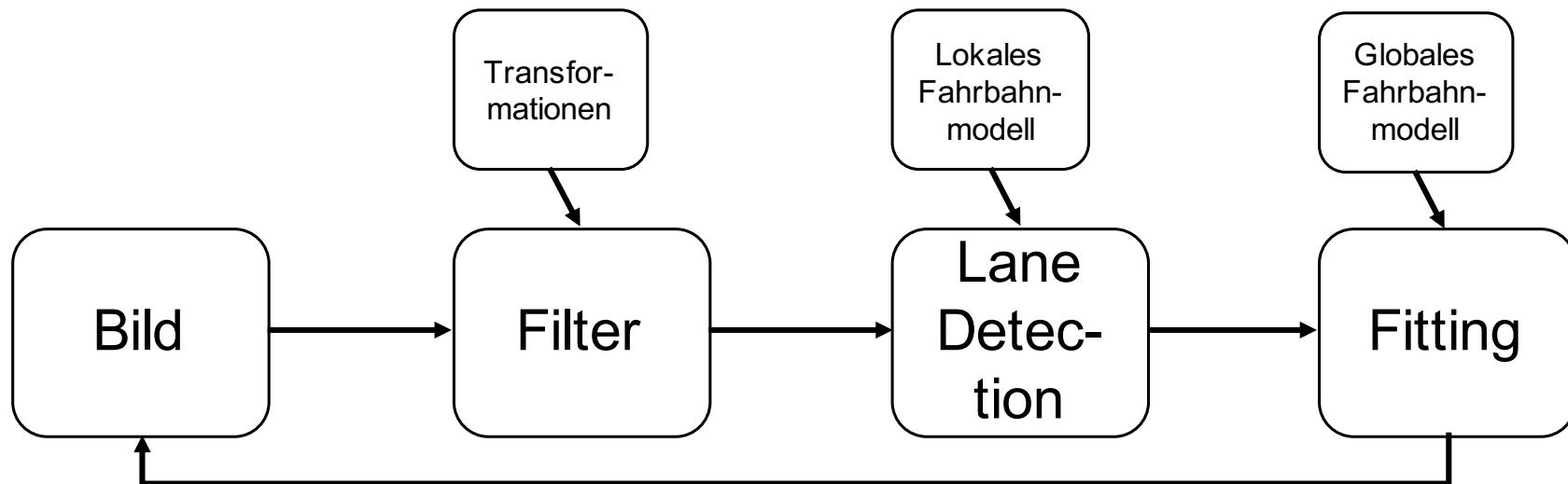
Masterprojekt – SDI Community Lab



Motivation / Anforderung

- 1. RC-Car SDI Community Lab**
- 2. Smart Camera Praktikum**

Ablauf Fahrspurerkennung



Filter



Filter

- **Canny-Edge**
- **Sobel-Magnitude**
- **Row-Filter**
- **Color-Thresholding**
- **Multi Filter**
- **Bird View Transformation**

Bird View Transformation



Canny-Edge (1/4)



Sobel-Magnitude (2/4)



Row-Filter (3/4)

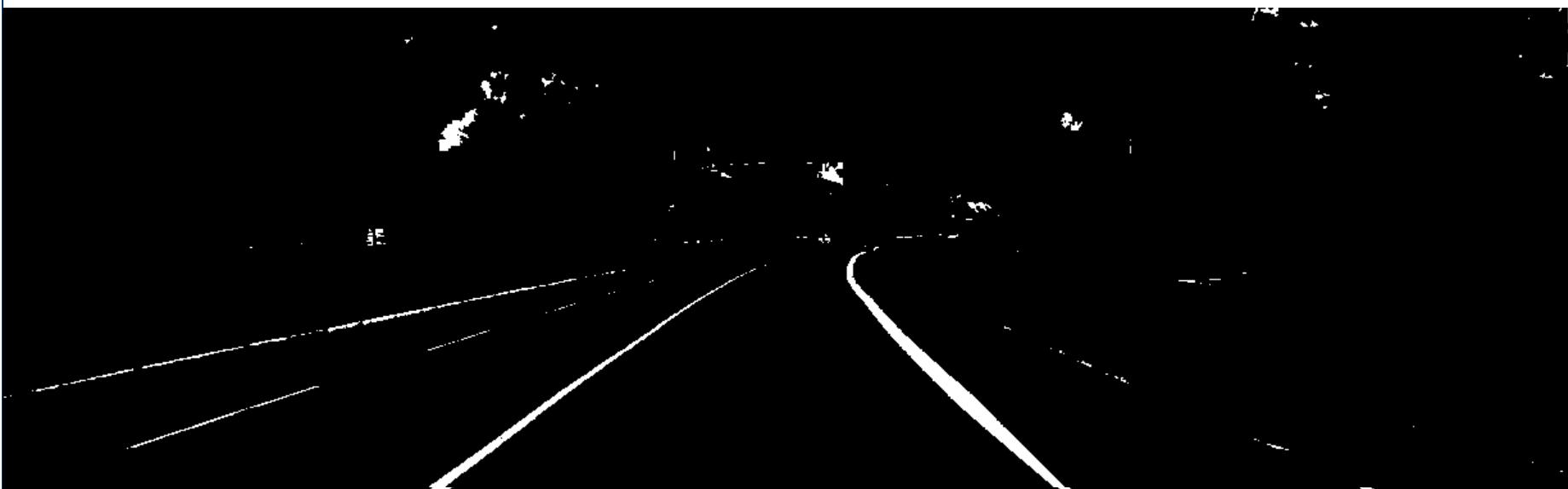


Color-Thresholding (4/4)



Multi Filter

OUT: MultiFilter



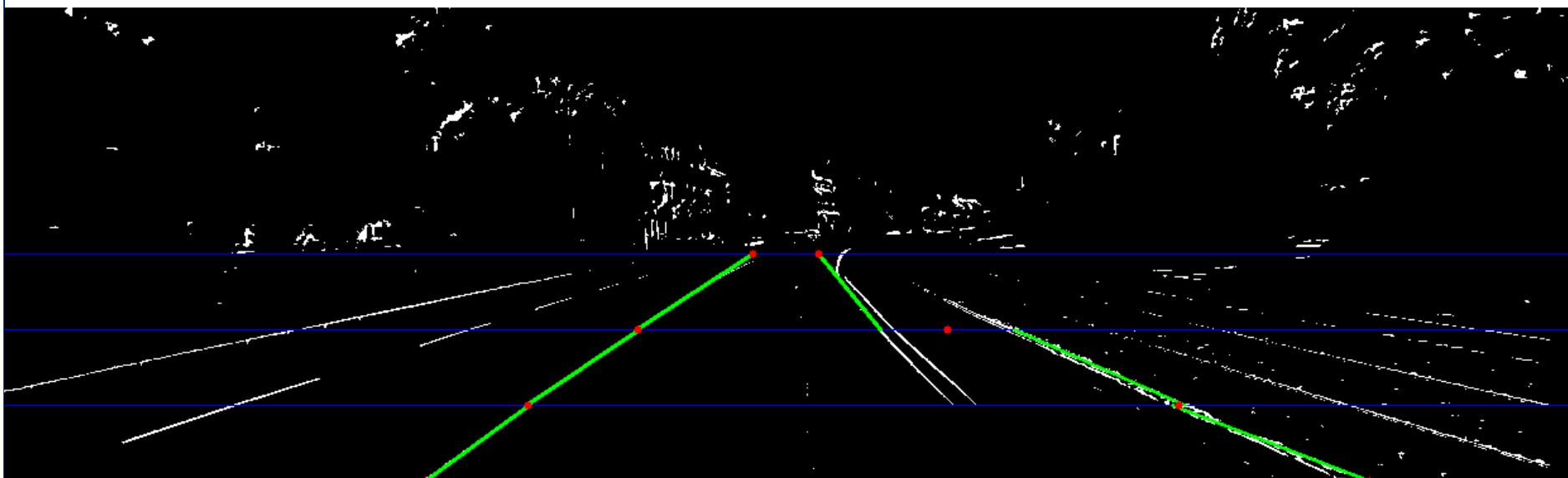
Lane Detection Algorithmen



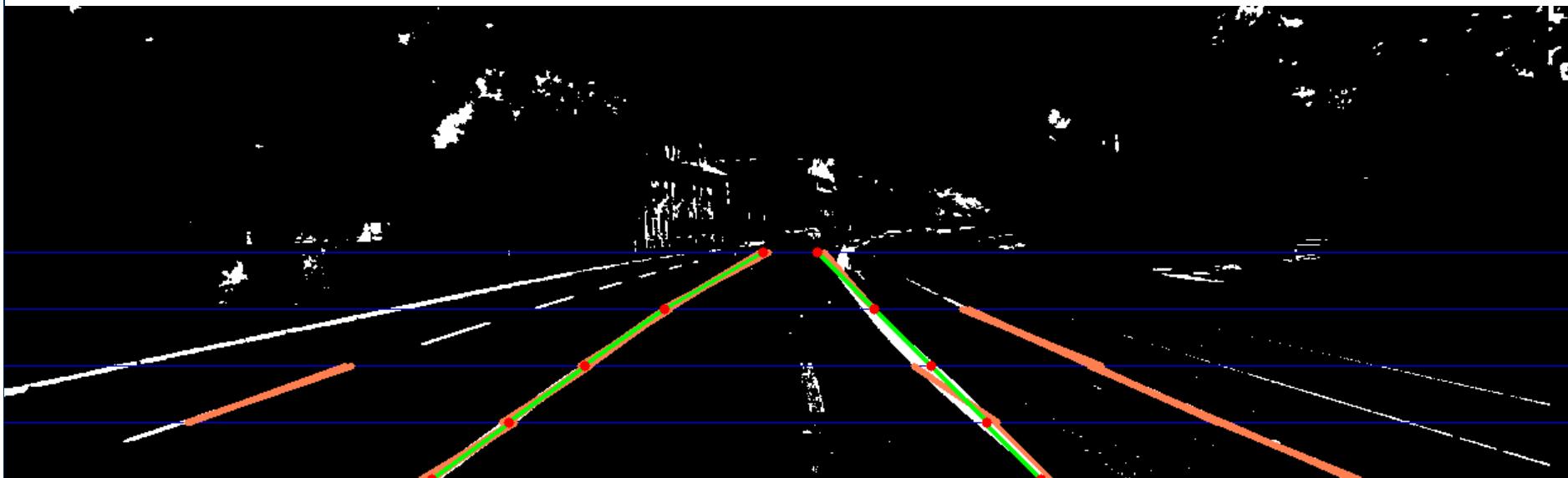
Algorithmen

- **Partitioned Hough**
- **ALM**
- **Sliding Window**
- **Fixed Window**
- **Random Lines**

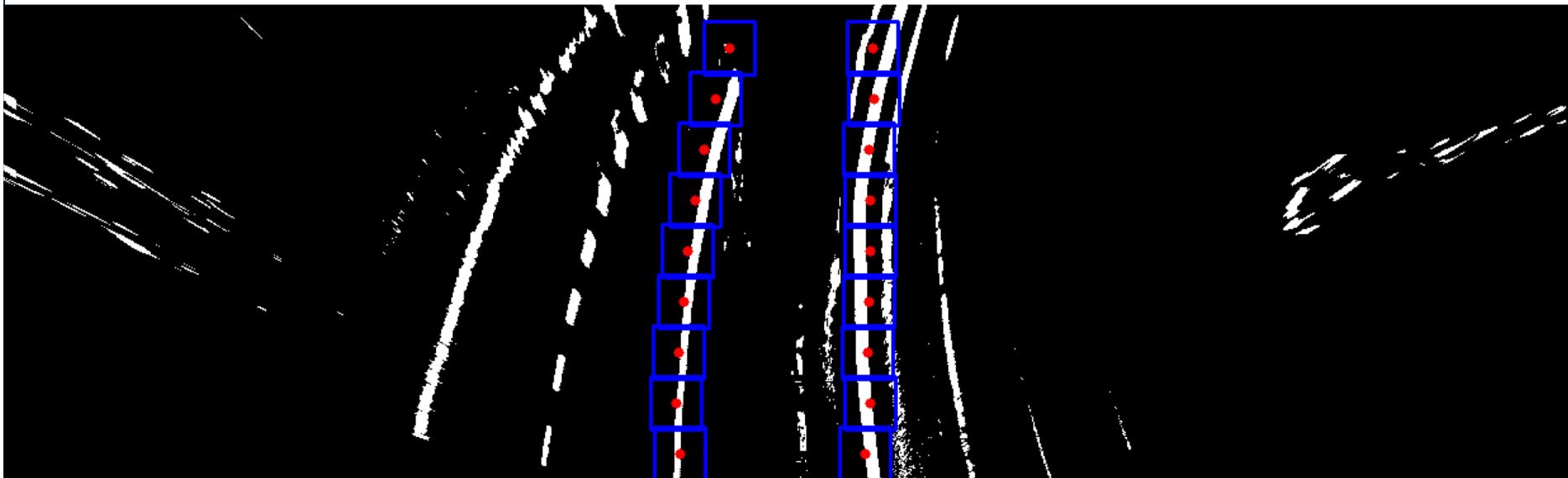
Partitioned Hough (1/5)



ALM (2/5)



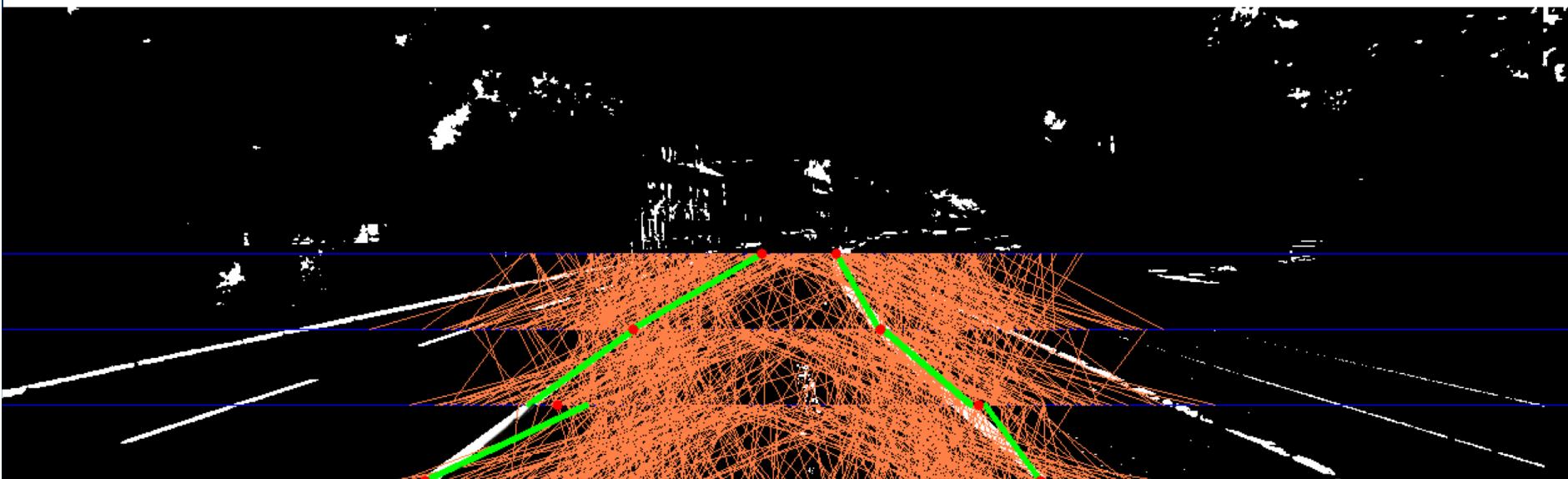
Sliding Window (3/5)



Fixed Window (4/5)



Random Lines (5/5)



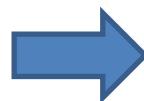
Evaluation



Parameterraum

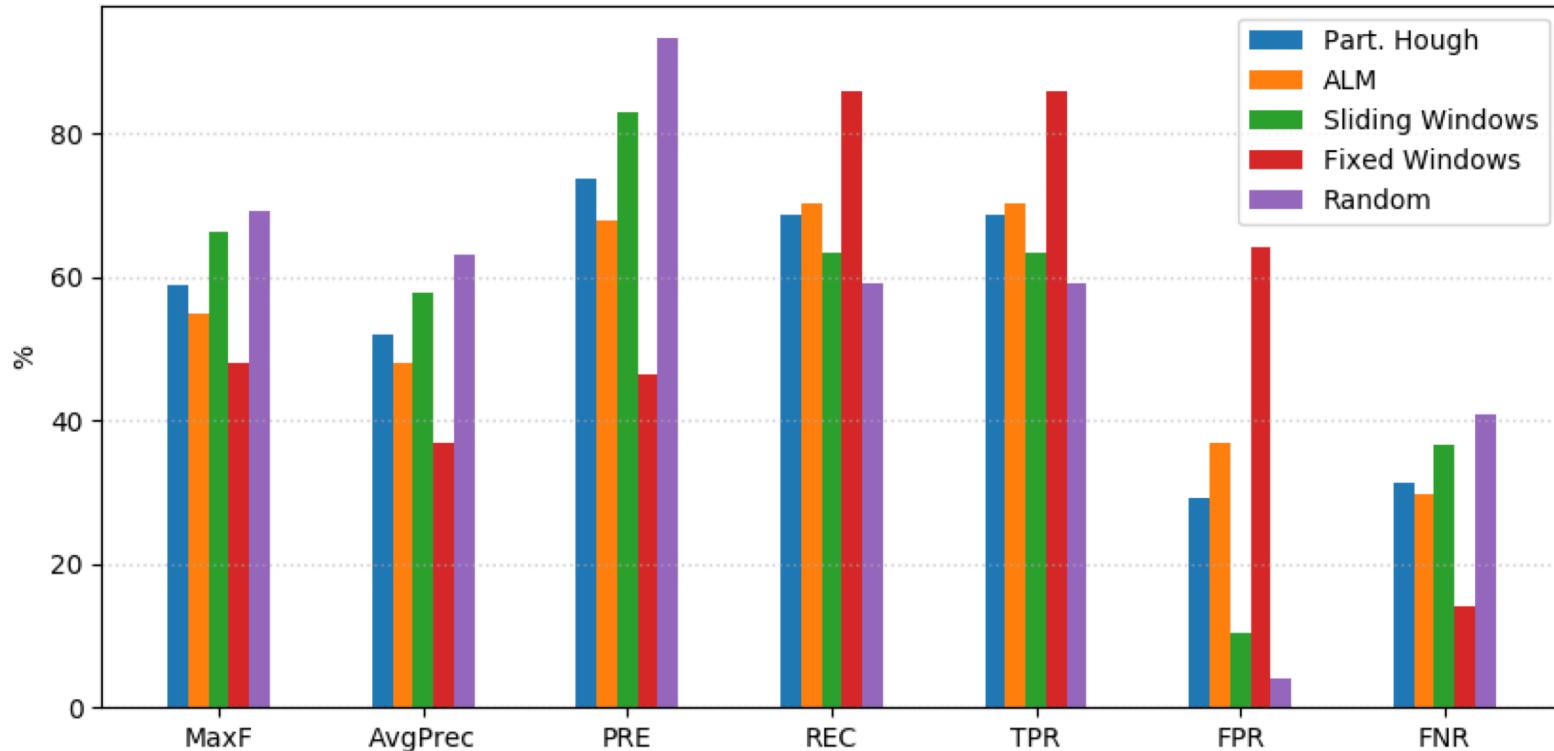
Parameter	Wertebereich	Relevanter Algo
Algo	[1,2,3,4,5]	
NUM_PART	[2,3,4,5]	1,2,5
NUM_LINES	[2,3,4,5]	2
W_NUM_WIN	[4,5,7,9,11]	3
W_WIDTH	[20, 40, 60, 80]	3, 4
R_NUM_LINES	[200, 400, 600, 800]	5
B_VIEW	[true, false]	1,2,3,4,5
Filter1	[true, false]	1,2,3,4,5
Filter2	[true, false]	1,2,3,4,5
Filter3	[true, false]	1,2,3,4,5
Filter4	[true, false]	1,2,3,4,5
ORDER	[2,3]	1,2,3,5

+ 3 für B_VIEW
+ 6 für Filter

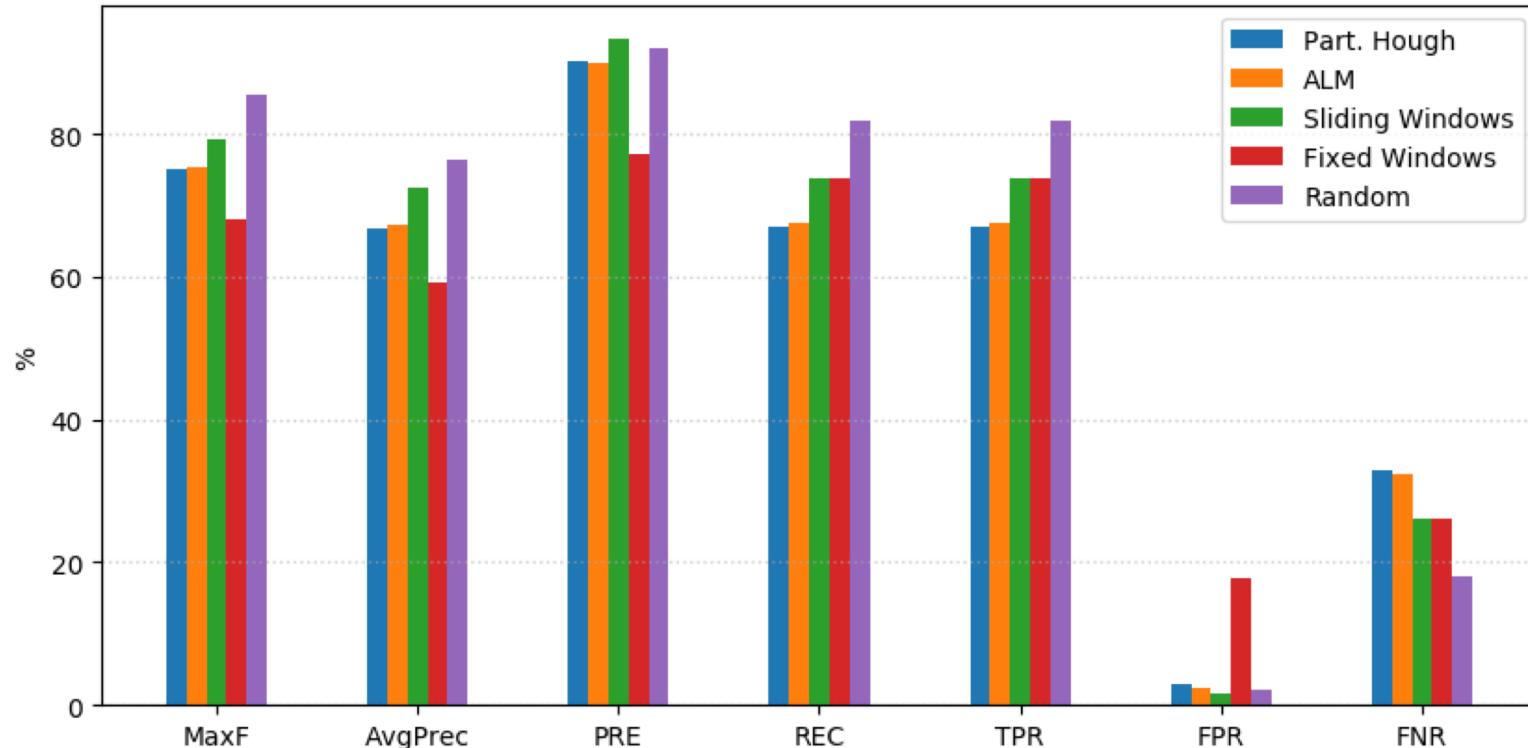


Algo	Komb.
Algo1	240
Algo2	960
Algo3	1200
Algo4	120
Algo5	960
Insg	3480

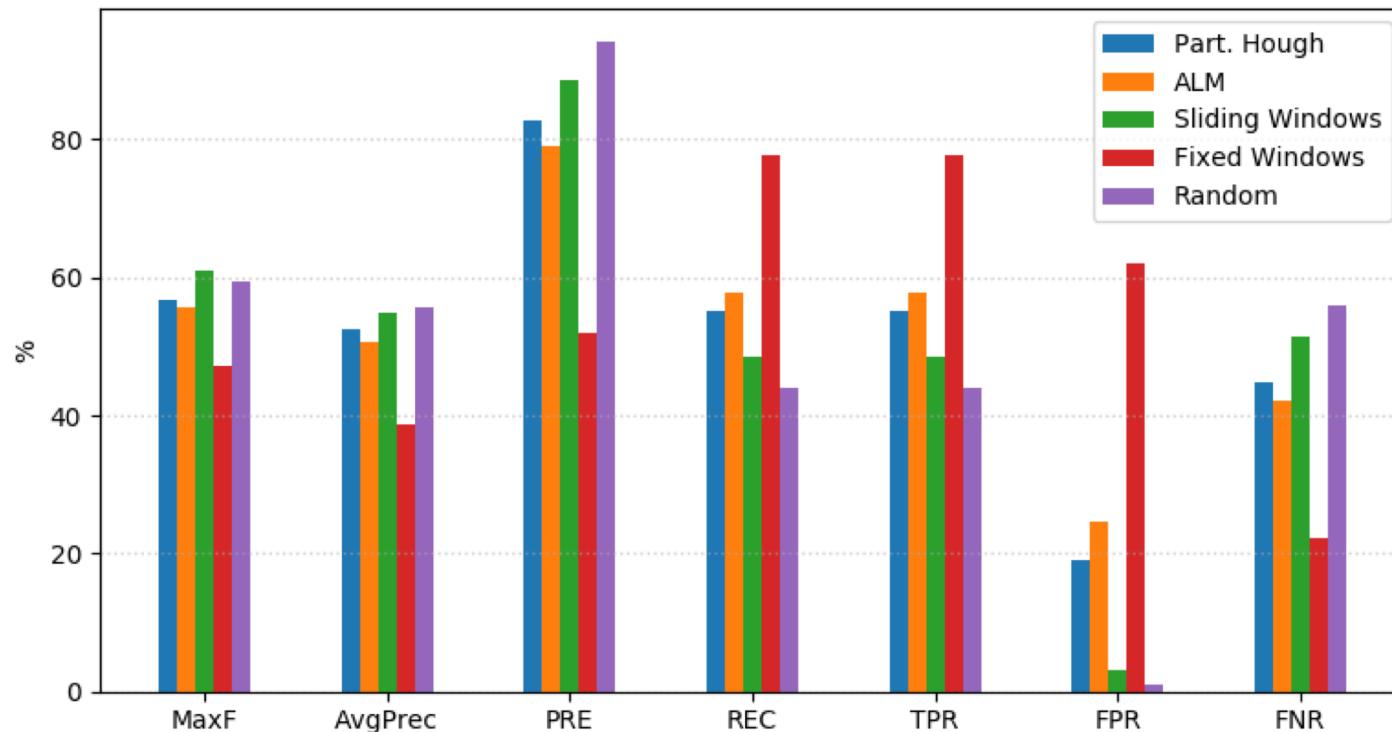
Average Figures For All Images

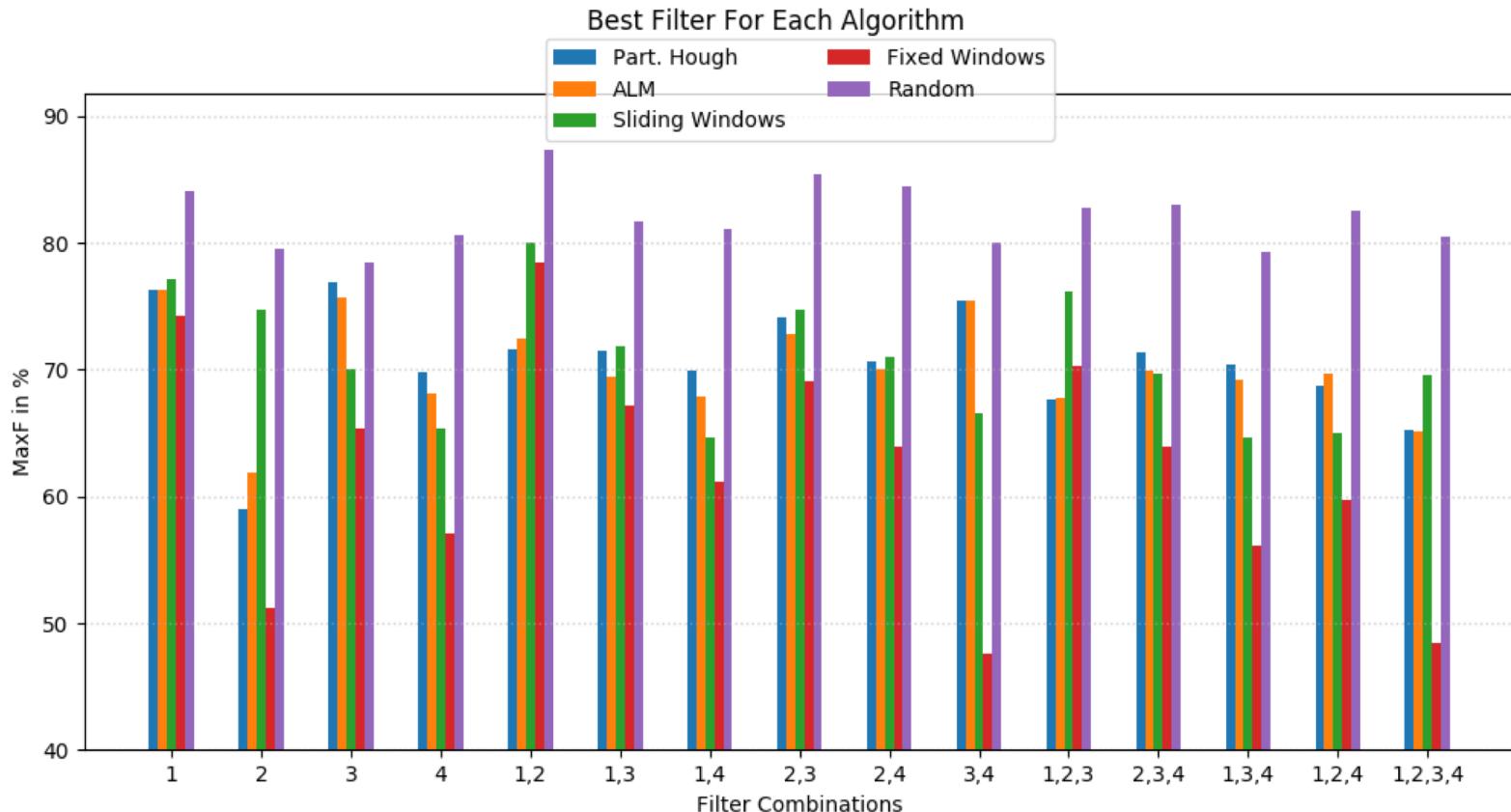


Average Figures For 20 Best Configurations

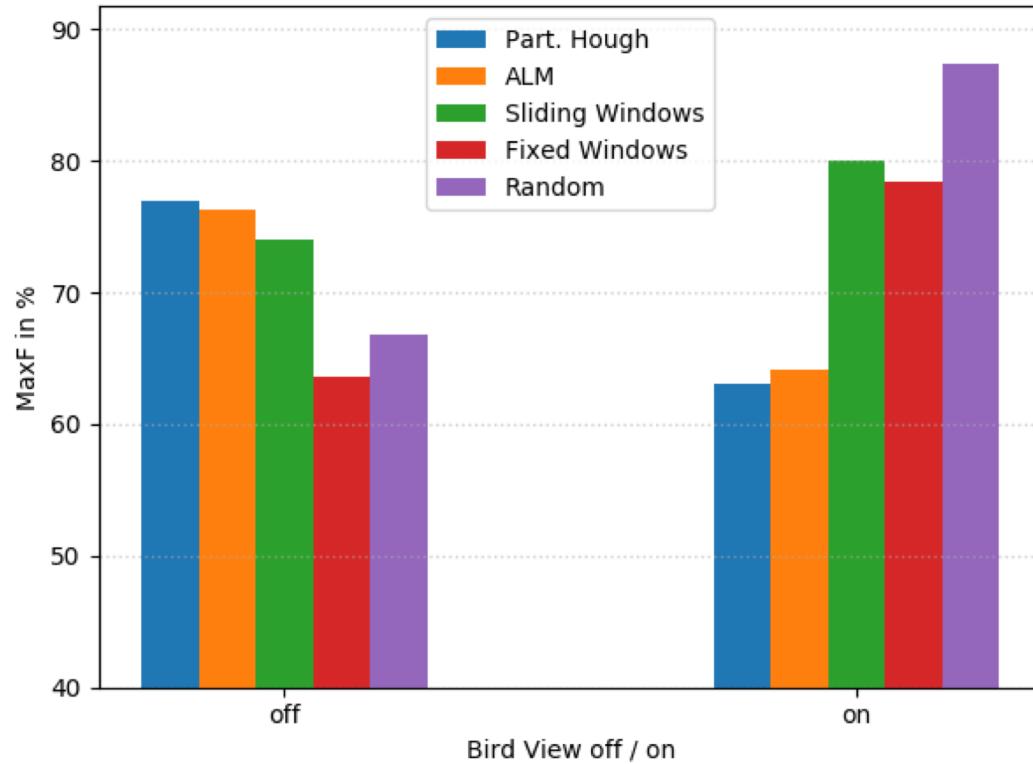


Average Figures For Image 6

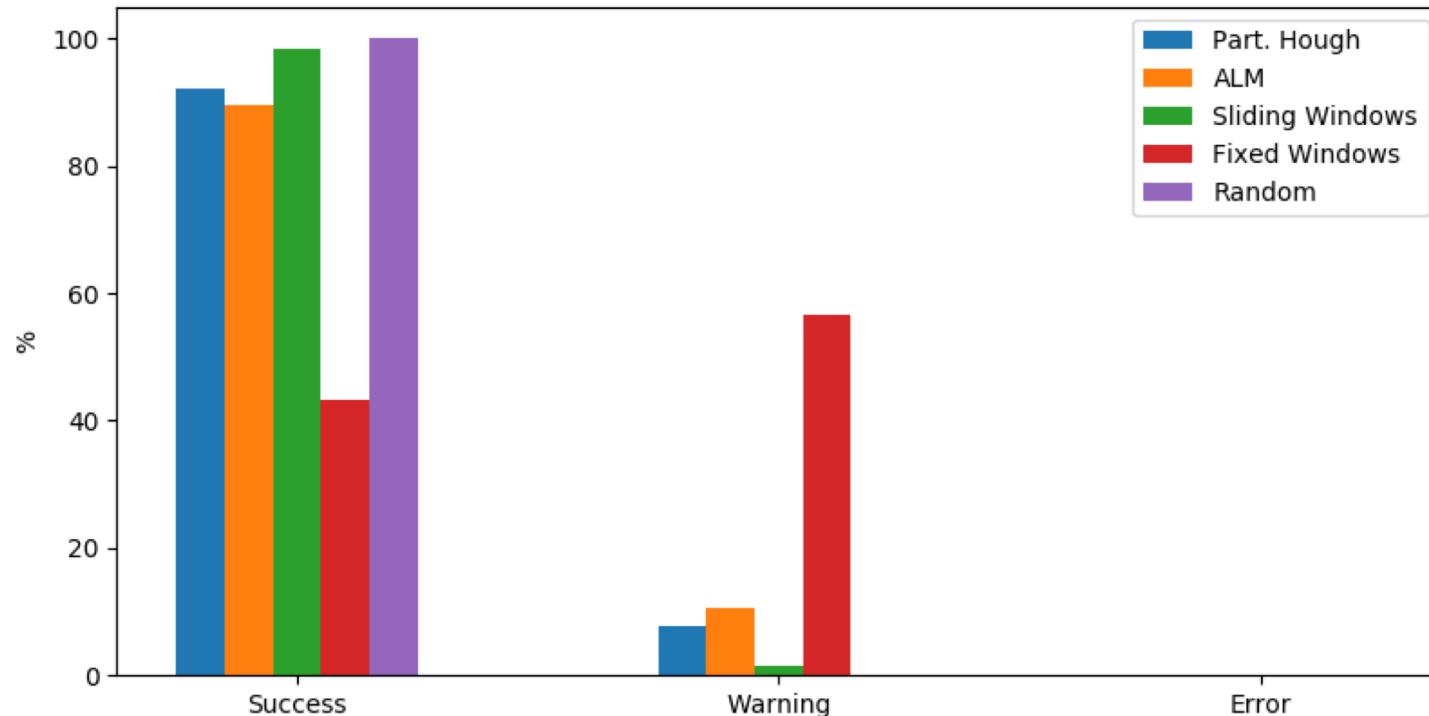




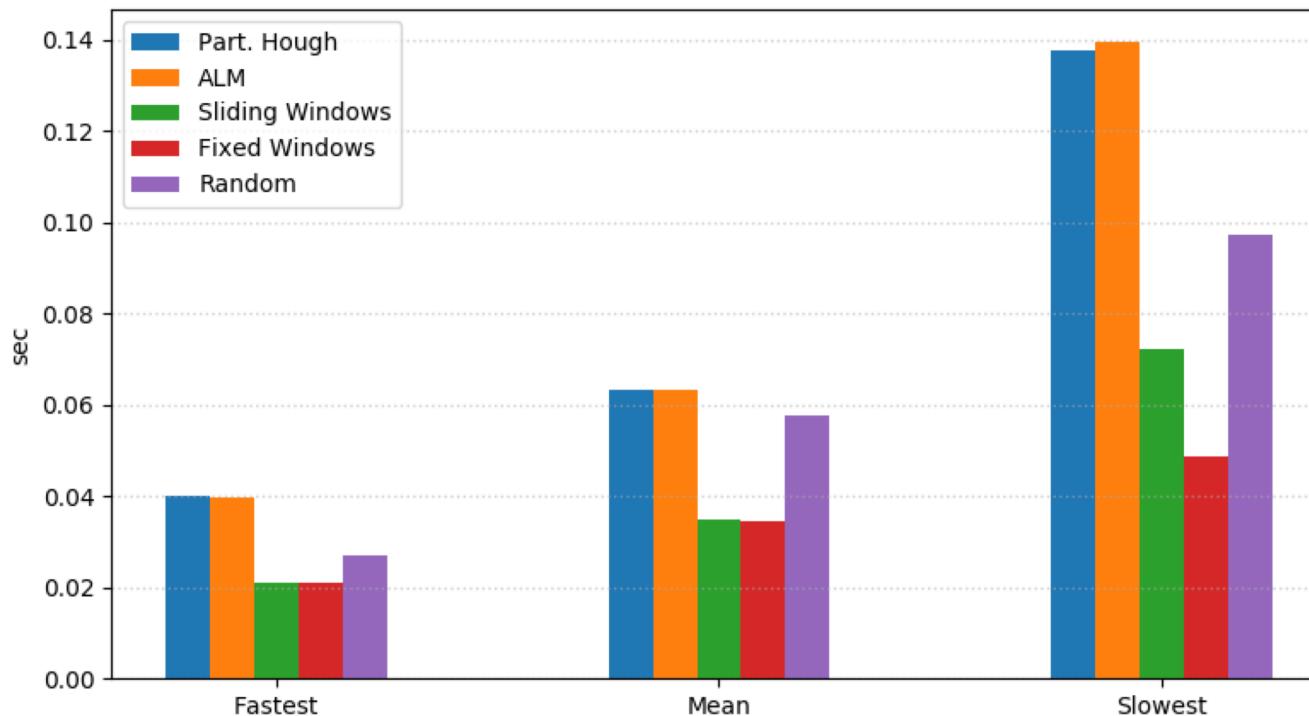
Best Bird View Setting For Each Algorithm



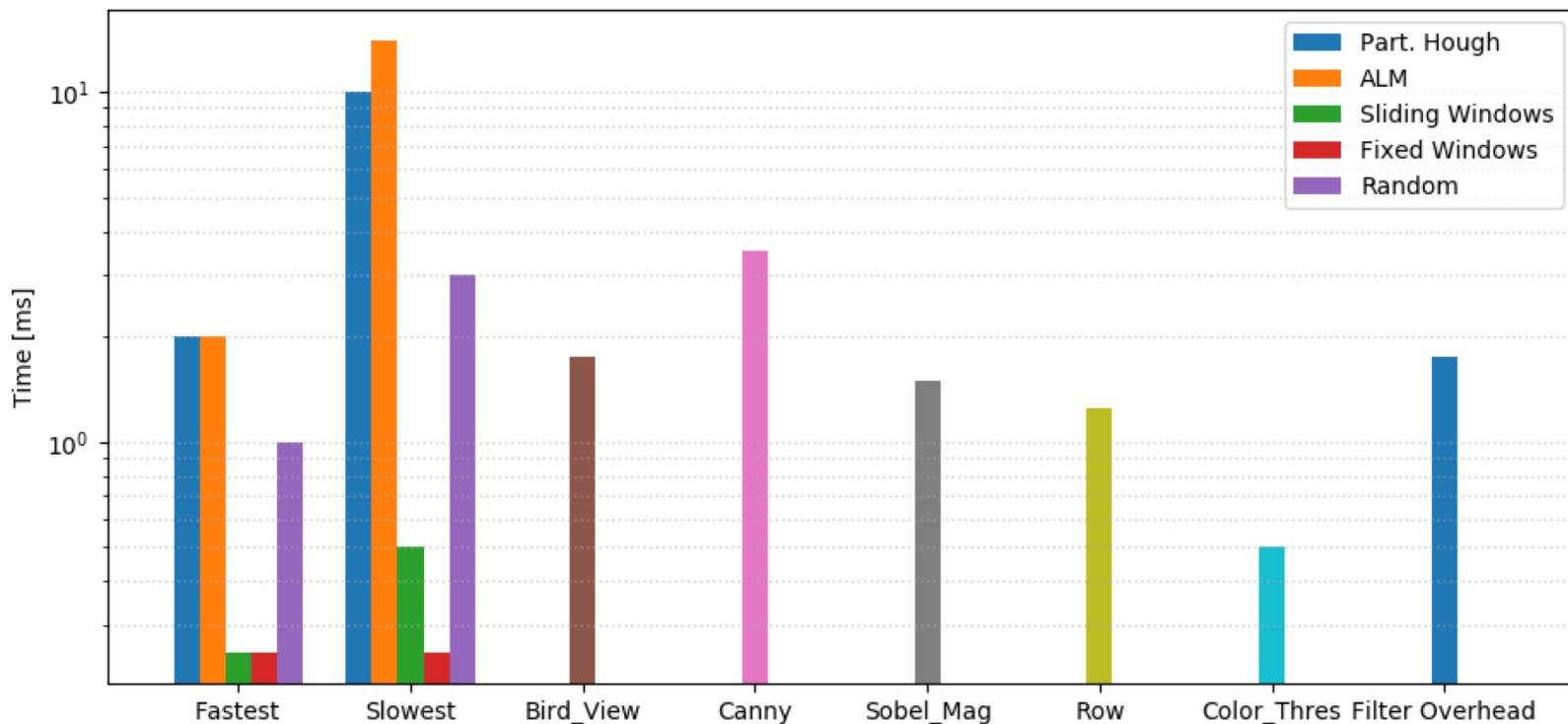
Exit Codes - 'Robustness'



Execution time in sec



Profiling Of Algorithms + Bird View + Filters



Zusammenfassung



Algorithmus/Filter	Eigenschaften
Random Lines	<ul style="list-style-type: none">• Beste Kennzahlen• Gute Laufzeit• Beste Robustheit• Meiste Optimierungsmöglichkeiten
Sliding Window	<ul style="list-style-type: none">• Gute Kennzahlen• Beste Laufzeit
Filter [1,2]	<ul style="list-style-type: none">• Langsam• Bestes Ergebnis (mit beiden Algorithmen)
Filter [2,3]	<ul style="list-style-type: none">• Schneller• Gutes Ergebnis
Filter [2,4]	<ul style="list-style-type: none">• Am schnellsten• Gutes Ergebnis

Fragen?

Danke!

