

KUWAHARA FILTER

Obrada slike i računalni vid

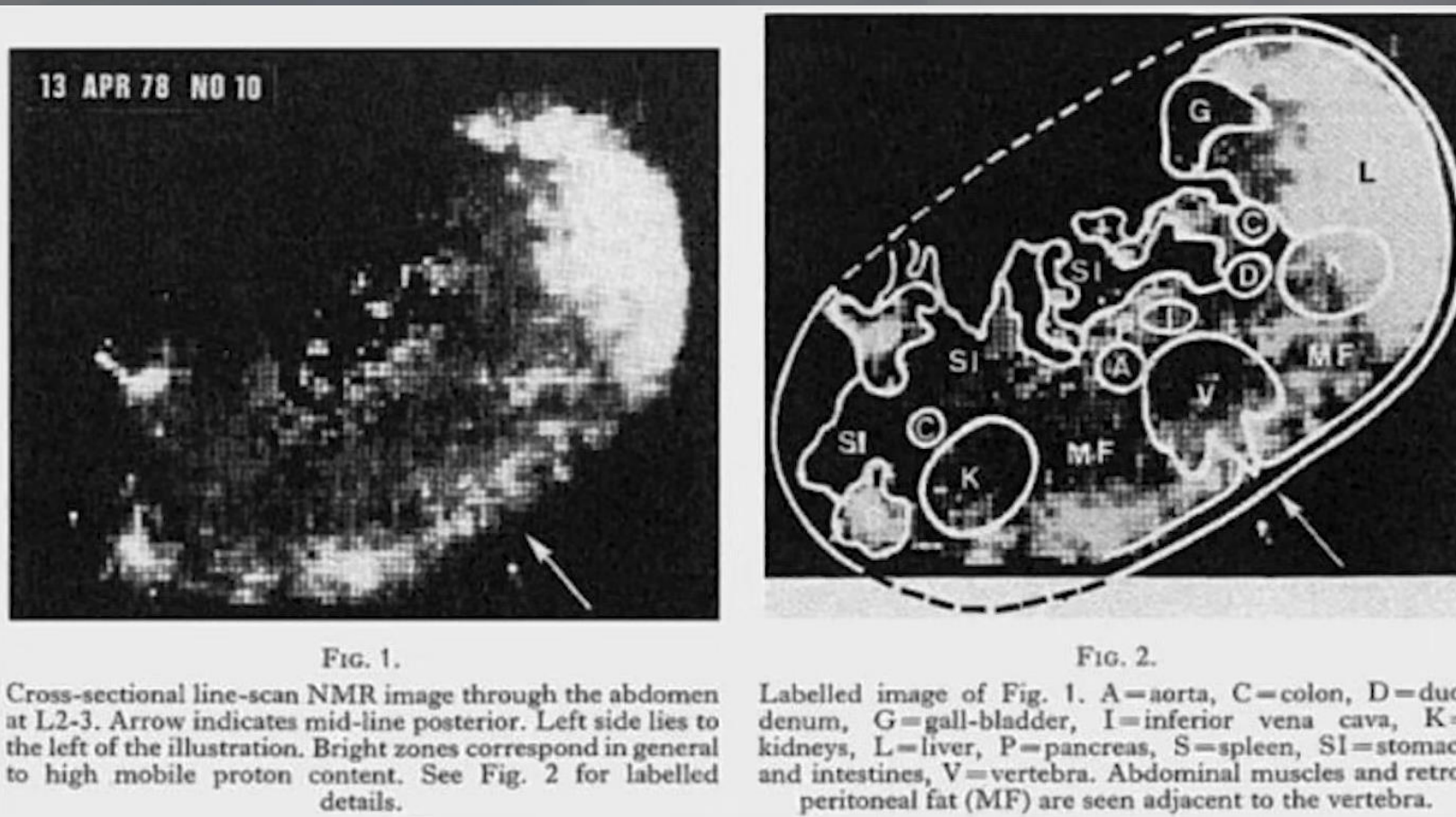
POVIJEST

dr. sc. Michiyoshi Kuwahara

sveučilišta Kyoto i Osaka Sangyo u Japanu

medicinsko oslikavanje dinamičnog srčanog
mišića 1970-ih i 80-ih godina

originalna ideja - smanjenje šuma u obradi medicinskih slika



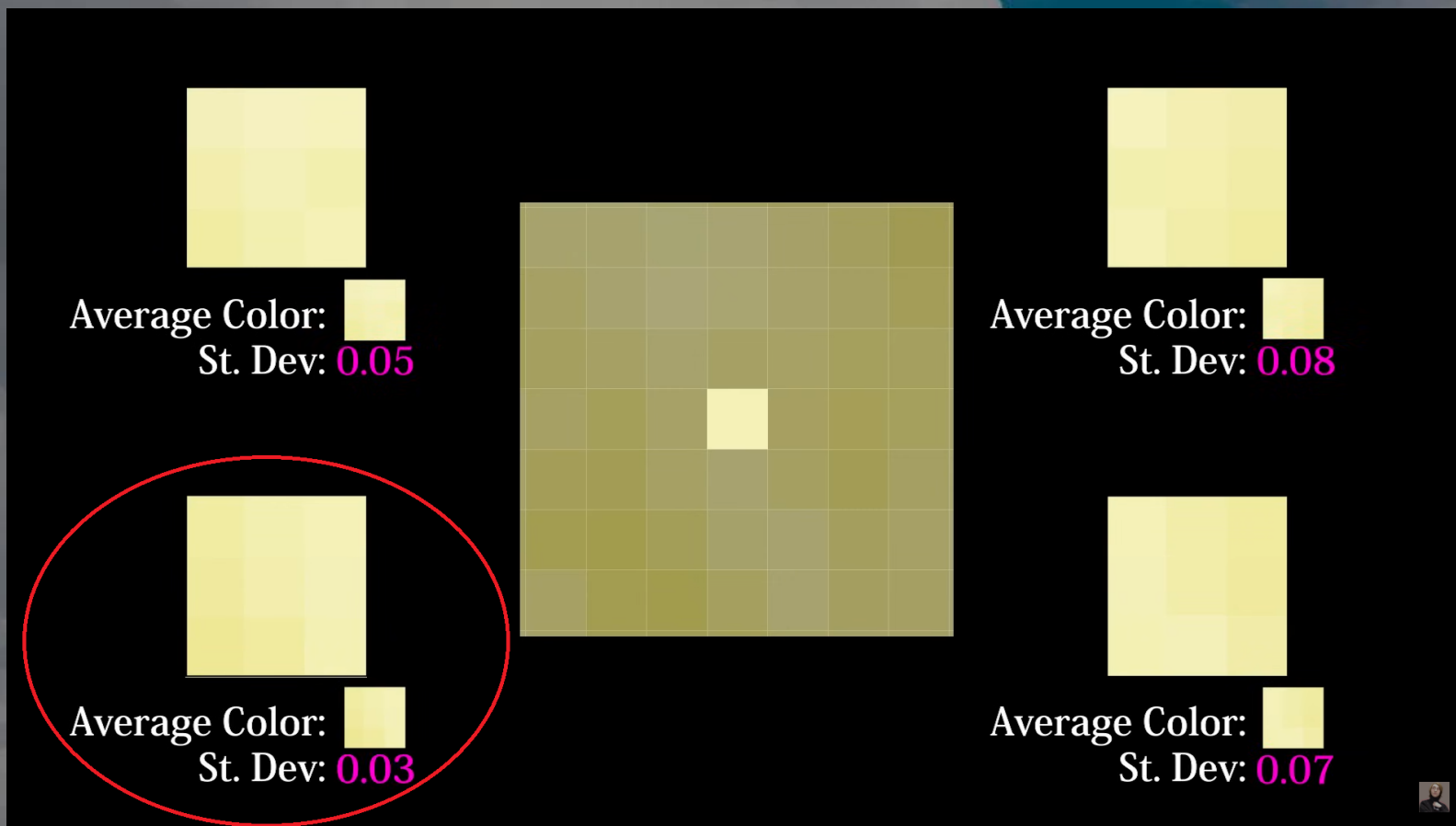
Obični Kuwahara filter

nelinearni filter

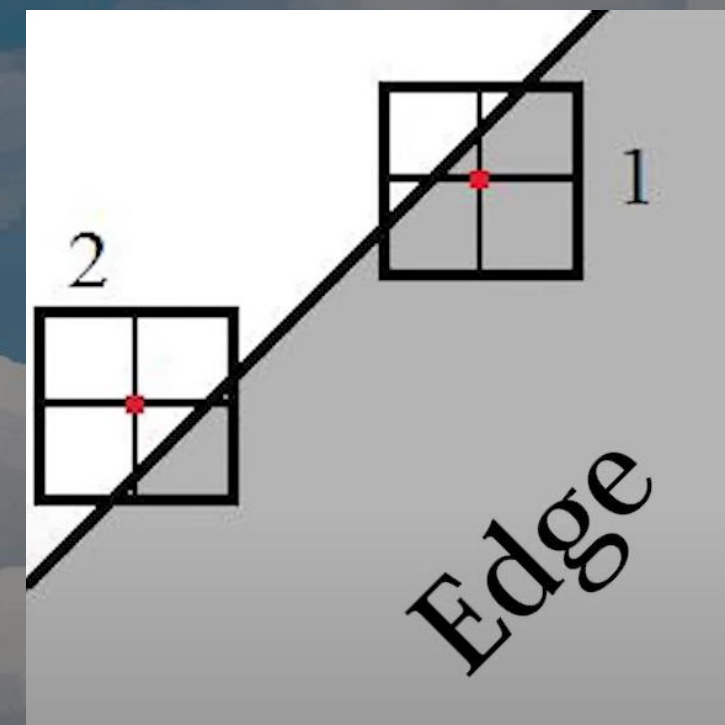
izглаđivanje

smanjenje šuma

očuvanje rubova



| | | | | |
|-----|-----|-------------|-----|-----|
| a | a | a/b | b | b |
| a | a | a/b | b | b |
| a/c | a/c | a/b/ c/d | b/d | b/d |
| c | c | c/d | d | d |
| c | c | c/d | d | d |



srednja vrijednost podregije s
minimalnom varijansom

običan Kuwahra filter sa kernel size 9 na slike sa i bez šuma





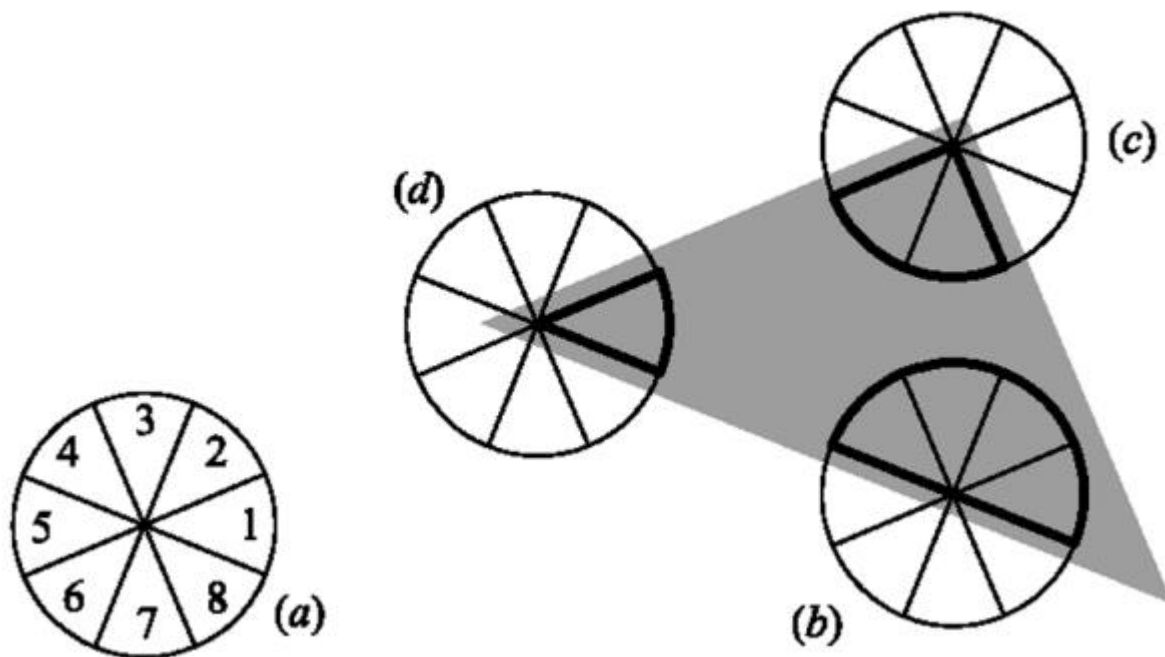
Generaliziran Kuwahara filter

30 godina kasnije

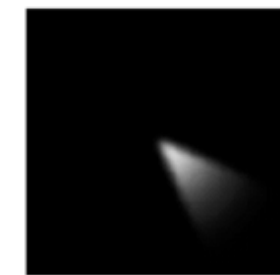
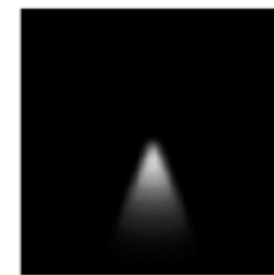
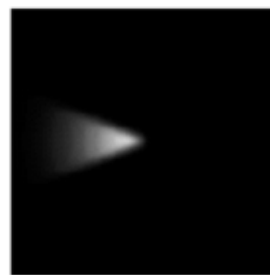
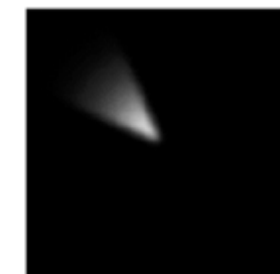
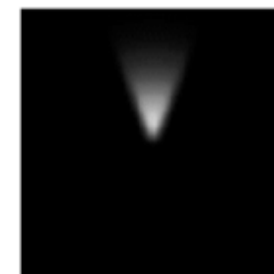
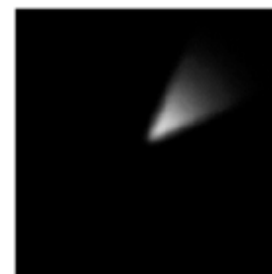
Giuseppe Papari, Nicolai Petkov i Patrizio Campisi

moderniziraju Kuwahara filter

- umanjiti kutijaste artefakte
- rubne linije

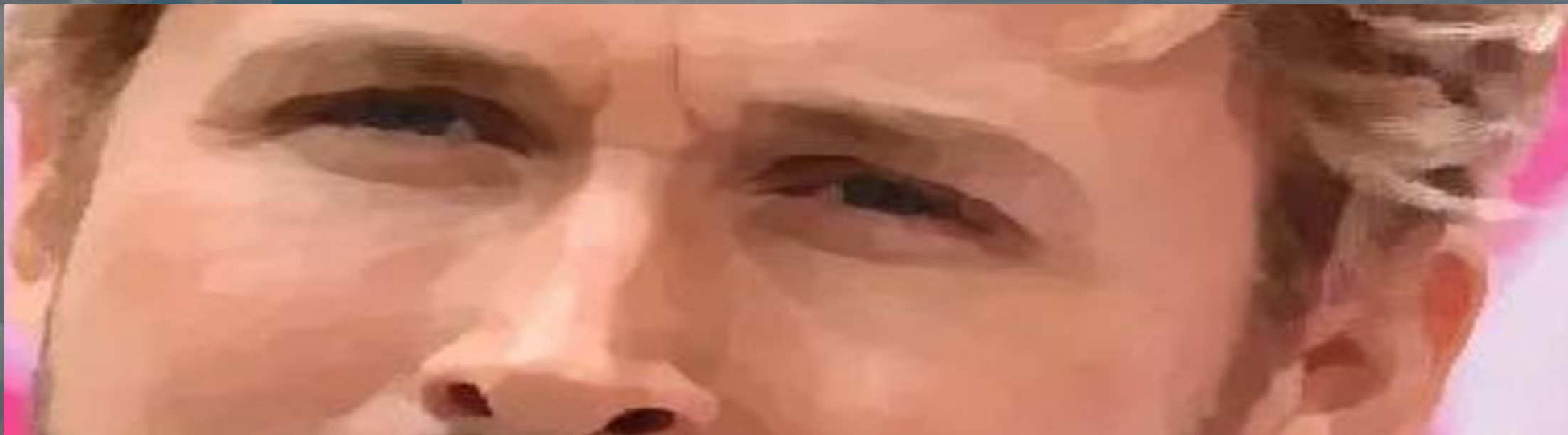


promjena oblika podregija
lokalnih prosjek ->
Gaussove težinske
funkcije



običan i generaliziran Kuwahra filter sa kernel size 9



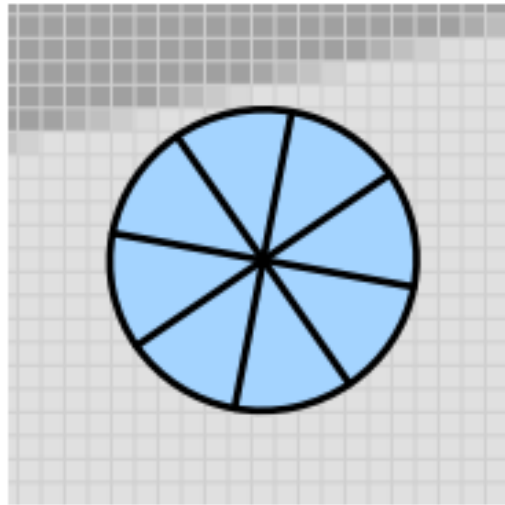


Anizotropan Kuwahara filter

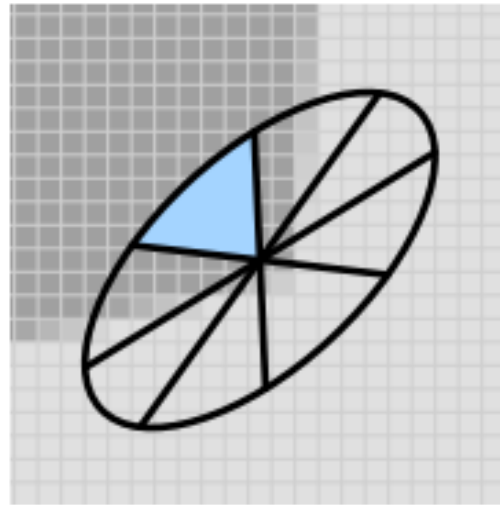
2010. Jan Eric Kyprianidi, Amir Semmo, Henry Kang,
Jürgen Döllner

anizotropno - svojstvo obrade slike na način ovisan o
smjeru

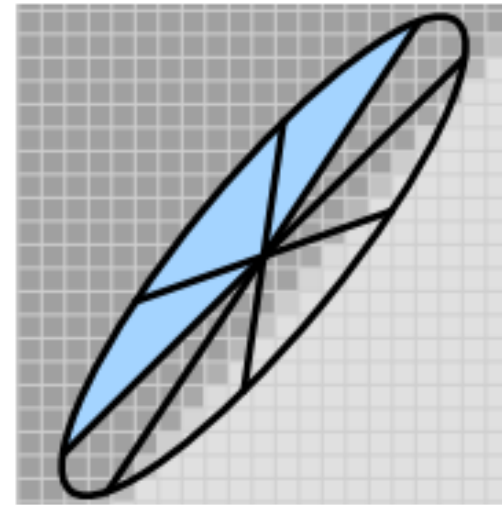
polinomske funkcije



(a) Homogeneous

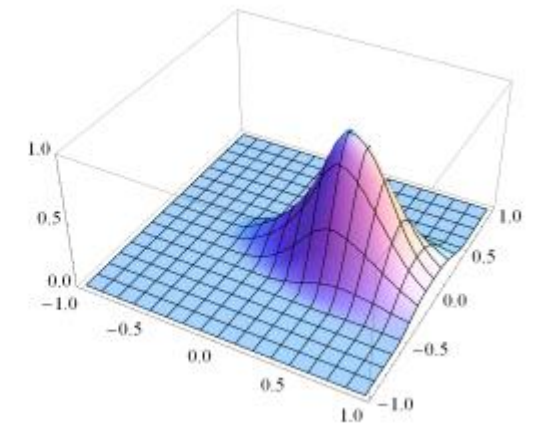
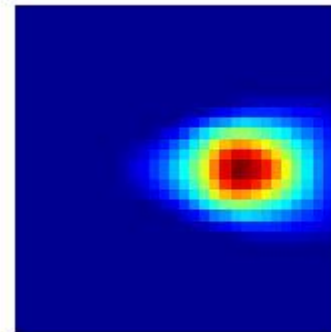


(b) Corner



(c) Edge

svojstveni vektori -
informacije o smjeru slike –
promjena oblika kernela



Običan, generalizirani i anizotropni Kuwahara filter



THE END

