Automatska segmentacija lezije na MRI snimkama

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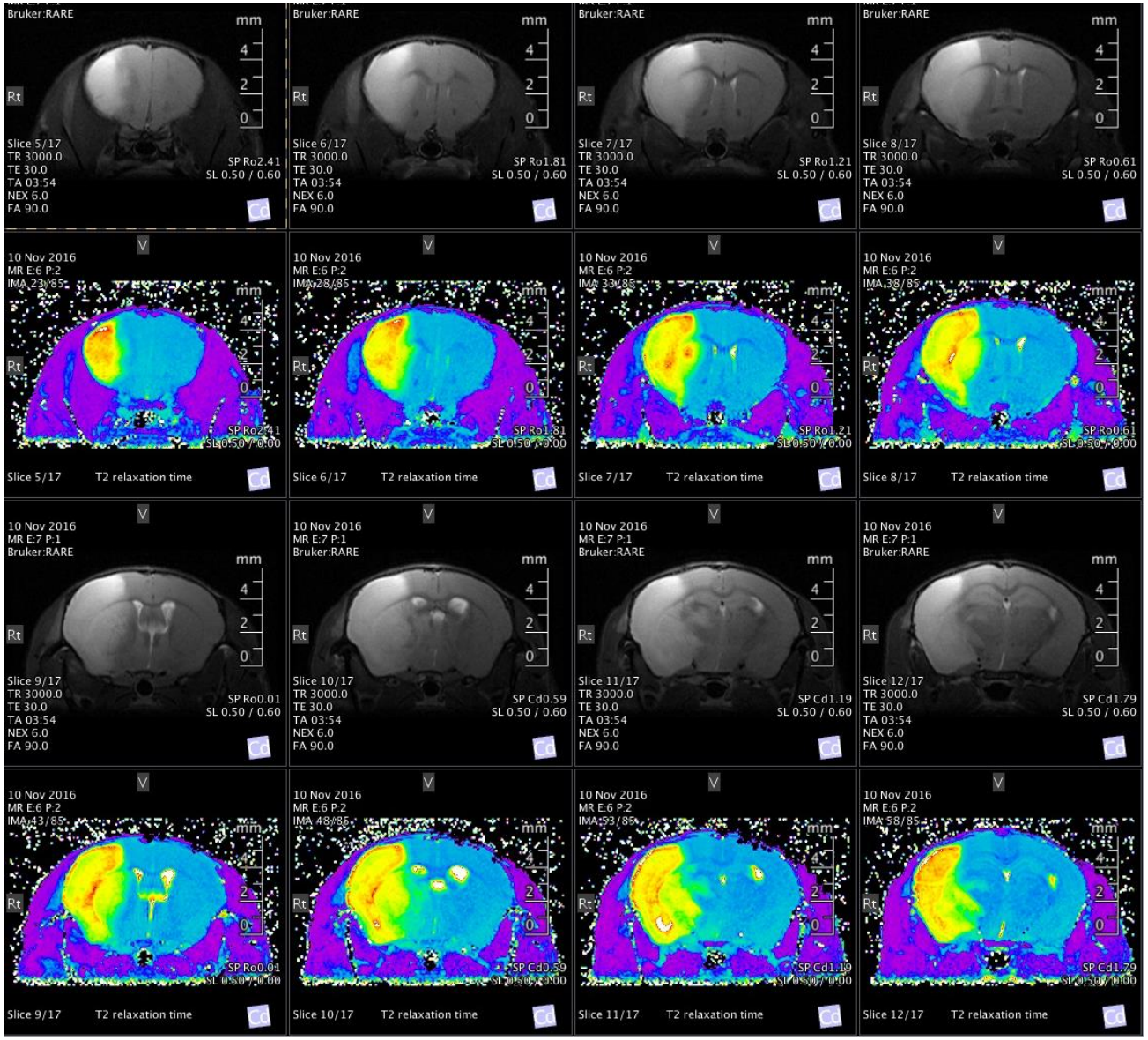
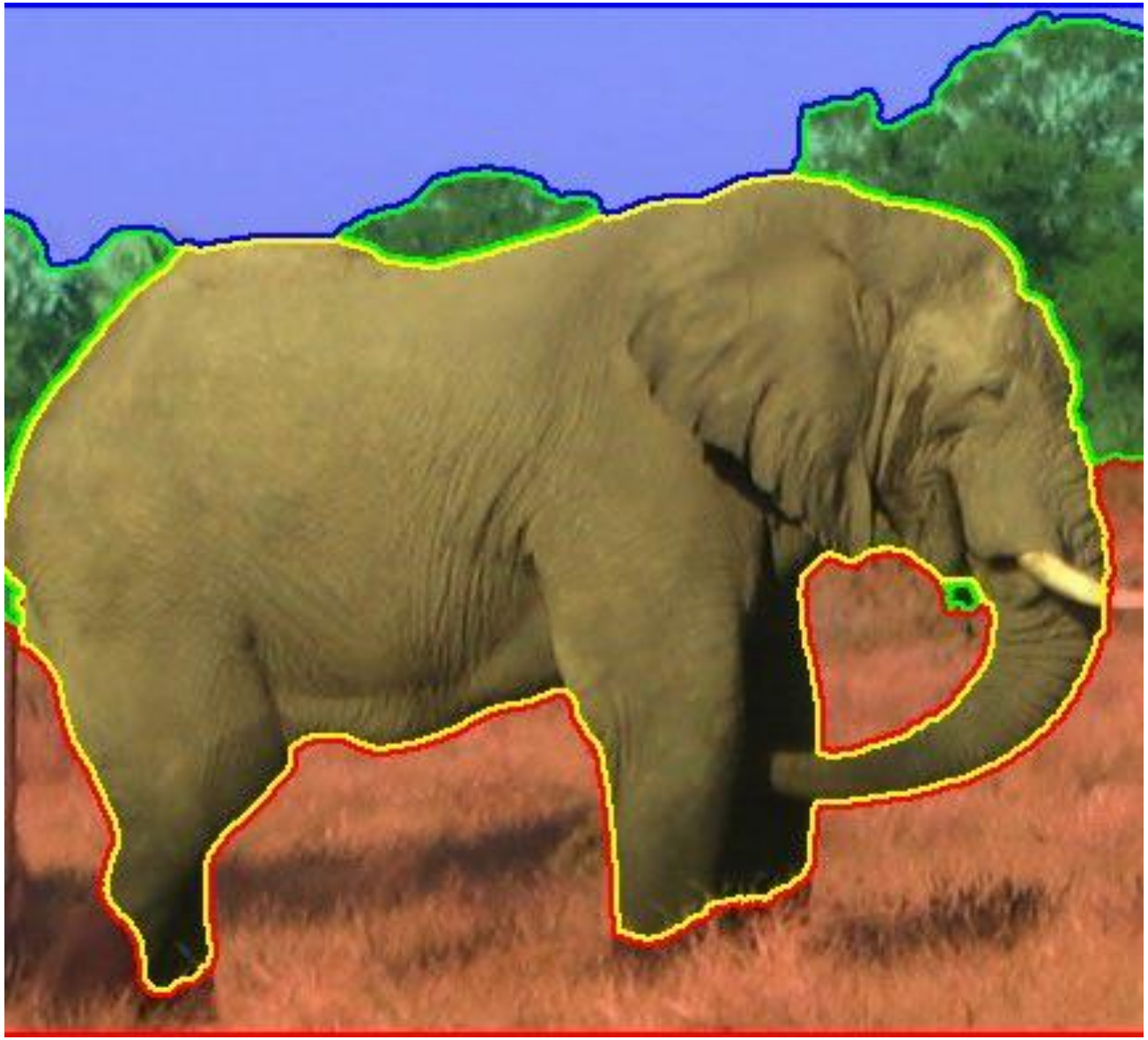


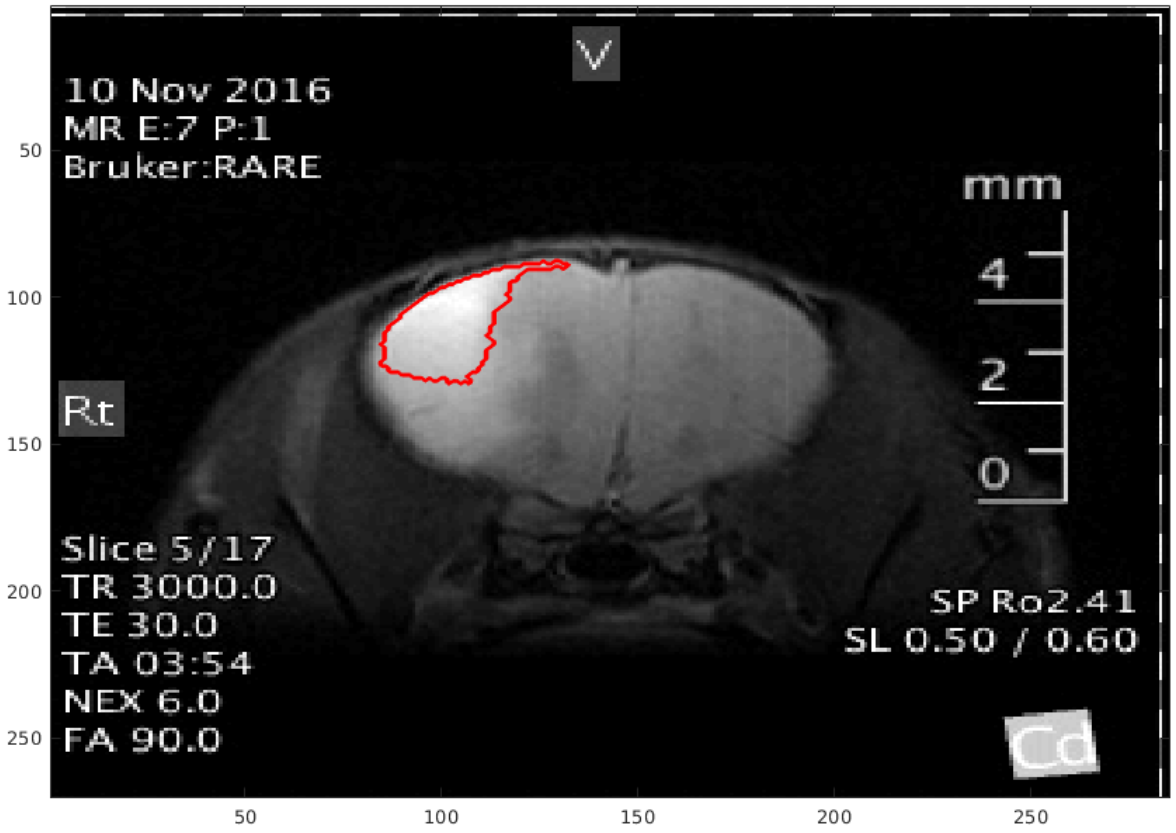
Problem

- Iz MRI snimaka odrediti površinu lezija i rubove
- Kombinirati T1 i T2 mape snimaka



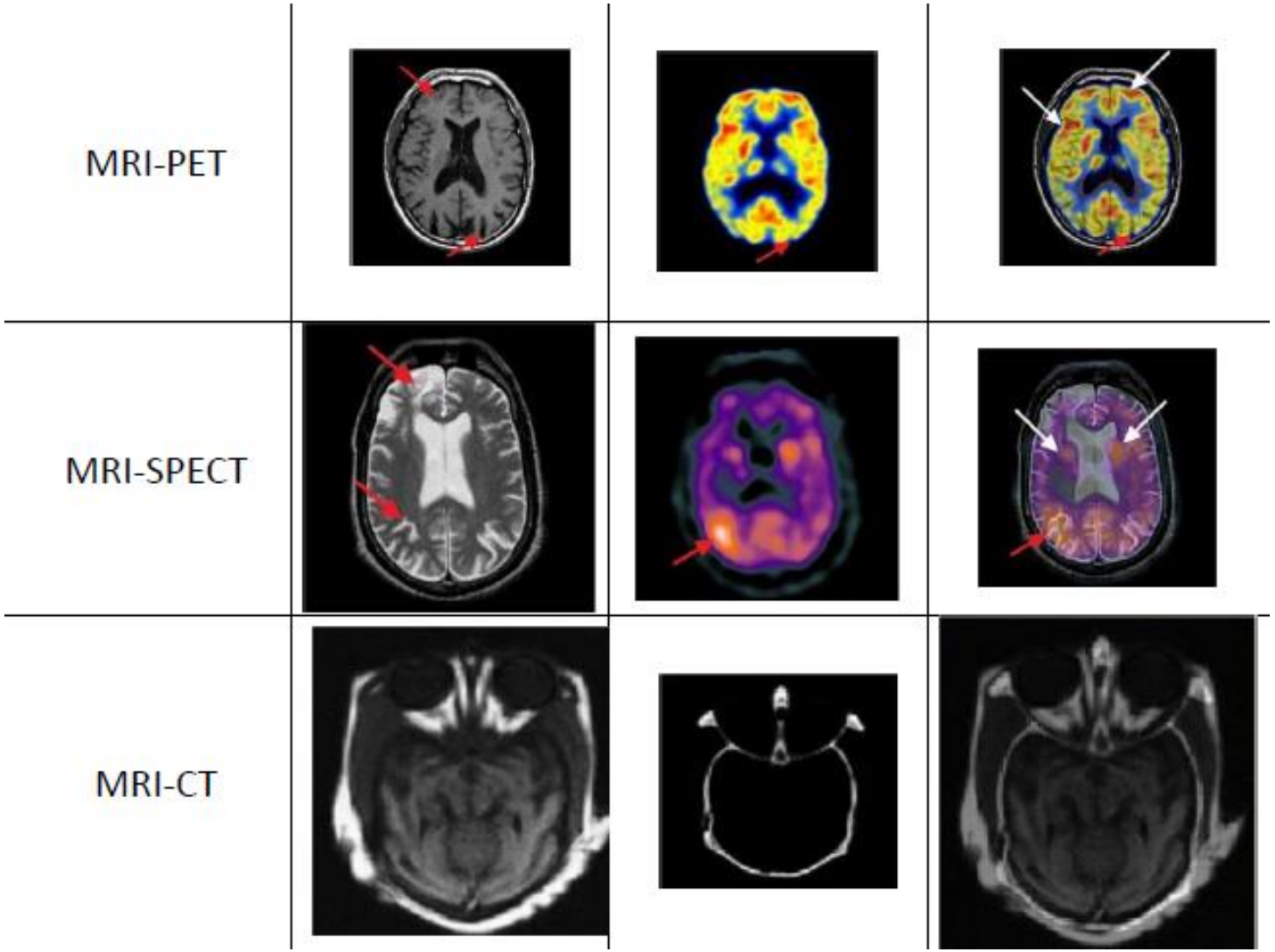
Segmentacija

- Dekompozicija slike u sastavne dijelove
- Uniformne s obzirom na sadržaj, boju, teksturu
- Detekcija rubova, ispunjavanje regija, amplitudna segmentacija (s obzirom na svjetlinu ili boju)
- Ekspertni sustavi, neuronske mreže



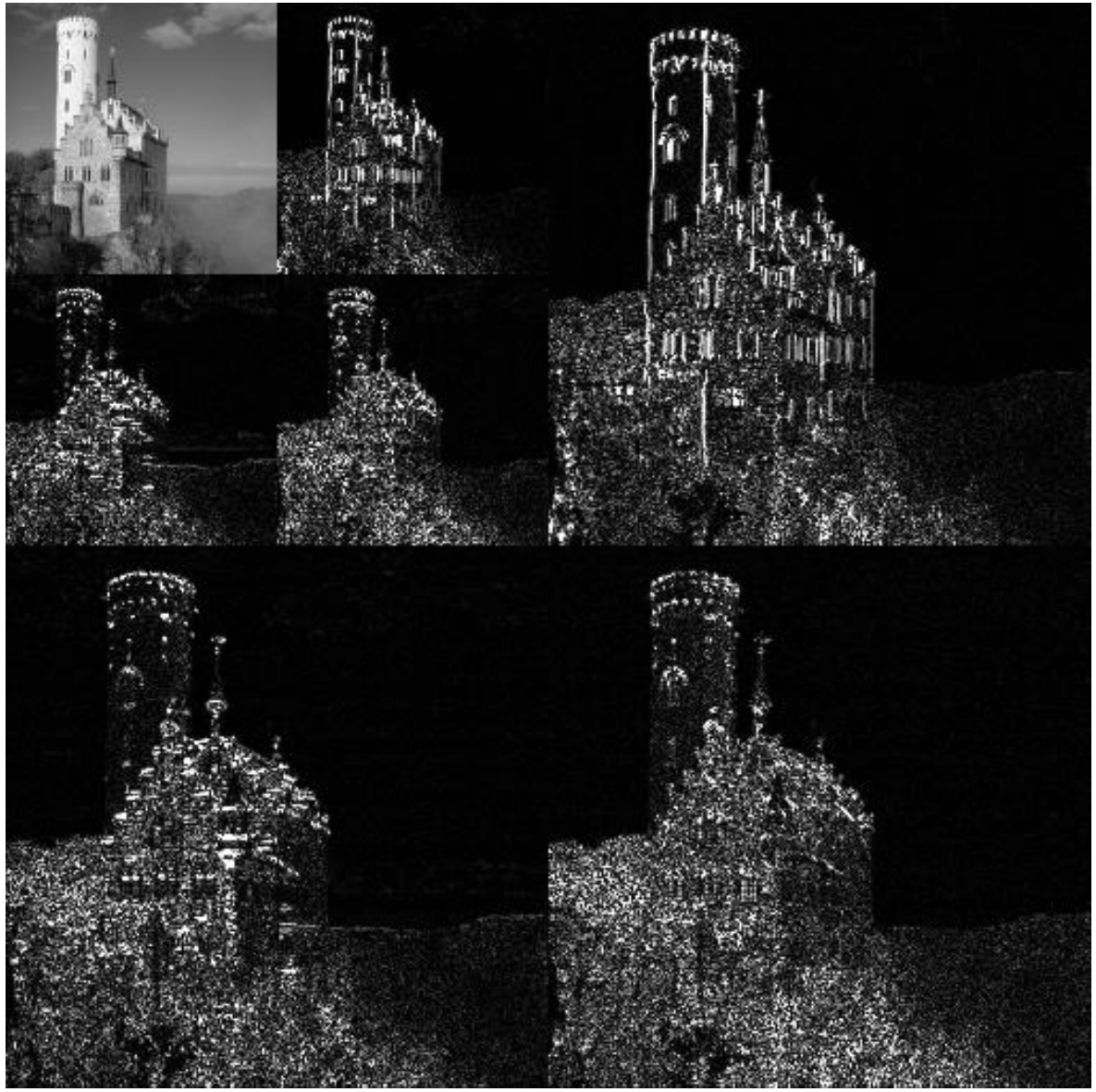
Metoda proširenja regije

- Grupiranje susjednih točaka s obzirom na sličnost
- Uvjet sličnosti je razlika u intenzitetu i uniformnost
- Početnu točku određujemo ručno
- Usporedbe sa susjednim točkama, centroidom, okolinom, ukupnim prosječnim intenzitetom



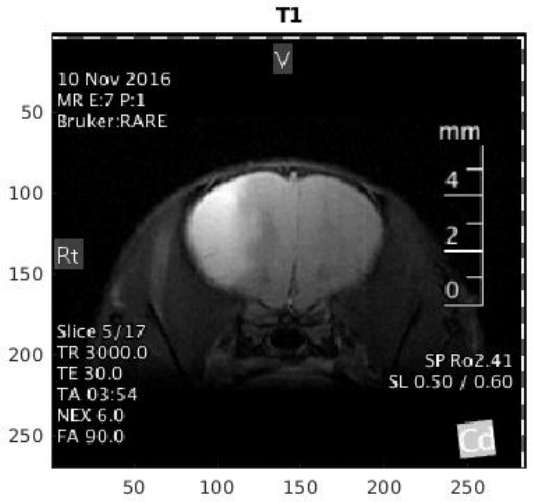
Stapanje slika

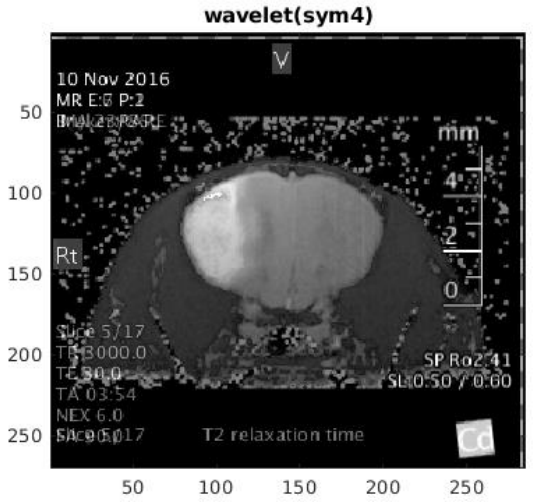
- Sakupljanje najvažnijih informacija sa više slika u jednu
- Rezultat je informativnija, preciznija i interpretabilnija slika
- Korisno u višesenzorskim snimkama (medicina, astronomija)

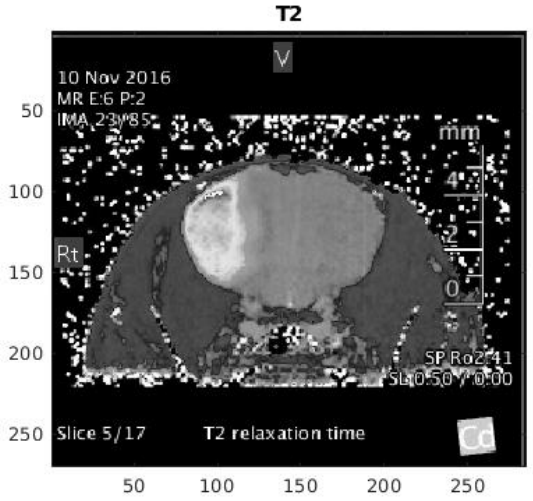


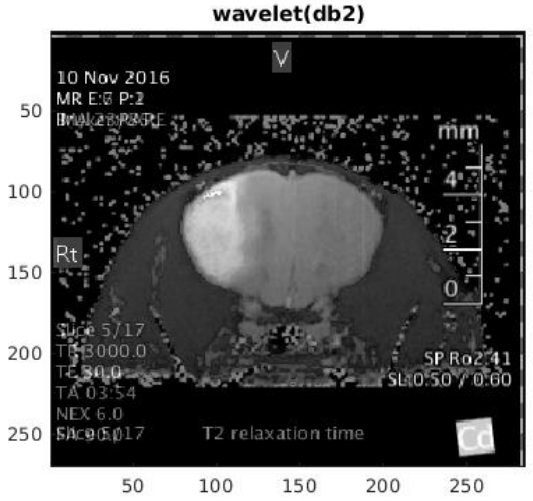
Wavelet transformacija

- Wavelet – porodica valovitih oscilacija u kratkom intervalu
- Analiza konvolucijom
- Skupovi komplementarnih waveleta (potpuni rastav signala) reverzibilni
- Kompresija (JPEG2000)



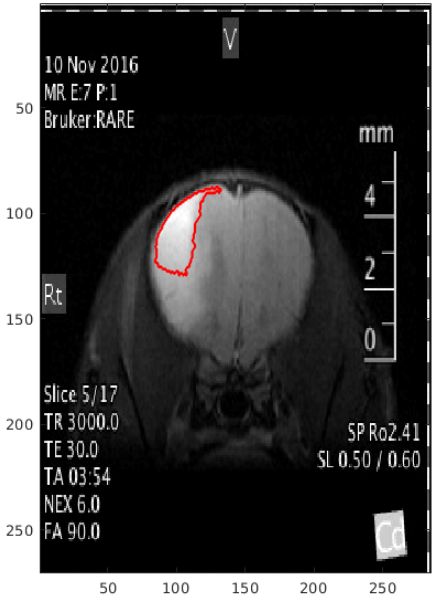


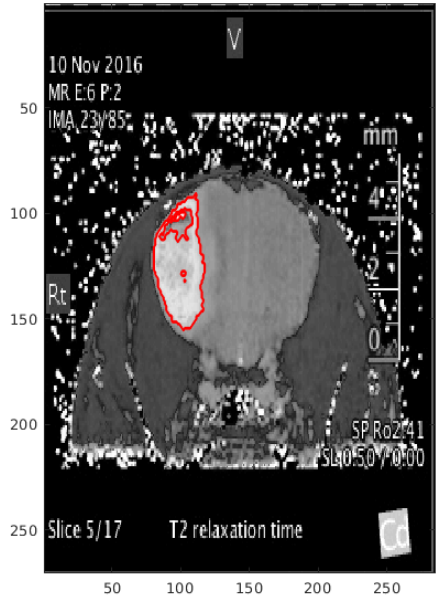


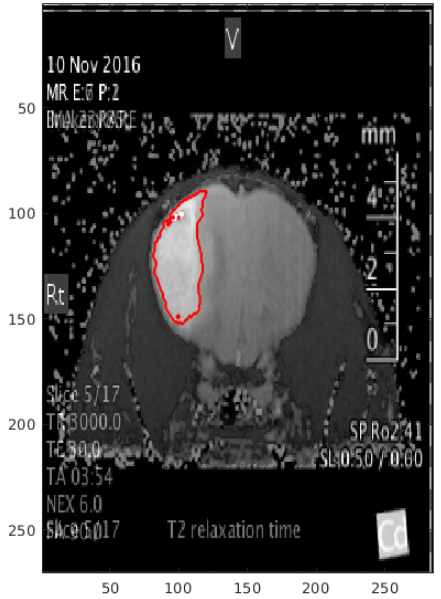


Stapanje wavelet transformacijom

- Dekompozicija wavelet transformacijom
- Kombiniranje u domeni transformacije (mean, max, min)
- Inverz transformacije

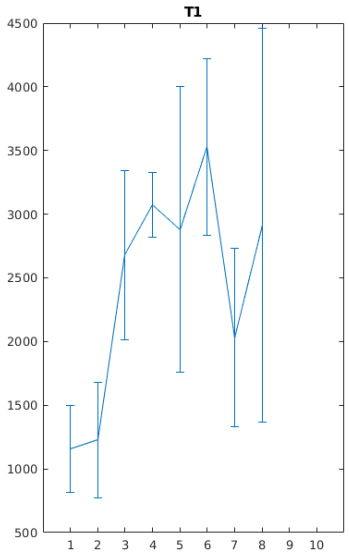


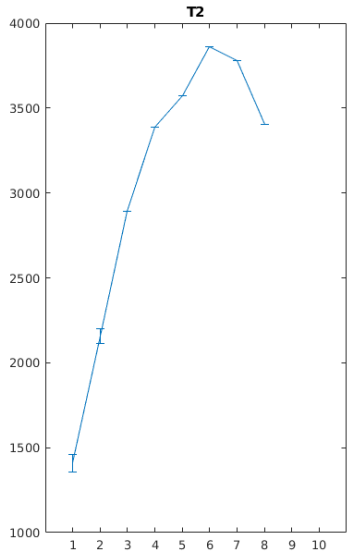


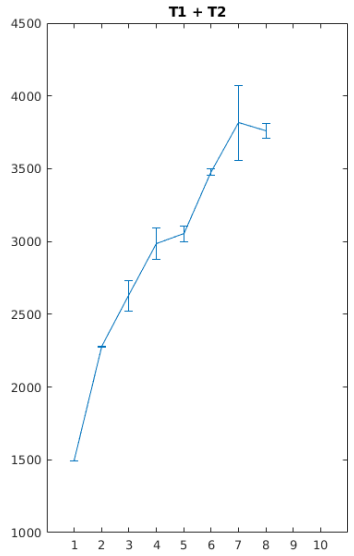


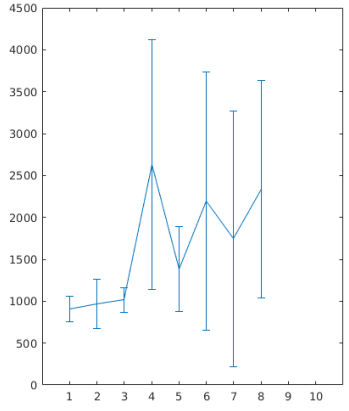
Pokus

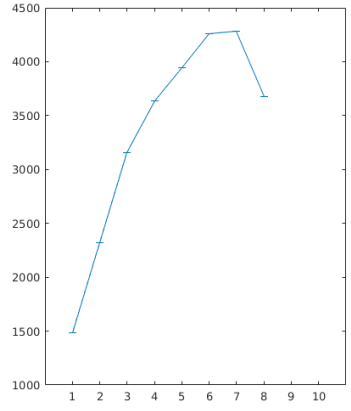
- T1 mapa nema jasne granice lezije
- T2 ima jasne granice, ali nisku razlučivost
- Kombinacijom dobivamo najbolje od obje slike

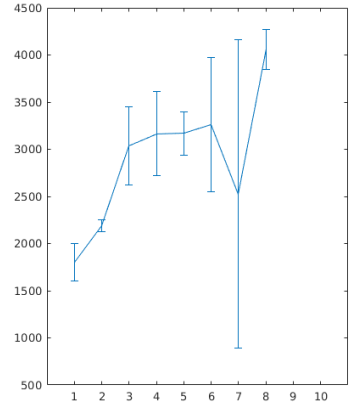












Mjerenja

Veličina u broju piksela u regiji

Bez kvantizacije i sa kvantizacijom prije segmentacije

Zaključak

- Višesenzorske snimke
- T1 – meko i tvrdo tkivo, visoka razlučivost
- T2 – jasne granice lezije
- Wavelet transformacije, PCA

Hvala na pažnji