# Medical AR - Sonification Project

* Marker Tutorial: <https://www.youtube.com/watch?v=pv0u8ClfGi4>
* 3D Tumour model: <https://sketchfab.com/3d-models/brain-tumor-9c1a83ac4b2a4d30b64a43234f039054>

Ein Bild, das Text, Karte enthält.

Automatisch generierte Beschreibung

(-> do you need to visualize tracking uncertainty area around the resection area or is the one around the tumour enough?)

**Use GitLab or something similar (give access to repository) ??**

Research:

* Tumour: difference between soft tissue and bone
* Contamination of healthy tissue
* When resecting tumour -> cut healthy area around
* Depends on how malignant the tumour is and how much it spread -> more malignant needs more radical cut with healthy tissue
* three stages of resection depending on how malignant the tumour is
* resect whole tumour: would need to register preoperative plan to the target(patient) anatomy to know where the tumour is located => for this project we assume we can do this, since the focus should be on sonification
* tracking uncertainty/error -> define tracking uncertainty area => areas where you don’t cut (could be inside the cutting area or inside the tumour) => investigate reasonable area size
* first stage: cube marker for tumour (tumour as sphere)
* track tool with marker
* sonify distance between tool and tumour

Challenges:

* nerves and vascular inside the cutting area
* tumour has complex geometry
* spatial sound for starting area where to cut, e.g. put sound source to tumour, listener = tool

Sounds:

- healthy tissue- tracking uncertainty: alarm sound- tumour tissue- sound for resection area+ transitionsthings to try: - simple distance sonification- spatial sound- sample based / additive s...

* define different sounds for different areas OR
* define one sound and change different parameters
* start with samples and the built-in classes from Unity
* combination of sound that is very intuitive for surgeon

Steps:

1. define input parameter (tools, tumour, distances)
2. (parallel to 1) build first applications to load file in buffer in Unity and
3. Connect parameters to sound sample

* demo in the end should be realistic (e.g. covered partly with blanket)