

MRI Adventure

Prepare children in VR before an MRI scan



WHAT

MRI Adventure is a virtual reality (VR) application allowing children to immerse themselves inside the 3D reproduction of an MRI scanner in a fun and safe environment.

The main objectives of the VR application are:

- Teach children the safety rules in an MRI environment.
- Allow children to get familiar with an MRI scanner in order to control their fears (feelings of anxiety and/or claustrophobia).
- Teach children to not move their heads during scans to ensure proper image acquisition.

WHY

- ✗ 30% of pediatric MRI scans are unusable (due to incomplete scans or excessive motion).
- ✗ 50% of pediatric MRI exams are sedated.
- ✗ Sedation is risky and scan duration last 2.5 times longer.
- ✗ MRI decoration and mock scanners cannot be used in a research context because of emotional induction.
- ✓ A VR application is the only way to train anywhere (at home, research laboratory, hospital) and to fully prepare children before an MRI scan (get familiar with MRI environment and security rules, train specifically to avoid head motions).

PRELIMINARY RESULTS

- 6x 6-12 years old children were asked to train in VR during 20 minutes and then to do an MRI scan during 5 minutes.
- Feelings of children (comfort, fears, claustrophobia) before and after the VR training and after the MRI scan were recorded. Head movements and gaze directions were also recorded during the VR training.
- **Outcome:** children successfully learned MRI security rules and to avoid head motions during scans thanks to the dedicated VR training.



PERSPECTIVES

- The reduction of anxiety and claustrophobia thanks to the VR training needs to be confirmed with a larger population. Scientific literature already demonstrated VR is helpful to treat many phobias such as claustrophobia.
- A full version of the VR application (including a specific task based on eye-tracking to train to avoid head motions) already exists for hospitals and research laboratories.
- A new version of the application for smartphones is under development to allow children to train in VR at home without the need of a VR headset.



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