

Fantastic Voyage: An Augmented Reality Approach to Anatomical Education for the General Public

Masterstudy:
Media Informatics

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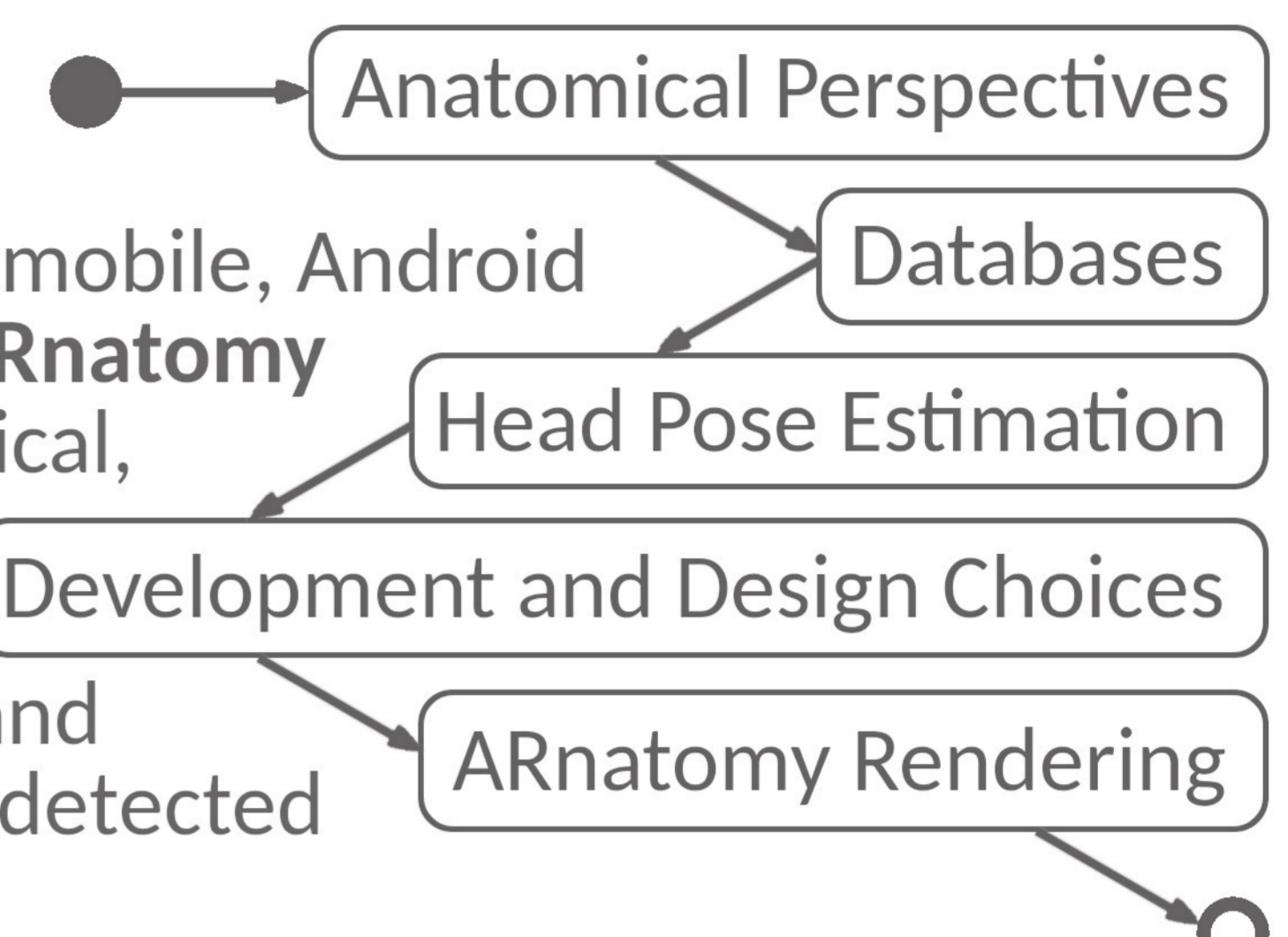
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Problem Statement and Motivation

Detailed anatomical education systems are too complex for the general public and mobile ones are inexistent. Augmented Reality (AR) mediates spatial abilities faster, and due to its high immersion, has more emotional involvement and facilitates concentration as well as user satisfaction. Patient knowledge is proportional to the patient's ability to ask informed questions and relates to higher treatment compliance and better communication between doctors and educated patients. **The motivation is to develop an AR-based tool to promote the interest of the general public in anatomical education.**

Approach

Implemented was an intuitive, immersive, mobile, Android application named **ARnatomy** that renders anatomical, interactive, 3D, AR models, linked with textual information and synchronized on the detected user face.



Interaction and Anatomy Exploration

- **Swiping** over anatomy models moves them in a list above the head as in the left picture.
- **Tapping** on anatomy models shows their labels and makes the residual models transparent as in the right picture.
- **Pinch gestures** translate the anatomy on the z axis, rostral and caudal, for in-depth anatomy exploration.
- A **long label tap** invokes the detail view, also accessible via a text search, showing non- and facial anatomy hierarchy as in the picture below.

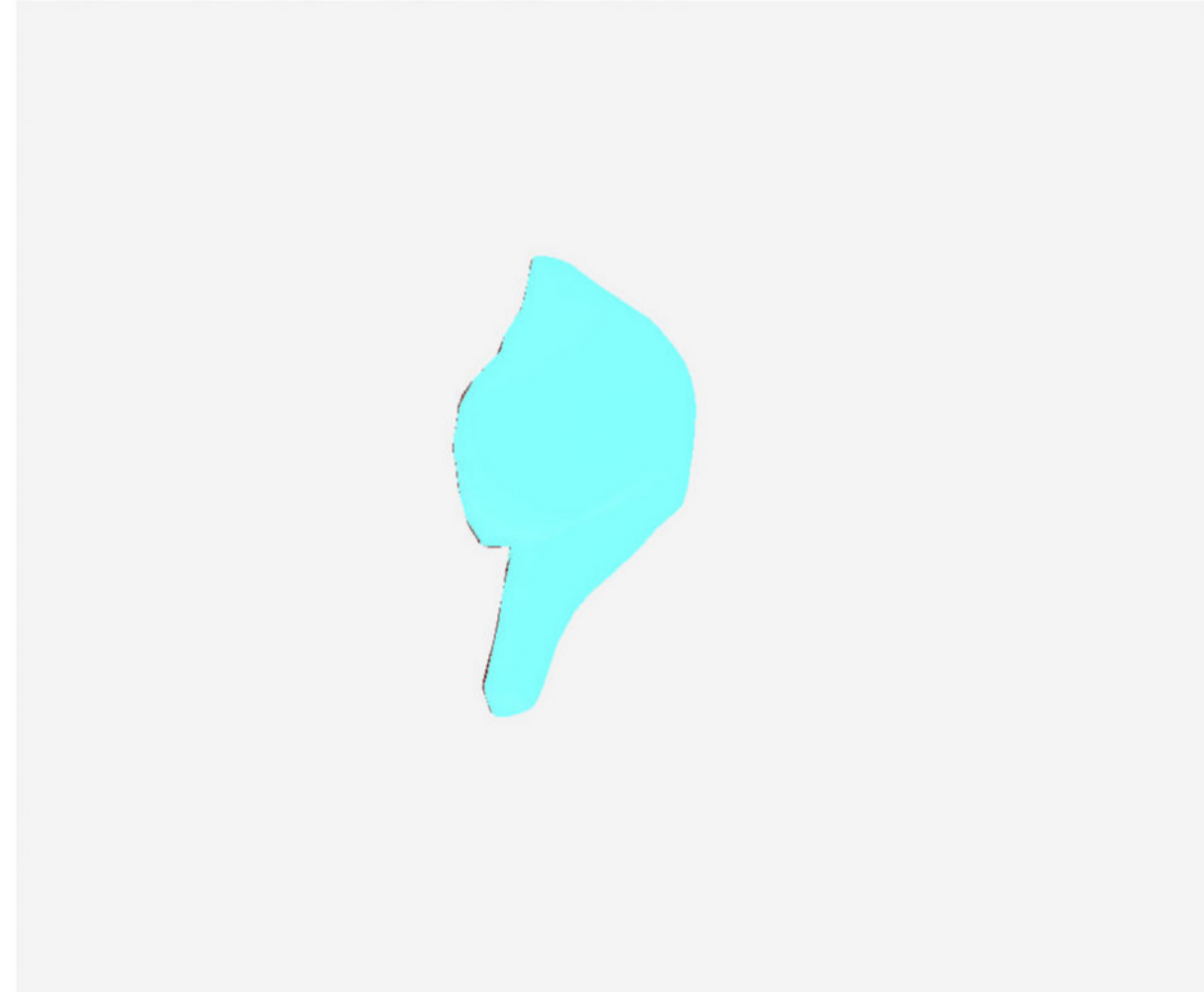


Organ component of neuraxis

Hypothalamus

Synonyms: Preoptico-hypothalamic area,
Preoptico-hypothalamic region

Organ component of neuraxis, each instance of which is the ventral part of some diencephalon, forming the floor and part of the lateral wall of some third ventricle. Anatomically, it includes some preoptic area, optic tract, optic chiasm, mammillary bodies, tuber cinereum, infundibulum, and neurohypophysis, but for physiological purposes the neurohypophysis is considered a distinct structure.

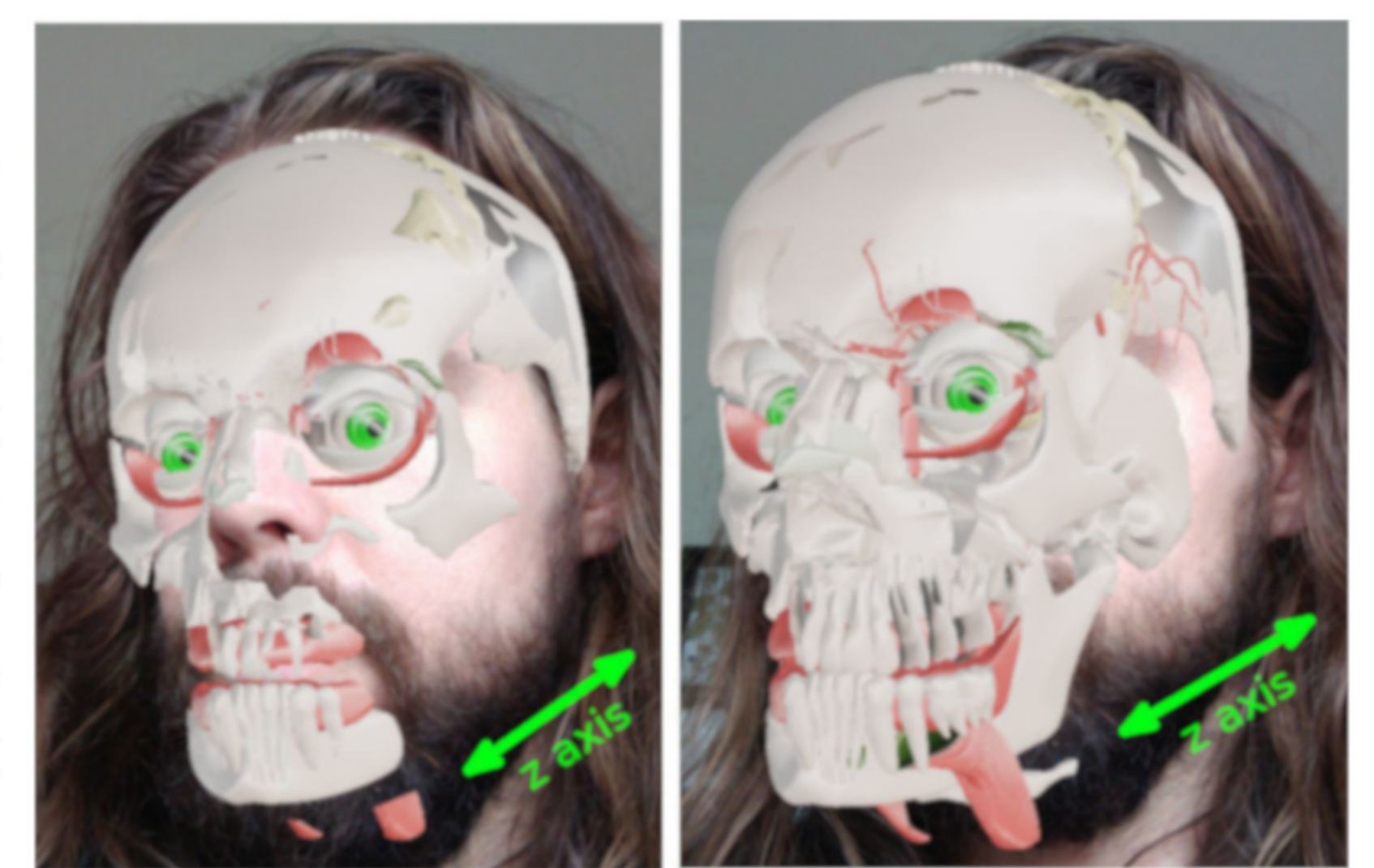


Allothalamus

Epithalamus

Informal Evaluation

Eight participants performed two case studies with brief instructions on what to do, but not how. The intention was to observe self-orientation, the discovery-based exploration, learning, and to get detailed answers in the later interview. Seven **participants learned** in the mean two anatomy structures during the mean case study time of 09:44 minutes. The z axis translation in the left and right picture has to be communicated more clearly.



Results and Conclusion

Many insights emerged through the informal evaluation about anatomical education and the importance of immersion and interaction. A required future change is general interaction learning with a onetime tutorial depicted in the middle and right image. Active learning with immersive AR constructs spontaneous knowledge encompassing better short-term memorization, better spatial abilities, higher concentration, higher user satisfaction, and, if mobile, higher availability than education technology without AR.

Interactive, immersive, 3D, AR anatomy visualizations paired with textual information can educate mobile device users of the general public.

