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APD URL: http://www.splab.net/APD/

1. Introduction
This "readme.txt" is for 3D printing of VTM-T20. Please follow the descriptions carefully in advance.

2. Terms of Use
- Takayuki Arai permits the use of the STL files for non-commercial purposes only.
- If you are considering them to use for exhibitions at a museum, please make a contact with Takayuki Arai.
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- When the user use the vocal-tract models, please mention that they are from Takayuki Arai with proper credits and cite the following papers in Section 6 if necessary.
- The user may be asked to answer surveys and/or the status report.

3. Sending an e-mail to Takayuki Arai
If the user agrees with the Terms of Use above, please send the following items to Takayuki Arai (arai@sophia.ac.jp) by e-mail to get the permission to use the files:
- Name
- Affiliation
- Address
- E-mail address
- Purpose of the use

4. Files
The zip file contains the following files:
- readme.txt (readme file in text format)
- VTM-T20_readme.pdf (readme PDF file)
- Arai_VTM-T20-i1.stl (STL file of /i/ for 3D printing)
- Arai_VTM-T20-e2.stl (STL file of /e/ for 3D printing)
- Arai_VTM-T20-a2.stl (STL file of /a/ for 3D printing)
- Arai_VTM-T20-o3.stl (STL file of /o/ for 3D printing)
- Arai_VTM-T20-u2.stl (STL file of /u/ for 3D printing)

5. Acknowledgment

6. References

- The first paper on VTM-T20
T. Arai, "Simple physical models of the vocal tract for education in speech science," Proc. of INTERSPEECH, 756-759, Brighton, 2009.

- The first education paper on vocal-tract models (The Acoustical Society of Japan)
T. Arai, "Education system in acoustics of speech production using physical models of the human vocal tract," Acoustical Science and Technology, 28(3), 190-201, 2007.

- The education paper published in JASA
T. Arai, "Education in acoustics and speech science using vocal-tract models," J. Acoust. Soc. Am., 131(3), 2444-2454, 2012.

- Invited paper on vocal-tract models (The Acoustical Society of Japan)
T. Arai, "Vocal-tract models and their applications in education for intuitive understanding of speech production," Acoustical Science and Technology, 37(4), 148-156, 2016.

Appendix A: Vowel production
- A sound source is needed to produce vowels with the vocal-tract models.
- Please note that a sound source with low quality can only produce less intelligible sounds.
- If you are seeking a better sound source, please contact arai@sophia.ac.jp.
- For more details on vowel production using VTM-T20, please see the following YouTube video:
    https://www.youtube.com/watch?v=THlBb-lMbNM

Appendix B: Speech production
- For those who wish to learn more, please visit Acoustic-Phonetics Demonstrations (APD):
    http://www.splab.net/APD/index.html

Appendix C: Examples of 3D printing

From left, /i/, /e/, /a/, /o/, /u/: