

Haptic material: a holistic approach for haptic texture mapping



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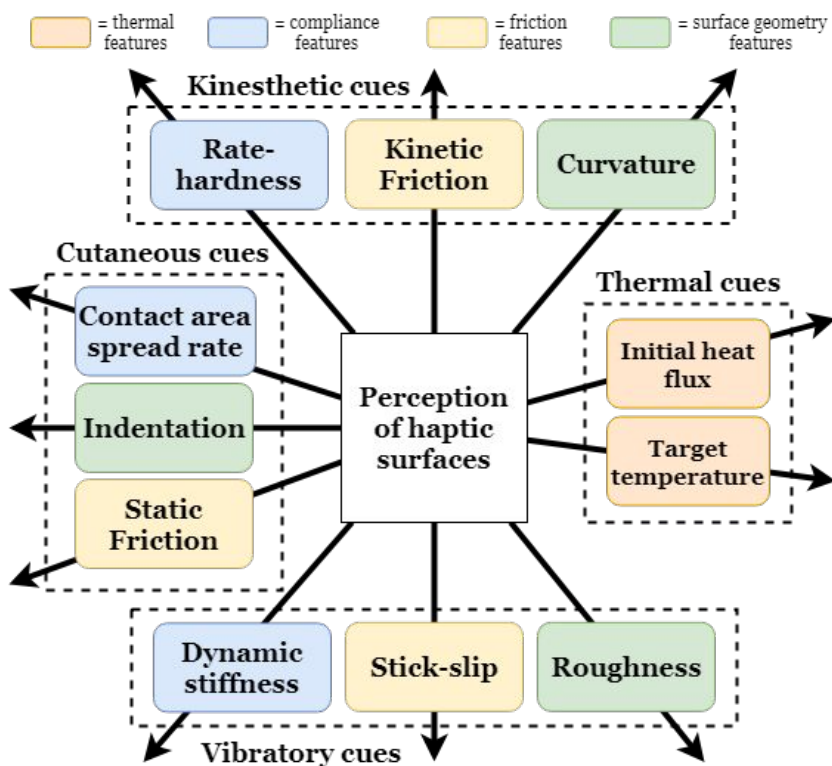
Context

- **Designing haptic content** for a virtual scene is complex because of the **lack of standards**
- Haptic data is often **defined and stored in a specific way**, which is **not interoperable** between rendering setups
- **A common, generalized format for haptic data** would facilitate processes, from acquisition to rendering

Elementary features of haptic surfaces

- Haptic rendering devices provide four types of physical cues: **kinesthetic, cutaneous, vibratory and thermal**
- Haptic perception of surfaces is composed of four percepts: **compliance, surface geometry, friction and warmth**
- Elementary features are defined from the possible **combination of percepts of cues**

Elementary haptic features



Approach

We propose a **hardware-independent** representation of haptic textures, based on **perceptually significant features**.

In line with the texture mapping approach, the **elementary haptic features** are stored in a set of **dedicated maps** called a "haptic material".

The **haptic material** can be associated to a 3D object, **regardless of the rendering device(s)**.

Live editing allows for **fast-prototyping haptic design**: properties can be edited directly on volumetric objects.

Future work

Estimate the perceptual **relative importance** of each feature.

Elaborate metrics based on **perceptual thresholds** and **resolution**.

Haptic content editing tool: importation from measurements data, generation from models, custom authoring.

Hardware-independent haptic **database**.

Illustrative implementation in Unity3D

