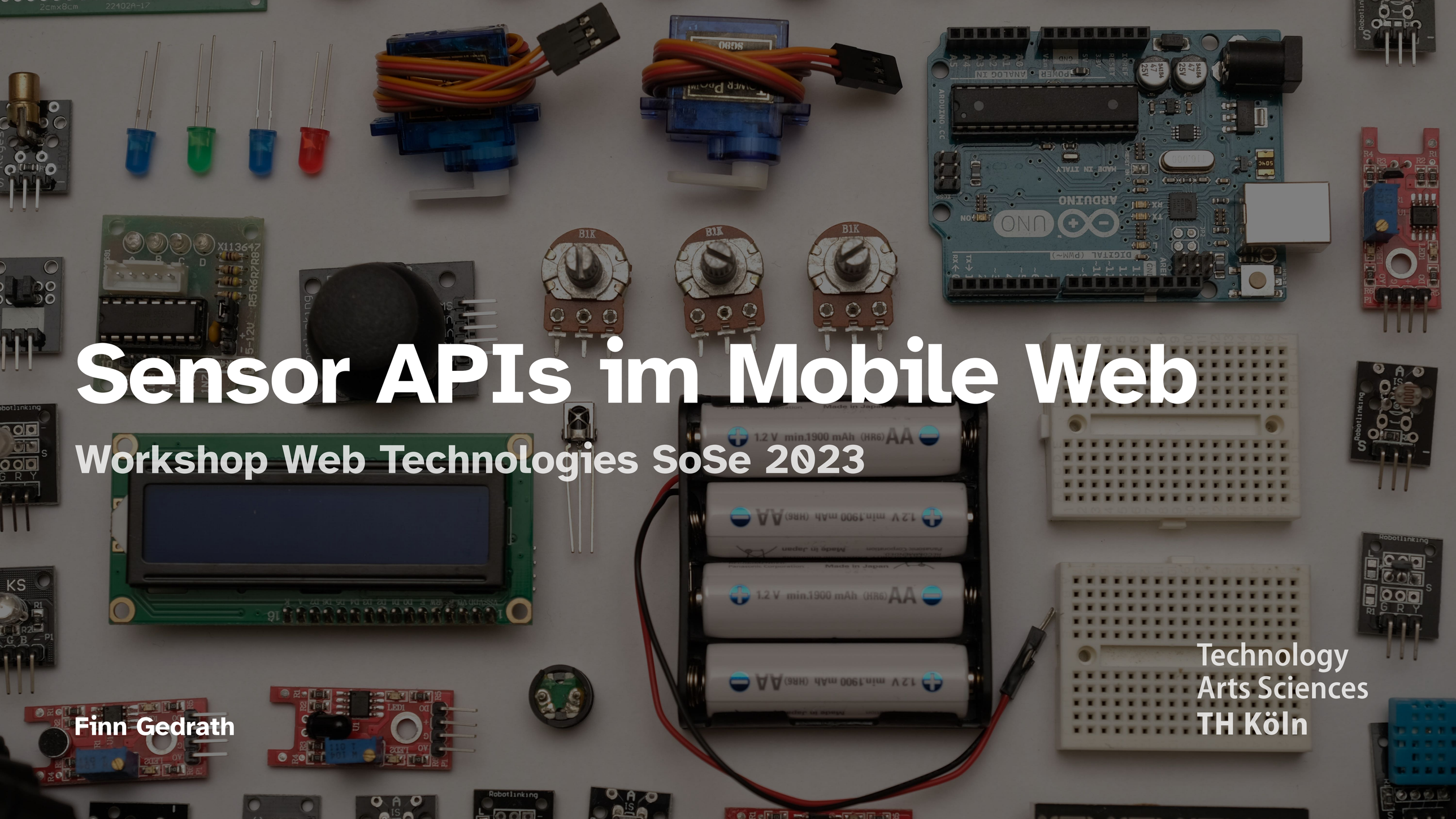

Sensor APIs im Mobile Web

Workshop Web Technologies SoSe 2023

Finn Gedrath

Technology
Arts Sciences
TH Köln

Input

Hands-On

Discussion

Hands-On

Presentation

What’s to come?

Input

Hands-On

Discussion

Hands-On

Presentation

What’s to come?

native

Operating System

Seamless Experience

Device Features

Screen & Output

native

Input

Surroundings

Location & Position

Camera & Microphone

App Lifecycle

„Web apps should be able to do anything iOS, Android, or desktop apps can.“

developer.chrome.com/blog/fugu-status (Nov. 2018)

Surroundings

Operating System

Input

Native Behaviors

Seamless Experience

Device Features

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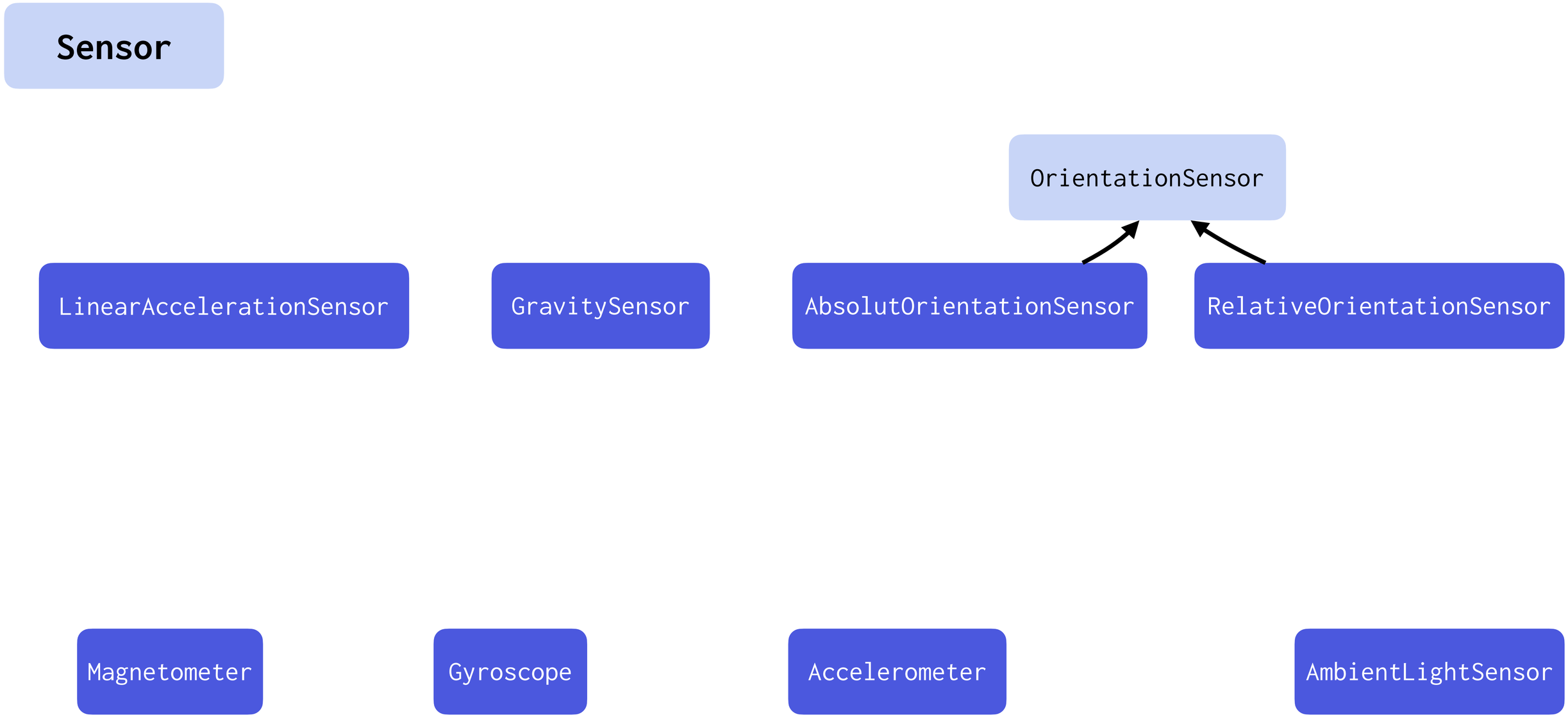
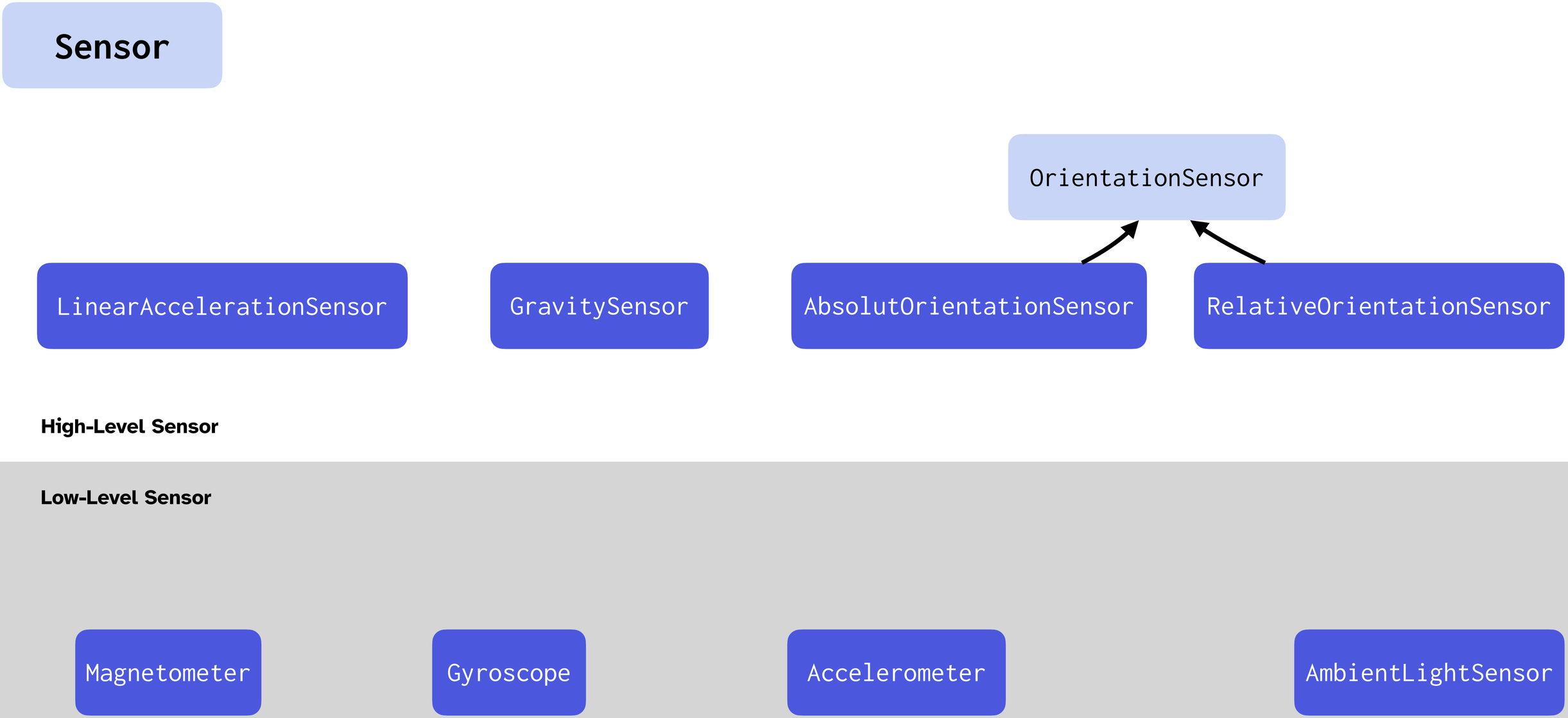
Camera & Microphone

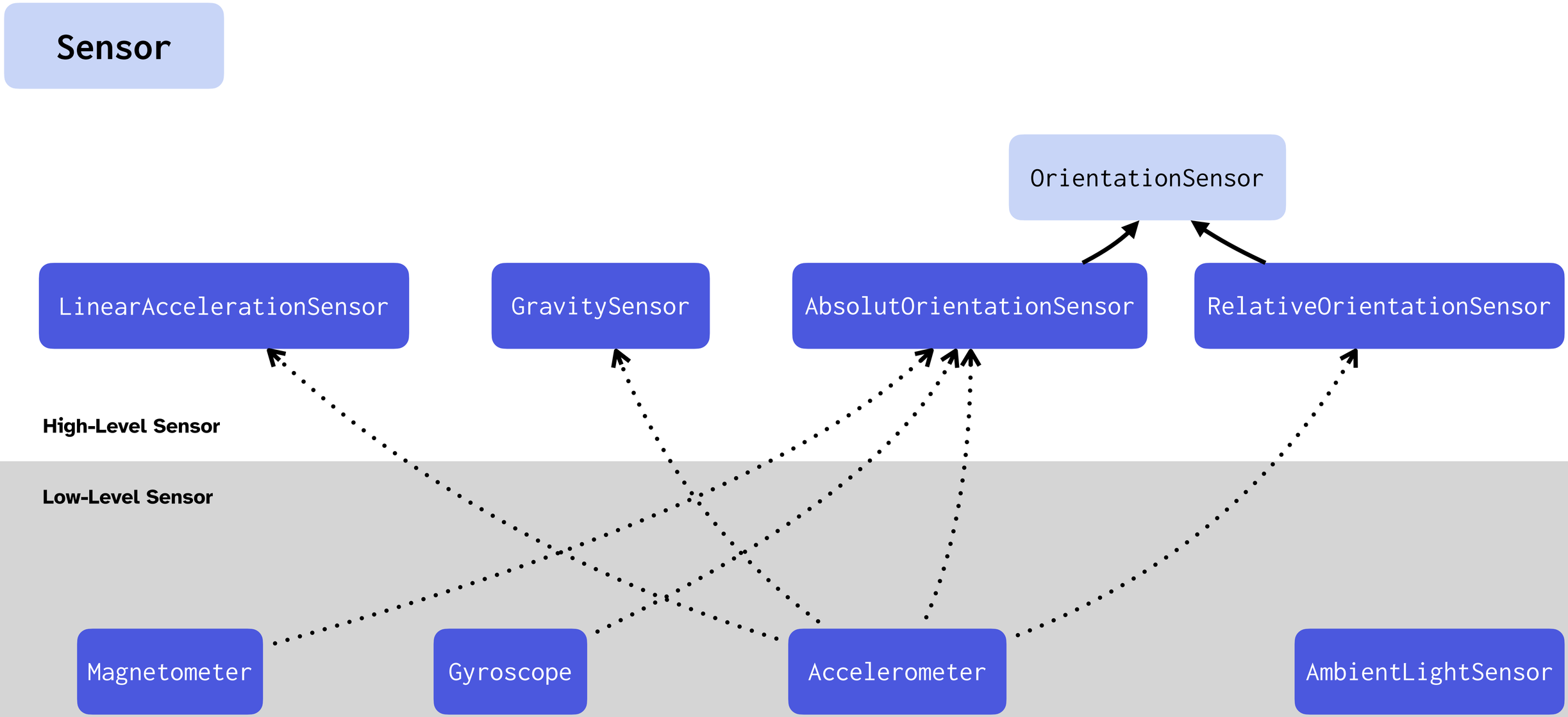
whatwebcando.today

Generic Sensor API

Generic Sensor API


Sensor
OrientationSensor
LinearAccelerationSensor
GravitySensor
AbsolutOrientationSensor
RelativeOrientationSensor
Magnetometer
Gyroscope
Accelerometer
AmbientLightSensor


Sensor
OrientationSensor
LinearAccelerationSensor
GravitySensor
AbsolutOrientationSensor
RelativeOrientationSensor
High-Level Sensor
Low-Level Sensor
Magnetometer
Gyroscope
Accelerometer
AmbientLightSensor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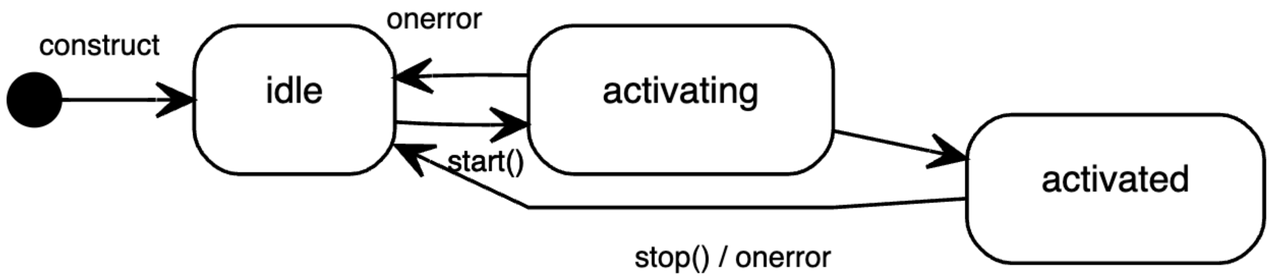
AmbientLightSensor

Generic Sensor API

Events:

- `reading`
  Neue Sensor Daten
- `activate`
  Der Sensor ist aktiviert
- `error`
  Fehlerverhalten

Sensor Lifecycle:



Generic Sensor API

```
const sensor = new NameOfSensor({
  frequency: 20
});

sensor.addEventListener("reading", () => {
  console.log("sensorData:", sensor.sensorData);
  console.log("time:", sensor.timestamp);

});

sensor.addEventListener("error", (event) => {
  console.log(event.error.name, event.error.message);
});

sensor.start();
```

Generic Sensor API

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});

sensor.start();
```

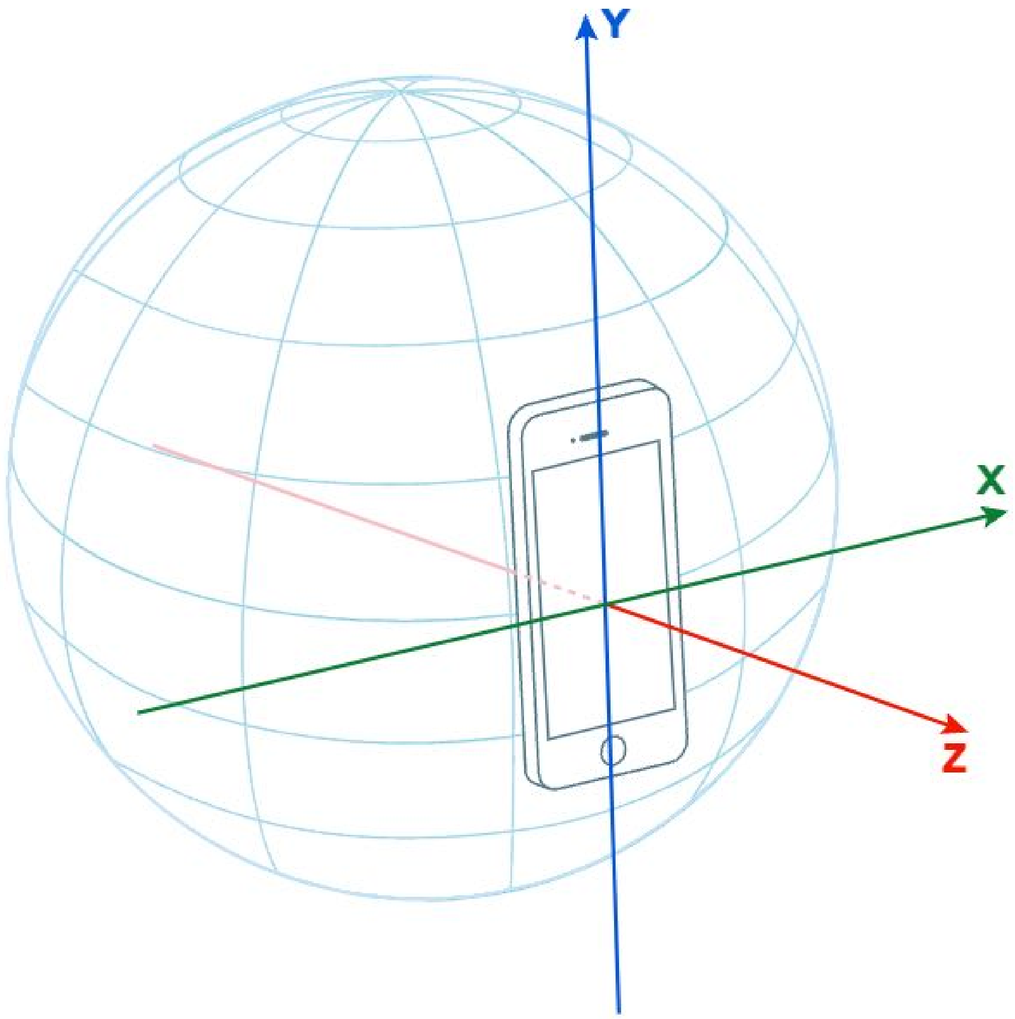
Mobile Browser Compatibility

	Chrome Android	Firefox for Android	Opera Android	Safari on iOS	Samsung Internet
`Sensor`	67	No	48	No	9.0
`AbsoluteOrientationSensor` 🧪	67	No	48	No	9.0
`RelativeOrientationSensor`	67	No	48	No	9.0
`Accelerometer` 🧪	67	No	48	No	9.0
`Gyroscope`	67	No	48	No	9.0
`LinearAccelerationSensor`	67	No	48	No	9.0
`GravitySensor`	91	No	64	No	16.0
`Magnetometer` 🧪	56 🏳️	No	No	No	No
`AmbientLightSensor` 🧪	56 🏳️	No	No	No	No

Orientation

W3C Working Draft, Stand 02.09.2021

- Orientierung/Drehung im Raum `quaternion`
- Zwei Varianten:
  - `AbsoluteOrientationSensor` relativ zur Erde (magnetisches Feld) → Bild rechts
  - `RelativeOrientationSensor` relativ zum screen oder device (initial)



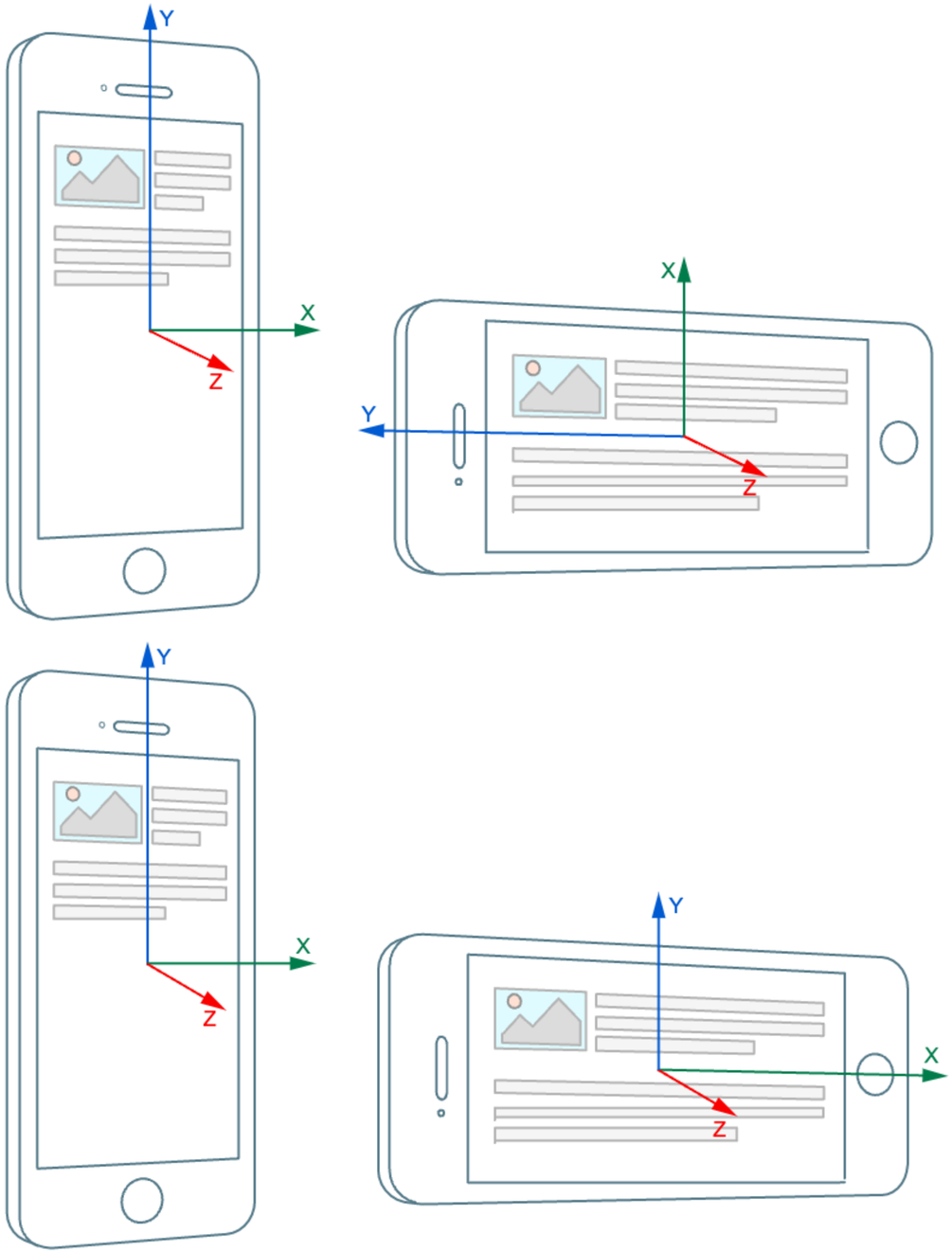
https://www.w3.org/TR/orientation-sensor

Accelerometer

W3C Candidate Recommendation Draft, Stand 30.01.2023

- Messung von Beschleunigung:
  `x, y, z`
- Relativ zu:
  - `screen`
  - `device`
- Zwei Varianten:
  - `LinearAccelerationSensor`
  - `GravitySensor`

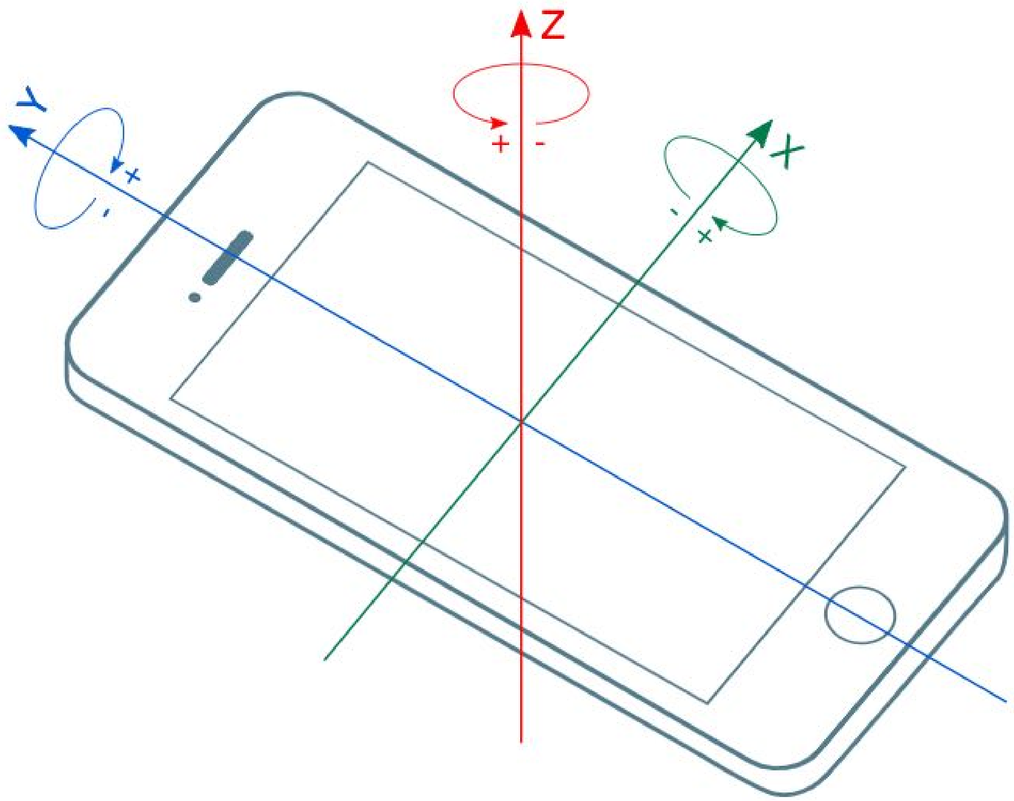
https://www.w3.org/TR/accelerometer



Gyroscope

W3C Candidate Recommendation Draft, Stand 30.01.2023

- Messung von Drehung:
  `x, y, z`
- Relativ zu:
  - `screen`
  - `device`

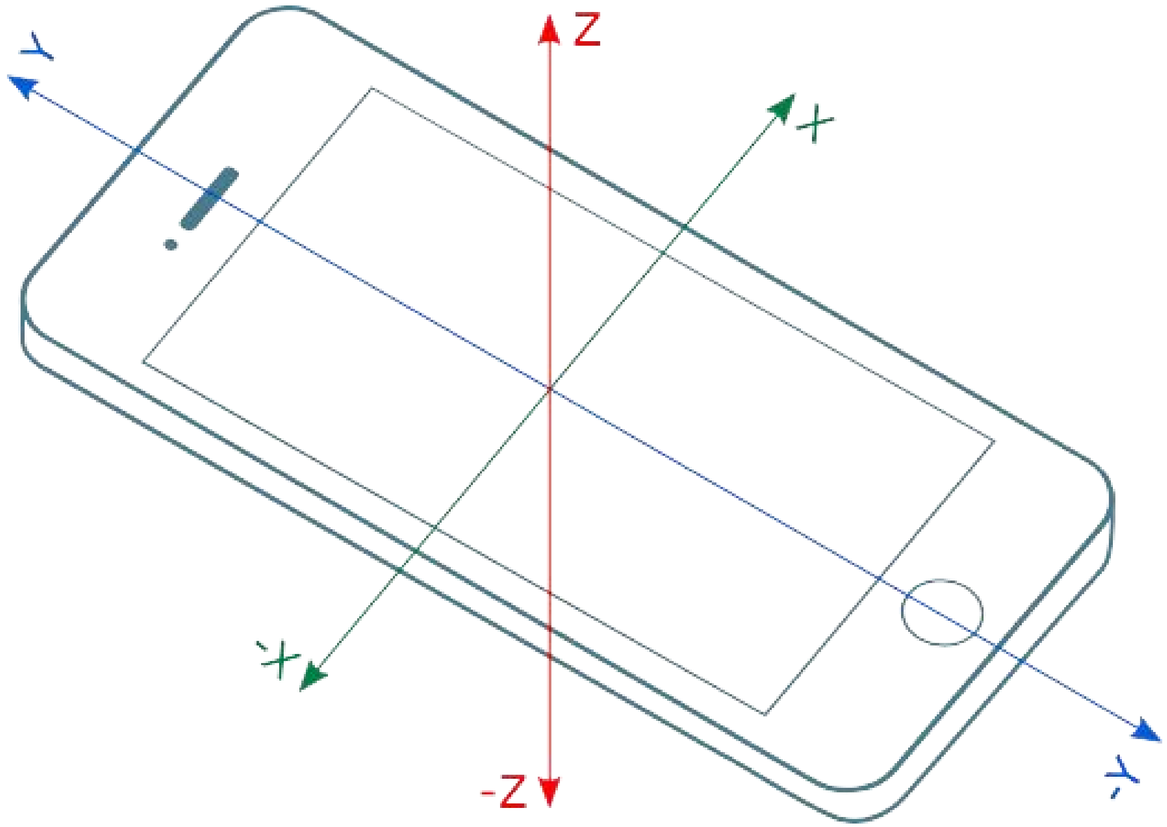


https://www.w3.org/TR/gyroscope/

Magnetometer

W3C Working Draft, Stand 30.01.2023

- Messung von Magnetfeldern:
  `x, y, z`
- Zwei Varianten:
  - `Magnetometer`
    Nur Erd-Magnetfeld
  - `UncalibratedMagnetometer`
    Objekte mit eigenem Magnetfeld werden erkannt



https://www.w3.org/TR/magnetometer/

AmbientLightSensor 🏳️ 🧪

W3C Working Draft, Stand 30.01.2023

- Messung der Beleuchtungsstärke `illuminance`
- Physikalische Einheit (lux)

Illuminance (lux)	Surfaces illuminated by
0.0001	Moonless, overcast night sky (starlight)
2	Moonless clear night sky with airglow
0.05–0.3	Full moon on a clear night
3.4	Dark limit of civil twilight under a clear sky
20–50	Public areas with dark surroundings
50	Family living room lights (Australia, 1998)
80	Office building hallway/toilet lighting
100	Very dark overcast day
150	Train station platforms
320–500	Office lighting
400	Sunrise or sunset on a clear day.
1000	Overcast day; typical TV studio lighting
10,000–25,000	Full daylight (not direct sun)
32,000–100,000	Direct sunlight

https://www.w3.org/TR/ambient-light/

Input

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What’s to come?

Feature Detection and Permissions

```
if ("AmbientLightSensor" in window) {
  console.log("AmbientLightSensor not supported");
  return;
}
```

```
navigator.permissions.query({ name: "ambient-light-sensor" }).then((result) => {
    /* do stuff */
});
```

Feature Detection and Permissions

```
if ("AmbientLightSensor" in window) {
  console.log("AmbientLightSensor not supported");
  return;
}
```

```
navigator.permissions.query({ name: permission }).then((result) => {
    /* do stuff */
});
```

Feature Detection and Permissions

```
if (!"AmbientLightSensor" in window) {
  console.log("AmbientLightSensor not supported");
  return;
}
```

```
navigator.permissions.query({ name: permission }).then((result) => {
    /* do stuff */
});
```

Aufgabe 1

15min

- Repository auf Grundlage des Links erstellen
- Clonen
- `AmbientLightSensor` implementieren
- Auf Gerät ausprobieren 🏳️
  `Generic Sensor Extra Classes` (chrome://flags)
- **Finde Orte im Raum mit unterschiedlicher Helligkeit**
- Bei Problemen fragen!

github.com/finnge/sensor-apis-workshop

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What’s to come?

Wie können wir Nutzer:innen des Erlbnispfades helfen...

10min

...einen Erlebnispunkt zu finden/ entdecken?

...ein AR-Objekt zu platzieren?

...mit einem AR-Objekt zu interagieren?

www.menti.com/
alex8eu5rumk

Motion Sensors

Magnetometer

Ambient Light Sensor

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What’s to come?

Aufgabe 2

45min

- Nutzt als Grundlage den Code von Aufgabe 1 oder aus eurem Beiboot
- Baut mit der Idee deiner Wahl einen minimalen PoC

github.com/finnge/sensor-apis-workshop

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What’s to come?

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What’s to come?

Started

App store payment support for TWAs	M88-90	
Compute Pressure	M115-118	
IWA Controlled Frame API (available only to IWAs)		
IWA Direct Sockets API		
Enterprise support to pre-allow permissions for File System Access API		
FileSystemHandle Unique IDs		
Gamepad Button and Axis Events		
Handwriting Recognition API	M91-98	
Implement Device Posture API		
Implement: Run on OS Login for Chrome OS		
Keyboard Map: layoutchange event		
PWA Web app launch handler		
Web Audio Render Capacity API		
Web Bluetooth exclusionFilters option in requestDevice()	M114	
Web Serial Bluetooth support		
WebSocketStream	M78-80	
Window Segments Enumeration API		

Under Consideration (star and comment the bug)

Ability to create virtual microphone and camera devices		
Ability to detect amount of GPU memory available		
Ability to rasterize DOM nodes into a generated image		
Access common libraries like Freetype, Harfbuzz, & ICU		
PWA Access to the bubble api (chat heads) to display interactive content for installed pwa		
Advanced Network Information		
PWA Allow web app to have actions (push-to-talk) which can be triggered in the background		
Android doesn't support screen capturing		
API to request key events normally reserved for browser shortcuts		
PWA App Menu API for installed PWAs		
Async Clipboard API: Support for multiple ClipboardItems.		
Async Clipboard: Add File support		
Async Clipboard: Add PDF support		
Async Clipboard: Add support for 'clipboardchange' event		
Async Clipboard: AVIF support		
Async Clipboard: GIF support		

Danke für eure Mitarbeit