

Claims

1. An apparatus ~~(100)~~ for playing back an audio object associated with a position, comprising:

a distance calculator ~~(110)~~ for calculating distances of the position to speakers,

wherein the distance calculator ~~(110)~~ is configured to take a solution with a smallest distance, and

wherein the apparatus ~~(100)~~ is configured to play back the audio object using the speaker corresponding to the solution,

wherein the distance calculator ~~(110)~~ is configured to calculate the distances depending on a distance function which returns a great-arc distance, or which returns weighted absolute differences in azimuth and elevation angles, or which returns a weighted angular difference.
2. An apparatus ~~(100)~~ according to claim 1,

wherein the distance calculator ~~(110)~~ is configured to calculate the distances of the position to the speakers only if a closest speaker playout flag ~~(mdae_closestSpeakerPlayout)~~, being received by the apparatus ~~(100)~~, is enabled,

wherein the distance calculator ~~(110)~~ is configured to take a solution with a smallest distance only if the closest speaker playout flag ~~(mdae_closestSpeakerPlayout)~~ is enabled, and

wherein the apparatus ~~(100)~~ is configured to play back the audio object using the speaker corresponding to the solution only of the closest speaker playout flag ~~(mdae_closestSpeakerPlayout)~~ is enabled.
3. An apparatus ~~(100)~~ according to claim 2, wherein the apparatus ~~(100)~~ is configured to not conduct any rendering on the audio object, if the closest speaker playout flag ~~(mdae_closestSpeakerPlayout)~~ is enabled.
4. An apparatus ~~(100)~~ according to one of the preceding claims, wherein the distance function is defined according to

$$\text{diffAngle} = \text{acos}(\cos(\text{azDiff}) * \cos(\text{elDiff})),$$

wherein azDiff indicates a difference of two azimuth angles,

wherein elDiff indicates a difference of two elevation angles, and

wherein diffAngle indicates the weighted angular difference.

5. An apparatus ~~(100)~~ according to one of the preceding claims, wherein the distance calculator ~~(110)~~ is configured to calculate the distances of the position to the speakers, so that each distance $\Delta(P_1, P_2)$ of the position to one of the speakers is calculated according to

$$\Delta(P_1, P_2) = |\beta_1 - \beta_2| + |\alpha_1 - \alpha_2|$$

wherein α_1 indicates an azimuth angle of the position, α_2 indicates an azimuth angle of said one of the speakers, β_1 indicates an elevation angle of the position, and β_2 indicates an elevation angle of said one of the speakers, or

wherein α_1 indicates an azimuth angle of said one of the speakers, α_2 indicates an azimuth angle of the position, β_1 indicates an elevation angle of said one of the speakers, and β_2 indicates an elevation angle of the position.

6. An apparatus ~~(100)~~ according to one of claims 1 to 4,

wherein the distance calculator ~~(110)~~ is configured to calculate the distances of the position to the speakers, so that each distance $\Delta(P_1, P_2)$ of the position to one of the speakers is calculated according to

$$\Delta(P_1, P_2) = |\beta_1 - \beta_2| + |\alpha_1 - \alpha_2| + |r_1 - r_2|$$

wherein α_1 indicates an azimuth angle of the position, α_2 indicates an azimuth angle of said one of the speakers, β_1 indicates an elevation angle of the position, β_2 indicates an elevation angle of said one of the speakers, r_1 indicates a radius of the position and r_2 indicates a radius of said one of the speakers, or

wherein α_1 indicates an azimuth angle of said one of the speakers, α_2 indicates an azimuth angle of the position, β_1 indicates an elevation angle of said one of the speakers, β_2 indicates an elevation angle of the position, r_1 indicates a radius of said one of the speakers and r_2 indicates a radius of the position.

7. An apparatus ~~(100)~~ according to one of claims 1 to 4,

wherein the distance calculator ~~(110)~~ is configured to calculate the distances of the position to the speakers, so that each distance $\Delta(P_1, P_2)$ of the position to one of the speakers is calculated according to

$$\Delta(P_1, P_2) = b \cdot |\beta_1 - \beta_2| + a \cdot |\alpha_1 - \alpha_2|$$

wherein α_1 indicates an azimuth angle of the position, α_2 indicates an azimuth angle of said one of the speakers, β_1 indicates an elevation angle of the position, β_2 indicates an elevation angle of said one of the speakers, a is a first number, and b is a second number, or

wherein α_1 indicates an azimuth angle of said one of the speakers, α_2 indicates an azimuth angle of the position, β_1 indicates an elevation angle of said one of the speakers, β_2 indicates an elevation angle of the position, a is a first number, and b is a second number.

8. An apparatus ~~(100)~~ according to one of claims 1 to 4,

wherein the distance calculator ~~(110)~~ is configured to calculate the distances of the position to the speakers, so that each distance $\Delta(P_1, P_2)$ of the position to one of the speakers is calculated according to

$$\Delta(P_1, P_2) = b \cdot |\beta_1 - \beta_2| + a \cdot |\alpha_1 - \alpha_2| + c \cdot |r_1 - r_2|$$

wherein α_1 indicates an azimuth angle of the position, α_2 indicates an azimuth angle of said one of the speakers, β_1 indicates an elevation angle of the position, β_2 indicates an elevation angle of said one of the speakers, r_1 indicates a radius of the position, r_2 indicates a radius of said one of the speakers, a is a first number, b is a second number, and c is a third number, or

wherein α_1 indicates an azimuth angle of said one of the speakers, α_2 indicates an azimuth angle of the position, β_1 indicates an elevation angle of said one of the speakers, and β_2 indicates an elevation angle of the position, r_1 indicates a radius of said one of the speakers, and r_2 indicates a radius of the position, a is a first number, b is a second number, and c is a third number.

9. A decoder device comprising:

a USAC decoder ~~(910)~~ for decoding a bitstream to obtain one or more audio input channels, to obtain one or more input audio objects, to obtain compressed object metadata and to obtain one or more SAOC transport channels,

an SAOC decoder ~~(915)~~ for decoding the one or more SAOC transport channels to obtain a group of one or more rendered audio objects,

an object metadata decoder ~~(918)~~, for decoding the compressed object metadata to obtain uncompressed metadata,

a format converter ~~(922)~~ for converting the one or more audio input channels to obtain one or more converted channels, and

a mixer ~~(930)~~ for mixing the one or more rendered audio objects of the group of one or more rendered audio objects, the one or more input audio objects and the one or more converted channels to obtain one or more decoded audio channels,

wherein the object metadata decoder ~~(918)~~ and the mixer ~~(930)~~ together form an apparatus ~~(100)~~ according to one of the preceding claims,

wherein the object metadata decoder ~~(918)~~ comprises the distance calculator ~~(110)~~ ~~(110)~~ of the apparatus ~~(100)~~ according to one of the preceding claims, wherein the distance calculator ~~(110)~~ ~~(110)~~ is configured, for each input audio object of the one or more input audio objects, to calculate distances of the position associated with said input audio object to speakers, and to take a solution with a smallest distance, and

wherein the mixer ~~(930)~~ is configured to output each input audio object of the one or more input audio objects within one of the one or more decoded audio channels to the speaker corresponding to the solution determined by the distance calculator

~~(110)~~ ~~(110)~~ of the apparatus ~~(100)~~ according to one of the preceding claims for said input audio object.

10. A method for playing back an audio object associated with a position, comprising:

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calculating distances of the position to speakers,

taking a solution with a smallest distance, and

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playing back the audio object using the speaker corresponding to the solution,

wherein calculating the distances is conducted depending on a distance function which returns a great-arc distance, or which returns weighted absolute differences in azimuth and elevation angles, or which returns a weighted angular difference.

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11. A computer program for implementing the method of claim 10 when being executed on a computer or signal processor.