



(51) International Patent Classification:
H04S 3/00 (2006.01)

(21) International Application Number:
PCT/EP2019/052156

(22) International Filing Date:
29 January 2019 (29.01.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
18154307.5 30 January 2018 (30.01.2018) EP
PCT/EP2018/025211
08 August 2018 (08.08.2018) EP

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

(54) Title: APPARATUSES FOR CONVERTING AN OBJECT POSITION OF AN AUDIO OBJECT, AUDIO STREAM PROVIDER, AUDIO CONTENT PRODUCTION SYSTEM, AUDIO PLAYBACK APPARATUS, METHODS AND COMPUTER PROGRAMS

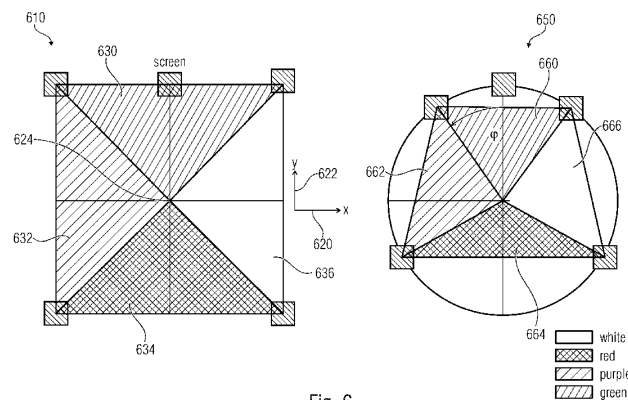


Fig. 6

$$\begin{aligned} &(\vec{r}) \quad (I) \\ &(\vec{r}) \quad (II) \\ &(\vec{r}_{\text{new}}) \quad (III) \\ &(r, \varphi) \quad (IV) \\ &(\varphi) \quad (V) \end{aligned}$$

(57) Abstract: An apparatus (100) for converting an object position of an audio object from a cartesian representation (110) to a spherical representation (112) is described. A basis area of the cartesian representation is subdivided into a plurality of basis area triangles (630, 632, 634, 636), and wherein a plurality of spherical-domain triangles (660, 662, 664, 666) are inscribed into a circle of a spherical representation. The apparatus is configured to determine, in which of the basis area triangles a projection (P) of the object position of the audio object into the base area is arranged; and the apparatus is configured to determine a mapped position (formula (I)) of the projection (P) of the object position using a linear transform (formula (II)), which maps the base area triangle onto its associated spherical domain triangle. The apparatus is configured to derive an azimuth angle (φ) and an intermediate radius value (formula (III))

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AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

from the mapped position (formula (I)). The apparatus is configured to obtain a spherical domain radius value (formula (IV)) and an elevation angle (formula (V)) in dependence on the intermediate radius value (r_{xy} , (formula (III))) and in dependence on a distance (z) of the object position from the base area. An apparatus for converting an object position of an audio object from a spherical representation to a spherical representation, applications of these apparatuses, methods and computer programs are also described.