410 with data from parameter database 510 for use in determining smart decision beam selections 506.

[0199] In operation, quality factor algorithm 504 may be operable to receive correlation qualities 508 and signal strengths 438 from correlation module 400 and signal strength module 402, respectively, in real time, as well as stored data from parameter database 510, in order to determine a quality factor for each uplink beam 130. Buffer 502 may receive one or more of the quality factors and determine provisional beam selection 512. Beam selection verification module 514 may then determine whether to verify provisional beam selection 512 based on relevant signaling information 180. If provisional beam selection 512 is verified, it may be selected as the smart decision beam selection 506. This system is discussed in greater detail below with reference to FIG. 17.

[0200] FIG. 17 illustrates relevant details and operation of smart decision selection module 410 in accordance with one embodiment of the present invention. As discussed above, smart decision selection module 410 may include quality factor algorithm 504, buffer 502, and beam selection verification module 514. Quality factor algorithm 504 may include uplink weights 520 and downlink weights 522. Uplink weights 520 may include uplink parameter weights 524 and uplink history weights 526. Uplink parameter weights 524 may include uplink correlation quality weight 528 and uplink signal strength weight 530. Similarly downlink weights 522 may include downlink parameter weights 532 and downlink history weights 534. Downlink parameter weights 532 may include downlink correlation quality weight 536 and downlink signal strength weight 538.

[0201] In general, uplink weights 520 are used by uplink quality factor algorithm 520 to determine uplink quality factors 550 corresponding to each uplink beam 130 based on one or more inputs or parameters. In particular, parameter weights 524 are used to weight the significance of each parameter used in determining uplink quality factors 550. Uplink correlation quality weight 528 and uplink signal strength weight 530 are used to weight the significance of the correlation quality and signal strength, respectively, of each uplink beam 130 in determining uplink quality factors 550. History weights 526 are used to weight the significance of each or one or more samples of the parameters. In some embodiments, history weights 526 are used to weight particular determinations, such as the correlation quality and signal strength of each uplink beam 130, based on the time slot or frame in which the determinations were made.

[0202] Similarly, downlink weights 522 may be used by downlink quality factor algorithm 520 to determine downlink quality factors corresponding to each uplink beam 130. It should be noted that although FIG. 17 focuses on the determination of uplink smart decision beam selection 506, downlink smart decision beam selection 507 may be determined in a similar manner. However, in some embodiments, one or more downlink weights 522 are different from their corresponding uplink weights 526, and thus the resulting downlink smart decision beam selection 507 may be different than the uplink smart decision beam selection 506 determined based on the same inputs or parameters.

[0203] The following discussion relates to the operation of smart decision beam selection module 410 in determining uplink smart decision beam selection 506. Uplink quality factor algorithm 540 may determine an uplink quality factor 550 for each uplink beam 130 based on one or more inputs, including correlation qualities 508 and signal strengths 438 for each uplink beam 130. In particular, uplink quality factor algorithm 540 may receive correlation qualities 508 and signal strengths 438 determined based on a current or most recent time slot of each uplink beam 130, which may be referred to as time slot "t." Uplink quality factor algorithm 540 may also base its determination of each uplink quality factor 550 on information from parameter database 510, including correlation qualities 508 and signal strengths 438 determined based on one or more prior time slots of each uplink beam 130, which may be referred to as time slots "t-1,""t-2," and so on.

[0204] In one embodiment, uplink quality factor algorithm 540 determines the uplink quality factor ("QF") 550 for each uplink beam 130 using the following equation:

$$\begin{aligned} QF(i) = {} & a1*\{b1*\text{Corr_Quality}(i,t) + b2*\text{Corr_Quality}(i,t-1) + \\ & b3*\text{Corr_Quality}(i,t-2) + b4*\text{Corr_Quality}(i,t-3) + \\ & \ldots + bn*\text{Corr_Quality}(i,t-n-1)\} + \\ & a2*\{c1*\text{Sig_Strength}(i,t) + c2*\text{Sig_Strength}(i,t-1) + \\ & c3*\text{Sig_Strength}(i,t-2) + c4*\text{Sig_Strength}(i,t-3) + \\ & \ldots + ck*\text{Sig_Strength}(i,t-k-1)\} \end{aligned} \quad (14)$$

where:

[0205] "i" indicates the beam number,

[0206] "t" indicates the time,

[0207] Corr_Quality indicates the correlation quality of the beam,

[0208] Sig_Strength indicates the signal strength of the beam, and

$$a1+a2+\ldots=b1+b2+b3+b4+\ldots+bn=c1+c2+c3+c4+\ldots+ck=1$$

[0209] Smart decision beam selection module 410 may be operable to select the number of the beam having the highest uplink quality factor 550, shown in FIG. 17 as best quality beam number 552. In some embodiments, uplink quality factor algorithm 540 is operable to determine a quality factor 550 for each uplink beam 130, as well as a best quality beam number 552, in each time slot in each frame.

[0210] The best quality beam number 552 may be received by buffer 502, which may include a decision storage system 554 operable to store one or more previously determined best quality beam numbers 552. In some embodiments, decision storage system 554 may be operable to store one or more previously determined best quality beam numbers 552 for each time slot, or traffic channel, in the relevant frequency. Buffer 502 may be operable to select a provisional beam selection 516 based on the received best quality beam number 552 as well as the previously determined best quality beam numbers 552 stored in decision storage system 554. In one embodiment, decision storage system 554 maintains a set of best quality beam numbers 552 for each traffic channel and determines provisional beam selection 516