[0024] Occasionally, one or some of these cameras are broken, obscured (e.g. by cargo ship, rain, sun glare), disconnected or otherwise unusable. When this happens, there is a gap in the perimeter that can be exploited by burglars, illegal immigrants or drug traffickers.

[0025] Critical facilities often use PTZ cameras, or fixed cameras on top of pan-tilt heads, as a solution to this problem. A human can choose a PTZ camera and redirect it to cover the gap. The problem is that, at best, it may take minutes for a human to identify the problem and address it. In practice, in facilities that have lots of cameras and more lax procedures, it is more likely that it will take days or even weeks for the problem to be identified and addressed.

[0026] The ideal solution would monitor all cameras and within seconds, identify when a camera is tampered with or unusable. The system would then automatically identify one or more PTZ cameras that cover the gap(s) optimally.

[0027] There is thus a need for more effective methods for camera control, especially for the cases of cooperatively controlling multiple PTZ cameras.

Summary ~~of the Invention~~

[0028] The principles of the present ~~invention~~ disclosure are generally embodied in a scoring method that evaluates input parameters including a point **115,** an optional direction **116** and a list of cameras **103** (see Fig. 1).

[0029] During the virtual pursuit of a suspect, the point **115** is typically a point located near where the suspect was last seen. The direction **116** corresponds to the direction desired by the operator and/or the approximate direction the suspect went toward. These positions and directions are specified in a space common to the cameras, often relative to a map **104.**

[0030] The scoring method **120** extrapolates the likely areas the suspect may have gone toward, and identifies which cameras **103** have an optimal or partial view of that

extrapolated area, then the higher-level application may use this scoring information to perform state changes **130,** e.g.:

a. Switch to the optimal new camera in the main camera viewport **210.**
b. Changing PTZ parameters on one or multiple cameras to point them toward the last seen position **115,** optionally favouring the area in the general direction **116.** Or pre-emptively position PTZ cameras toward the possible branches in the newly selected camera.
c. Display other cameras that scored high, e.g. are nearby and/or connected by passages and hallways, in one or more secondary camera viewport **205.**

[0031] Typically, though not necessarily, all steps are performed in real-time or near real-time.

[0032] The proposed method works reliably across a wide range of problems. In addition, the method makes minimal use of memory and computation capabilities, so a standard low-end computer system can navigate through a plurality of cameras interactively.

[0032a] Accordingly, in one aspect of the present disclosure, there is provided a method for selecting at least one camera among a plurality of cameras disposed in a space, each of the plurality of cameras comprising a field of view and a position in the space, the space being projected onto a map, the method comprising:

a) for each of the plurality of cameras, calculating a per-camera score with respect to a point located in the map, each of the per-camera scores being calculated with respect to a portion of the space visible by the camera as projected onto the map;
b) selecting the at least one camera with the highest per-camera scare;
c) performing an action on the selected at least one camera.

[0032b] In another aspect, there is provided a method a method for cooperative control of a plurality of cameras disposed in a space, each of the plurality of cameras comprising a direction, a zoom, and a position in the space, the space being projected onto a map, the method comprising:-

a) distributing weighted sample points on at least one area in the map to be monitored by at least a subset of the plurality of cameras, wherein each of the sample points is being assigned a weight relative to its importance;

b) determining at least a subset of the plurality of cameras in which each of the cameras of the subset of the plurality of cameras is capable of viewing at least some of the sample points;

c) changing, if necessary, the direction and/or the zoom and/or the position of each camera of the subset of the plurality of cameras such that each camera of the subset of the plurality of cameras covers at least some of the weighted sample points and such that most of the weighted sample points are covered by at least one of the cameras of the subset of the plurality of cameras.

[0033] Other and further aspects and advantages of the present disclosure ~~invention~~ will be obvious upon an understanding of the illustrative embodiments about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the example embodiments of the present disclosure ~~invention~~ in practice. The features of the present ~~invention~~ disclosure which are believed to be novel are set forth with particularity in the appended claims.

Brief Description of the Drawings

[0034] The above and other objects, features and advantages of the invention will 30 become more readily apparent from the following description, reference being made to the accompanying drawings in which:

[0035] Figure 1 is a high-level overview diagram of the navigation method.

[0036] Figure 2 is a screenshot of the Omnipresence 3D software, one exemplary embodiment of the present invention.