

"Xovis AG"

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Machine translation

1. [20220012501](#) METHOD AND ARRANGEMENT FOR DETERMINING A GROUP OF PERSONS TO BE CONSIDERED US - 13.01.2022Int.Class [G06K 9/00](#) Appl.No 17293121 Applicant XOVIS AG Inventor Markus HERRLI

The invention relates to a method and an arrangement (1) for determining a group of persons (100) to be considered staying in an observation region (50) by considering exception markings (60) for other persons (200), wherein the group of persons (100) to be considered is a group of the persons (100) staying in the observation region (50) excluding the other persons (200) who stay in the observation region (50) and carry one of the exception markings (60). Thereby, the exception markings (60) are graphic pattern with at least one characteristic length ratio. In the method, at least one image is recorded of the observation region (50), and in the at least one image, the persons (100, 200) staying in the observation region (50) and optical signatures of the exception markings (60) are detected, wherein the detected optical signatures are assigned to detected persons (200). Furthermore, a detected group of the detected persons (100) in the observation region (50) is determined excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered. The arrangement (1) includes at least one image recording device (2) for recording at least one image of the observation region (50), a person detection module (3) for detecting in the at least one image the persons (100, 200) staying in the observation region (50), an exception marking detection module (4) for detecting optical signatures of the exception markings (60), an assignment module (5) for assigning the detected optical signatures to detected persons (200), and a group detection module (6) for determining a detected group of the detected persons (100) in the observation region (50) excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered.

2. [W0/2020/119924](#) METHOD AND ARRANGEMENT FOR DETERMINING A GROUP OF PERSONS TO BE CONSIDERED W0 - 18.06.2020Int.Class [G06K 9/00](#) Appl.No PCT/EP2018/085011 Applicant XOVIS AG Inventor HERRLI, Markus

The invention relates to a method and an arrangement (1) for determining a group of persons (100) to be considered staying in an observation region (50) by considering exception markings (60) for other persons (200), wherein the group of persons (100) to be considered is a group of the persons (100) staying in the observation region (50) excluding the other persons (200) who stay in the observation region (50) and carry one of the exception markings (60). Thereby, the exception markings (60) are graphic pattern with at least one characteristic length ratio. In the method, at least one image is recorded of the observation region (50), and in the at least one image, the persons (100, 200) staying in the observation region (50) and optical signatures of the exception markings (60) are detected, wherein the detected optical signatures are assigned to detected persons (200). Furthermore, a detected group of the detected persons (100) in the observation region (50) is determined excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered. The arrangement (1) includes at least one image recording device (2) for recording at least one image of the observation region (50), a person detection module (3) for detecting in the at least one image the persons (100, 200) staying in the observation region (50), an exception marking detection module (4) for detecting optical signatures of the exception markings (60), an assignment module (5) for assigning the detected optical signatures to detected persons (200), and a group detection module (6) for determining a detected group of the detected persons (100) in the observation region (50) excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered.

3. [3895058](#) METHOD AND ARRANGEMENT FOR DETERMINING A GROUP OF PERSONS TO BE CONSIDERED EP - 20.10.2021Int.Class [G06K 9/00](#) Appl.No 18830423 Applicant XOVIS AG Inventor HERRLI MARKUS

The invention relates to a method and an arrangement (1) for determining a group of persons (100) to be considered staying in an observation region (50) by considering exception markings (60) for other persons (200), wherein the group of persons (100) to be considered is a group of the persons (100) staying in the observation region (50) excluding the other persons (200) who stay in the observation region (50) and carry one of the exception markings (60). Thereby, the exception markings (60) are graphic pattern with at least one characteristic length ratio. In the method, at least one image is recorded of the observation region (50), and in the at least one image, the persons (100, 200) staying in the observation region (50) and optical signatures of the exception markings (60) are detected, wherein the detected optical signatures are assigned to detected persons (200). Furthermore, a detected group of the detected persons (100) in the observation region (50) is determined excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered. The arrangement (1) includes at least one image recording device (2) for recording at least one image of the observation region (50), a person detection module (3) for detecting in the at least one image the persons (100, 200) staying in the observation region (50), an exception marking detection module (4) for detecting optical signatures of the exception markings (60), an assignment module (5) for assigning the detected optical signatures to detected persons (200), and a group detection module (6) for determining a detected group of the detected persons (100) in the observation region (50) excluding the detected persons (200) with assigned detected optical signature, wherein the detected group is the group of the persons (100) to be considered.

4. [20190019309](#) METHOD FOR CALIBRATION OF A STEREO CAMERA US - 17.01.2019Int.Class [G06T 7/00](#) Appl.No 15750618 Applicant XOVIS AG Inventor Markus Herrli

In a method for calibration of a stereo camera (1) comprising two cameras (2, 3) arranged in a distance along a first direction [x] and mechanically attached to a common structure, rectification functions mapping raw image coordinates to rectified coordinates are provided. Recalibration is based on images of a scene captured by the stereo camera (1) affixed in an observation position, the recalibration yielding correction functions mapping rectified coordinates to corrected coordinates. Recalibration is based on matching objects comprised in images of the captured scene obtained by the two cameras (2, 3). The stereo camera (1) is affixed in a fixed relationship with a planar surface (4), with a known distance and angle between the stereo camera (1) and the surface (4), and objects are matched in the recalibration that belong to the surface (4), wherein a disparity caused by the known distance is exploited when determining the correction functions. Exploiting the additional information with respect to the surface (4), the determination of the correction functions may be greatly improved. In particular, the inventive method allows for employing general correction functions, and no modelling of the calibration errors is required.



5. [3128482](#) METHOD FOR CALIBRATION OF A STEREO CAMERA

EP - 08.02.2017

Int.Class [G06T 7/00](#) Appl.No 15405052 Applicant XOVIS AG Inventor HERRLI MARKUS

In a method for calibration of a stereo camera [1] comprising two cameras [2, 3] arranged in a distance along a first direction [x] and mechanically attached to a common structure, rectification functions mapping raw image coordinates to rectified coordinates are provided. Recalibration is based on images of a scene captured by the stereo camera [1] affixed in an observation position, the recalibration yielding correction functions mapping rectified coordinates to corrected coordinates. Recalibration is based on matching objects comprised in images of the captured scene obtained by the two cameras [2, 3]. The stereo camera [1] is affixed in a fixed relationship with a planar surface [4], with a known distance and angle between the stereo camera [1] and the surface [4], and objects are matched in the recalibration that belong to the surface [4], wherein a disparity caused by the known distance is exploited when determining the correction functions. Exploiting the additional information with respect to the surface [4], the determination of the correction functions may be greatly improved. In particular, the inventive method allows for employing general correction functions, and no modelling of the calibration errors is required.

6. [3332387](#) METHOD FOR CALIBRATION OF A STEREO CAMERA

EP - 13.06.2018

Int.Class [G06T 7/80](#) Appl.No 16727456 Applicant XOVIS AG Inventor HERRLI MARKUS

In a method for calibration of a stereo camera [1] comprising two cameras [2, 3] arranged in a distance along a first direction [x] and mechanically attached to a common structure, rectification functions mapping raw image coordinates to rectified coordinates are provided. Recalibration is based on images of a scene captured by the stereo camera [1] affixed in an observation position, the recalibration yielding correction functions mapping rectified coordinates to corrected coordinates. Recalibration is based on matching objects comprised in images of the captured scene obtained by the two cameras [2, 3]. The stereo camera [1] is affixed in a fixed relationship with a planar surface [4], with a known distance and angle between the stereo camera [1] and the surface [4], and objects are matched in the recalibration that belong to the surface [4], wherein a disparity caused by the known distance is exploited when determining the correction functions. Exploiting the additional information with respect to the surface [4], the determination of the correction functions may be greatly improved. In particular, the inventive method allows for employing general correction functions, and no modelling of the calibration errors is required.

7. [20150324647](#) METHOD FOR DETERMINING THE LENGTH OF A QUEUE

US - 12.11.2015

Int.Class [G06K 9/00](#) Appl.No 14409881 Applicant XOVIS AG Inventor Martin Wuethrich

Method for determining the length of a queue of objects in a predefined region having at least one entrance and at least one exit, in the course of which errors in the acquisition of objects entering or exiting the region are corrected during the determination of the length of the queue. In a first step, a specific entry signature E of each object entering the predefined region through the at least one entrance is determined with the aid of at least one first image sensor. Thereafter, the specific entry signature E is stored in an entry list of a calculation unit, each entry signature E being provided with an index value i reflecting the temporal sequence of the entries. In addition, a value L reflecting the length of the queue of the objects is increased by one. Furthermore, a specific exit signature A of an object exiting the predefined region through the at least one exit is determined with the aid of at least one second image sensor, the specific exit signature A being stored in an exit list of a calculation unit as exit signature A₀ with index value j=0. The index value of exit signatures A_j already present in the exit list is respectively increased by one, and exit signatures A_j which have an index value j that is greater than a predetermined value M are deleted from the exit list. Subsequently, similarity values C_n for $-N \leq n \leq +N$ are calculated with the aid of the calculation unit, N being a predetermined value which defines a specific number N of entry signatures of objects which, before or after the object with the entry signature E_i which next exits the predefined region on the basis of the length of the queue L, will exit or have already exited the predefined region. In the process, similarity metrics U_{mn} are respectively calculated between an exit signature A_m and an entry signature E_i with index value i, m running from 0 to M, and added to C_n. The value L is decremented by the value one. Subsequently, the similarity values C_n are compared with the similarity value C₀. The value L is corrected by adding the index value x given the presence of a value C_x with index value n=x that indicates a higher similarity than the similarity value C₀.

8. [2677460](#) METHOD FOR DETERMINING THE LENGTH OF A QUEUE

EP - 25.12.2013

Int.Class [G06K 9/00](#) Appl.No 12405058 Applicant XOVIS AG Inventor WÜTHRICH MARTIN

The method comprises determining a specific entry signature E of an object [6] entering through an entrance [2] into a predefined region [1] by a first image sensor, storing the specific entry signature E in an entry list of a calculation unit, determining a specific exit signature A of an object exiting the predefined region through an exit [3] by a second image sensor, storing the specific exit signature A in the exit list of the calculation unit as an exit signature A₀ with index value j=0, and calculating similarity values by the calculation unit. The method comprises determining a specific entry signature E of an object [6] entering through an entrance [2] into a predefined region [1] by a first image sensor, storing the specific entry signature E in an entry list of a calculation unit, determining a specific exit signature A of an object exiting the predefined region through an exit [3] by a second image sensor, storing the specific exit signature A in the exit list of the calculation unit as an exit signature A₀ with index value j=0, and calculating similarity values C_n for n, where n is -N to +N, by the calculation unit, where N is a predetermined value. Each entry signature is provided with an index value i reflecting the temporal sequence of the entries. A value L reflecting the length of the queue of objects is incremented by one. The index value of each exit signature A_j already present in the exit list is incremented by one, and exit signatures A_j having an index value j greater than a predetermined value M are deleted from the exit list. The similarity U_{mn} is measured between the exit signature A_m and entry signature E_i [L+m+n], where m is 0-M, and is added to C_n. The method further comprises decrementing the value of L by the value one, correcting the value of L by comparing the similarity values C_n with similarity value of C₀ and in the presence of a C_x value with index value n=x of a higher similarity than the similarity value indicating C₀, and correcting the value of L by adding the index value x. Each similarity value C_n is added to a corresponding histogram value K_n in a histogram list, and the new histogram value K_n is stored in the histogram list. A correction of the value of L occurs when a histogram value K_x with index value n = x indicates a higher similarity histogram value K₀ by correcting the value of L and adding the index value. The calculation of the similarity values C_n and the correction of the value L is not carried out after determination of exit signature and after a predetermined number of sensed discharge signatures A, in particular more five, ten or fifteen sensed discharge signatures A. The correction the value L is carried out if a similarity value C_x or histogram value K_x indicative of a higher similarity, which is higher by a predetermined value Q as the similarity value C₀ or the histogram value k₀, where Q indicates a 1.5-fold higher similarity. The image sensors detect entrance signatures E, exit signatures A, and color signatures of the objects. The similarity measures U_{mn} are calculated using a distance vector between the exit and the entry signatures in a three dimensional color space. An expected new residence in the predefined area is calculated and displayed by a display device due to the determined length of the queue of the objects at the entrance. Differences between the entrance signatures and the exit signatures due to different lighting conditions at the entrance and the exit are compensated by a correction algorithm. An independent claim is included for a device for determining a length of a queue of objects.

9. [2786564](#) METHOD AND DEVICE FOR MONITORING A MONITORING REGION

EP - 08.10.2014

Int.Class [H04N 7/18](#) Appl.No 12794848 Applicant XOVIS AG Inventor HERRLI ANDEREGG MARKUS

The invention relates to a method and a device [1] for monitoring a monitoring region [2] with at least two image sensors [3, 4]. A sub-region [5, 6] of the monitoring region [2] is monitored by each of the image sensors [3, 4], wherein each image sensor [3, 4] detects objects [9.1, 9.2] to be monitored that are located within the sub-region [5, 6] monitored by said image sensor, and each image sensor [3, 4] outputs data relating to the detected objects [9.1, 9.2]. The image sensors [3, 4] are disposed and oriented in such a way that the monitored sub-regions [5, 6] overlap and that each object [9.1, 9.2] to be monitored that is located in the monitoring region [2] is always detected by at least one image sensor [3, 4]. A total of the objects to be monitored in the



monitoring region [2] is determined from the data from the image sensors [3, 4], wherein by means of a computation unit [8] on the basis of the data from the image sensors [3, 4] the objects [9.1, 9.2] to be monitored in overlapping sub-regions [5, 6] which are detected by more than one image sensor [3, 4] can be co-ordinated with one another by means of evaluation of the match in order to determine the total of the objects to be monitored in the monitoring region [2]. The method and the device are suitable for tracking people and for counting people and function with sensor overlap or with camera overlap.

10. **2600611** METHOD AND DEVICE FOR SURVEILLANCE OF A SURVEILLANCE AREA

EP - 05.06.2013

Int.Class **H04N 7/18** Appl.No 11405363 Applicant XOVIS AG Inventor ANDEREGG HERRLI MARKUS

A portion [5,6] of monitoring area [2] within which objects [9.1,9.2] is monitored by each image sensor [3,4] and the detected data is output. The image sensors are oriented to monitor portion of monitoring area and each of the objects which are located in the monitoring area always. The rating of correspondence of the object is assigned to determine the totality of the objects based on the detected data. An independent claim is included for device for monitoring of objects in monitoring area.

11. **20140327780** METHOD AND DEVICE FOR MONITORING A MONITORING REGION

US - 06.11.2014

Int.Class **H04N 7/00** Appl.No 14361440 Applicant XOVIS AG Inventor Markus Herrli Anderegg

A method and a device for monitoring a monitoring region with at least two image sensors. A sub-region of the monitoring region is monitored by each of the image sensors, wherein each image sensor detects objects to be monitored that are located within the sub-region monitored by said image sensor, and each image sensor outputs data relating to the detected objects and are disposed and oriented in such a way that the monitored sub-regions overlap and that each object to be monitored that is located in the monitoring region is always detected by at least one image sensor.

12. **3044760** METHOD FOR ANALYZING THE DISTRIBUTION OF OBJECTS IN FREE WAITING LINES

EP - 20.07.2016

Int.Class **G06T 7/20** Appl.No 14772053 Applicant XOVIS AG Inventor GYGER CYRILL

The invention relates to a method for analyzing the distribution of objects in a free waiting line, wherein, on the basis of position information, a monitored region comprising the free waiting line is first divided into a plurality of positions. On the basis of the position information, objects associated with the free waiting line are detected. Said objects are then tracked. At least for some of the detected objects, a current waiting time in the free waiting line is kept up to date. At least for some of the positions of the monitored region, the current waiting time of one or more of the detected objects located at the corresponding positions are associated with the corresponding positions. Furthermore, the positions having associated waiting times are divided into a plurality of classes, wherein each of the classes corresponds to a continuous waiting-time range.

13. **20160224844** METHOD FOR ANALYZING THE DISTRIBUTION OF OBJECTS IN FREE QUEUES

US - 04.08.2016

Int.Class **H04N 7/18** Appl.No 15021320 Applicant Xovis AG Inventor Cyrill Gyger

In a method for analyzing the distribution of objects in a free queue, proceeding from position information, firstly a monitoring region comprising the free queue is subdivided into a plurality of positions. Proceeding from the position information, objects assigned to the free queue are identified. Said objects are subsequently tracked. At least for a portion of the identified objects, a current waiting time in the free queue is tracked. At least for a portion of the positions of the monitoring region, the current waiting time of one or a plurality of the identified objects situated at the corresponding positions is assigned. Furthermore, the positions with assigned waiting times are classified into a plurality of classes, wherein each of the classes corresponds to a continuous waiting time range.

14. **2849151** METHOD FOR ANALYSIS OF FREE QUEUES

EP - 18.03.2015

Int.Class **G06T 7/20** Appl.No 13405111 Applicant XOVIS AG Inventor GYGER CYRILL

Bei einem Verfahren zur Analyse der Verteilung von Objekten in einer freien Warteschlange, ausgehend von Positionsinformationen, wird zunächst ein Überwachungsbereich, welcher die freie Warteschlange umfasst, in eine Mehrzahl von Positionen unterteilt. Ausgehend von den Positionsinformationen werden Objekte erkannt, welche der freien Warteschlange zugeordnet sind. Diese Objekte werden anschliessend verfolgt. Zumindest für einen Teil der erkannten Objekte wird eine aktuelle Wartezeit in der freien Warteschlange nachgeführt. Zumindest zu einem Teil der Positionen des Überwachungsbereichs wird die aktuelle Wartezeit eines oder mehrerer der erkannten Objekte, die sich an den entsprechenden Positionen befinden, zugeordnet. Ferner erfolgt eine Einteilung der Positionen mit zugeordneten Wartezeiten in mehrere Klassen, wobei jede der Klassen einem zusammenhängenden Wartezeitbereich entspricht.

15. **3044759** METHOD FOR ANALYSIS OF THE SPATIAL EXPANSION OF FREE QUEUES

EP - 20.07.2016

Int.Class **G06T 7/70** Appl.No 14772052 Applicant XOVIS AG Inventor GYGER CYRILL

In a method for determining the spatial extent of a free-forming queue, on the basis of position information, a monitoring area that comprises the free-forming queue is first of all divided into a plurality of positions. On the basis of the position information, objects that are associated with the free-forming queue are recognised and tracked. Periodic storage operations of a current position of at least some of the tracked objects are performed. An average speed of at least some of the objects is detected, the average speed of an object being determined on the basis of a plurality of the stored positions of the respective object. Finally, a first map is produced that records a density of occurrence of objects at the relevant positions in relation to the positions in the monitoring area. For this, objects with an average speed outside a predetermined range are not taken into account when producing the first map. Based on of a predetermined starting area for the free-forming queue, a floodfill method is performed to produce a contiguous area that corresponds to the extent of the free-forming queue. For a validity check, the first map is used.

16. **20160224845** METHOD FOR ANALYSING THE SPATIAL EXTENT OF FREE QUEUES

US - 04.08.2016

Int.Class **G06K 9/00** Appl.No 15021551 Applicant Xovis AG Inventor Cyrill Gyger

In a method for determining the spatial extent of a free queue, proceeding from position information, firstly a monitoring region comprising the free queue is subdivided into a plurality of positions. Proceeding from the position information, objects assigned to the free queue are identified and tracked. A current position of at least a portion of the tracked objects is periodically stored. An average speed of at least a portion of the objects is determined, wherein the average speed of an object is determined on the basis of a plurality of the stored positions of the respective object. Finally, a first map is created, which records, in relation to the positions in the monitoring region, an occurrence density of objects at the corresponding positions, Objects having an average speed outside a predefined range are not taken into account when creating the first map. Proceeding from a predefined exit region of the free queue, a flood fill method is carried out for generating a continuous region corresponding to the extent of the free queue. The first map is used for a validity check.



17. WO/2017/025214 METHOD FOR CALIBRATION OF A STEREO CAMERA

WO - 16.02.2017

Int.Class G06T 7/00 Appl.No PCT/EP2016/062407 Applicant XOVIS AG Inventor HERRLI, Markus

In a method for calibration of a stereo camera [1] comprising two cameras [2, 3] arranged in a distance along a first direction [x] and mechanically attached to a common structure, rectification functions mapping raw image coordinates to rectified coordinates are provided. Recalibration is based on images of a scene captured by the stereo camera [1] affixed in an observation position, the recalibration yielding correction functions mapping rectified coordinates to corrected coordinates. Recalibration is based on matching objects comprised in images of the captured scene obtained by the two cameras [2, 3]. The stereo camera [1] is affixed in a fixed relationship with a planar surface [4], with a known distance and angle between the stereo camera [1] and the surface [4], and objects are matched in the recalibration that belong to the surface [4], wherein a disparity caused by the known distance is exploited when determining the correction functions. Exploiting the additional information with respect to the surface [4], the determination of the correction functions may be greatly improved. In particular, the inventive method allows for employing general correction functions, and no modelling of the calibration errors is required.

18. WO/2013/188988 METHOD FOR DETERMINING THE LENGTH OF A QUEUE

WO - 27.12.2013

Int.Class G06K 9/00 Appl.No PCT/CH2013/000105 Applicant XOVIS AG Inventor WÜTHRICH, Martin

The invention relates to a method for determining the length of a queue of objects [8] in a predefined region [1] with at least one entrance [2] and at least one exit [3], in which errors in the detection of objects [6, 7] entering or exiting the region [1] are corrected during the determination of the length of the queue. In a first step, a specific entry signature E of each object [6] entering through the at least one entrance [2] into the predefined region [1] is determined by means of at least one first image sensor [4]. Thereafter, the specific entry signature E is stored in an entry list of a calculation unit [9], wherein each entry signature E is provided with an index value i reflecting the temporal sequence of the entries. In addition, a value L reflecting the length of the queue of objects is incremented by one. A specific exit signature A of an object [7] exiting the predefined region [1] through the at least one exit [3] is also determined by at least one second image sensor [5], the specific exit signature A being stored in an exit list of a calculation unit [9] as an exit signature A0 with index value j=0. The index value of each exit signature Aj already present in the exit list is incremented by one and exit signatures Aj having an index value j greater than a predetermined value M are deleted from the exit list. Then, similarity values Cn for $-N \leq n \leq +N$ are calculated by the calculation unit [9], wherein N is a predetermined value that defines a specific number N of entry signatures of objects that have exited the predefined region before, or will exit after, the object with the entry signature EL which, based on the length L of the queue, will next exit the predefined region. In the process, respective similarity measures Umn between an entry signature Am and an exit signature EL+m+n, where m runs from 0 to M, are calculated and summed for Cn. The value L is decremented by the value one. Then, the similarity values Cn are compared to the similarity value C0. If there is a value Cx with index value n = x indicating a higher similarity than the similarity value C0, the value L is corrected by adding the index value x.

19. WO/2013/078568 METHOD AND DEVICE FOR MONITORING A MONITORING REGION

WO - 06.06.2013

Int.Class H04N 7/18 Appl.No PCT/CH2012/000261 Applicant XOVIS AG Inventor HERRLI ANDEREGG, Markus

The invention relates to a method and a device [1] for monitoring a monitoring region [2] with at least two image sensors [3, 4]. A sub-region [5, 6] of the monitoring region [2] is monitored by each of the image sensors [3, 4], wherein each image sensor [3, 4] detects objects [9.1, 9.2] to be monitored that are located within the sub-region [5, 6] monitored by said image sensor, and each image sensor [3, 4] outputs data relating to the detected objects [9.1, 9.2]. The image sensors [3, 4] are disposed and oriented in such a way that the monitored sub-regions [5, 6] overlap and that each object [9.1, 9.2] to be monitored that is located in the monitoring region [2] is always detected by at least one image sensor [3, 4]. A total of the objects to be monitored in the monitoring region [2] is determined from the data from the image sensors [3, 4], wherein by means of a computation unit [8] on the basis of the data from the image sensors [3, 4] the objects [9.1, 9.2] to be monitored in overlapping sub-regions [5, 6] which are detected by more than one image sensor [3, 4] can be co-ordinated with one another by means of evaluation of the match in order to determine the total of the objects to be monitored in the monitoring region [2]. The method and the device are suitable for tracking people and for counting people and function with sensor overlap or with camera overlap.

20. WO/2015/035524 METHOD FOR ANALYSING THE SPATIAL EXTENT OF FREE-FORMING QUEUES

WO - 19.03.2015

Int.Class G06T 7/20 Appl.No PCT/CH2014/000128 Applicant XOVIS AG Inventor GYGER, Cyrill

In a method for determining the spatial extent of a free-forming queue, on the basis of position information, a monitoring area that comprises the free-forming queue is first of all divided into a plurality of positions. On the basis of the position information, objects that are associated with the free-forming queue are recognised and tracked. Periodic storage operations of a current position of at least some of the tracked objects are performed. An average speed of at least some of the objects is detected, the average speed of an object being determined on the basis of a plurality of the stored positions of the respective object. Finally, a first map is produced that records a density of occurrence of objects at the relevant positions in relation to the positions in the monitoring area. For this, objects with an average speed outside a predetermined range are not taken into account when producing the first map. Based on a predetermined starting area for the free-forming queue, a floodfill method is performed to produce a contiguous area that corresponds to the extent of the free-forming queue. For a validity check, the first map is used.

21. WO/2015/035525 METHOD FOR ANALYZING THE DISTRIBUTION OF OBJECTS IN FREE WAITING LINES

WO - 19.03.2015

Int.Class G06T 7/20 Appl.No PCT/CH2014/000129 Applicant XOVIS AG Inventor GYGER, Cyrill

The invention relates to a method for analyzing the distribution of objects in a free waiting line, wherein, on the basis of position information, a monitored region comprising the free waiting line is first divided into a plurality of positions. On the basis of the position information, objects associated with the free waiting line are detected. Said objects are then tracked. At least for some of the detected objects, a current waiting time in the free waiting line is kept up to date. At least for some of the positions of the monitored region, the current waiting time of one or more of the detected objects located at the corresponding positions are associated with the corresponding positions. Furthermore, the positions having associated waiting times are divided into a plurality of classes, wherein each of the classes corresponds to a continuous waiting-time range.

