CLAIMS

1. A computer-implemented method comprising:

generating, using a first clock that is an internal clock of a lane transaction system and in response to detection of respective transponders of transacting vehicles by a sensor of the late transaction system, transaction time stamps of a set of lane transaction entities;

generating, using a second clock that is an internal clock of an image acquisition system and that is different than the first clock, and in response to separate detection of the transacting vehicles by a sensor that is different from the sensor of the lane transaction system, picture time stamps of a series of lane transaction pictures;

accessing the set of lane transaction entries, each entry in the set designating a toll transaction between a vehicle and a toll system and including a transaction descriptor and one of the transaction time stamps generated by the first clock;

accessing the series of lane transaction pictures, the series including a plurality of pictures, each of which is associated one of the picture time stamps generated by the second clock;

identifying, using a computer processor, a lane transaction entry from the set as a violation transaction entry based on the transaction descriptor;

selecting a group of lane transaction entries from among the set of lane transaction entries based on the time stamp of the violation transaction entry;

selecting a group of lane transaction pictures from the series of lane transaction pictures based on the selected group of lane transaction entries and at least one of the time stamps of the series of lane transaction pictures; and

identifying a lane transaction picture from the group of lane transaction pictures as a violation picture corresponding to the violation transaction entry by associating the group of lane transaction entries with the group of lane transaction pictures.

2. The method of claim 1, wherein associating the group of lane transaction entries with the group of lane transaction pictures comprises:

matching a first picture of the group of lane transaction pictures with a first lane transaction entry of the group of lane transaction entries; and

matching a second picture of the group of lane transaction pictures with a second lane transaction entry of the group of lane transaction entries.

3. The method of claim 2, wherein the first picture is a picture of a first transaction between a first vehicle and the toll system in a lane of the toll system and the second picture is a picture of a second transaction between a second vehicle and the toll system in the lane of the toll system, the second transaction occurring after the first transaction.

4. The method of claim 1, wherein:

selecting a group of lane transaction entries from among the set of lane transaction entries based on the time stamp of the violation transaction entry comprises:

determining a landmark transaction entry from among the set of lane transaction entries; and

selecting a sequence of lane transaction entries that comprises two or more sequential transaction entries for a particular lane in the toll system without any intervening entries that are not in the sequence of lane transaction entries, the landmark transaction entry being at a beginning of the sequence or an end of the sequence and the sequence including the violation transaction entry; and

selecting a group of lane transaction pictures from the series of lane transaction pictures based on the selected group of toll transaction entries and at least one of the time stamps of the series of lane transaction pictures comprises:

determining a time stamp of the landmark transaction entry; and

selecting a sequence of lane transaction pictures from the series of lane transaction pictures using the time stamp of the landmark transaction entry, the series of lane transaction pictures comprising a sequence of pictures for the particular lane in the toll system without any intervening pictures that are not in the sequence of lane transaction pictures.

5. The method of claim 4, wherein selecting the sequence of lane transaction pictures from the series of lane transaction pictures using the time stamp of the landmark transaction entry comprises selecting the sequence of lane transaction pictures from the series of lane transaction

pictures such that a time stamp for a first picture or a last picture in the sequence is within a predetermined period of time from the time stamp of the landmark transaction entry.

6. The method of claim 4, wherein determining the landmark transaction entry from among the set of lane transaction entries comprises determining a particular transaction entry from among the set of lane transaction entries for a vehicle with three or more axles using data for the particular transaction entry that identifies a number of axles for the vehicle.

7. The method of claim 4, wherein determining the landmark transaction entry from among the set of lane transaction entries comprises determining a particular transaction entry from among the set of lane transaction entries for a vehicle that has a transponder using data for the particular transaction entry.

8. The method of claim 7, wherein determining the particular transaction entry for a vehicle that has a transponder using the data for the particular transaction entry comprises determining, using data for the particular transaction entry, the particular transaction entry for the vehicle that paid for a transaction with the toll system using the transponder.

9. The method of claim 4, wherein determining the landmark transaction entry from among the set of lane transaction entries comprises:

determining a pair of transaction entries from among the set of lane transaction entries that have a time gap between the pair of transaction entries during which no transaction occurred for the particular lane; and

selecting one of the pair of transaction entries as the landmark transaction entry.

10. The method of claim 4, comprising:

determining a second landmark transaction entry from among the set of lane transaction entries, wherein:

selecting the sequence of lane transaction entries that comprises two or more sequential transaction entries for a particular lane in the toll system comprises selecting the sequence of lane transaction entries with the landmark transaction entry at the beginning of the sequence and the second landmark transaction entry being at the end of the sequence, the sequence comprising all transaction entries for the particular lane between the landmark transaction entry and the

second landmark transaction entry; and

selecting the sequence of lane transaction pictures from the series of lane transaction pictures using the time stamp of the landmark transaction entry comprises

determining a time stamp of the second landmark transaction entry; and

selecting the sequence of lane transaction pictures from the series of lane transaction pictures using a timestamp of the landmark transaction entry to determine a first picture in the sequence and the timestamp of the second landmark transaction entry to determine a second picture in the sequence, the sequence including all pictures for the particular lane between the first picture and the second picture.

11. The method of claim 4, wherein:

determining the landmark transaction entry from among the set of lane transaction entries comprises:

determining whether a particular transaction entry for the particular lane and from among the set of lane transaction entries is adjacent to a violation transaction entry for the particular lane; and

selecting the particular transaction entry as the landmark transaction entry in response to determining that the particular transaction entry for the particular lane is not adjacent to a violation transaction entry for the particular lane; and

selecting the sequence of lane transaction entries that comprises two or more sequential transaction entries for the particular lane in the toll system without any intervening entries that are not in the sequence of lane transaction entries comprises selecting the sequence of lane transaction entries that comprises three or more sequential transaction entries for the particular lane in the toll system.

12. The method of claim 4, comprising:

determining a time interval that includes the landmark transaction entry and the violation transaction entry; and

determining that the time interval does not include another landmark transaction entry, wherein selecting the sequence of lane transaction entries that comprises two or more sequential transaction entries for the particular lane in the toll system without any intervening entries that are not in the sequence of lane transaction entries comprises selecting the sequence of lane

transaction entries that includes only the landmark transaction entry and does not include a second landmark transaction entry.

13. A system comprising:

a lane transaction entry data store configured to store lane transaction entries that each designate a toll transaction between a vehicle and a toll system, include a transaction descriptor, and are associated with transaction time stamps generated by a first clock that is an internal clock of a lane transaction system for the toll transactions between the vehicles and the toll system;

a vehicle image data store configured to store lane transaction pictures that are associated with picture time stamps generated by a second clock that is an internal clock of an image acquisition system that is different from the first clock of the lane transaction system; and

a processing device configured to:

generate, using the first clock and in response to detection of respective transponders of transacting vehicles by a sensor of the late transaction system, transaction time stamps of a group of lane transaction entities;

generate, using the second clock and in response to separate detection of the transacting vehicles by a sensor that is different from the sensor of the lane transaction system, picture time stamps of a group of lane transaction pictures;

identify a violation transaction entry from the lane transaction entry data store using the transaction descriptor included in the violation transaction entry;

select the group of lane transaction entries from the lane transaction entry data store using the time stamp of the violation transaction entry, the group of lane transaction entries including the violation transaction entry;

select the group of lane transaction pictures from the vehicle image data store based on the selected group of toll transaction entries and at least one of the time stamps of the lane transaction entries in the group of lane transaction entries; and

identify a lane transaction picture from the group of lane transaction pictures as a violation picture corresponding to the violation transaction entry by associating the group of lane transaction entries with the group of lane transaction pictures.

14. The system of claim 13, wherein associating the group of lane transaction entries with the group of lane transaction pictures comprises:

matching a first picture of the group of lane transaction pictures with a first lane transaction entry of the group of lane transaction entries; and

matching a second picture of the group of lane transaction pictures with a second lane transaction entry of the group of lane transaction entries.

15. The system of claim 14, wherein the first picture is a picture of a first transaction between a first vehicle and the toll system in a lane of the toll system and the second picture is a picture of a second transaction between a second vehicle and the toll system in the lane of the toll system, the second transaction occurring after the first transaction.

16. The system of claim 13, wherein the processing device is configured to:

select a group of lane transaction entries from the lane transaction entry data store using the time stamp of the violation transaction entry by:

determining a landmark transaction entry from the lane transaction entry data store; and

selecting a sequence of lane transaction entries that comprises two or more sequential transaction entries for a particular lane in the toll system without any intervening entries that are not in the sequence of lane transaction entries, the landmark transaction entry being at a beginning of the sequence or an end of the sequence and the sequence including the violation transaction entry; and

select a group of lane transaction pictures from the vehicle image data store based on the selected group of toll transaction entries and at least one of the time stamps of the lane transaction entries in the group of lane transaction entries by:

determining a time stamp of the landmark transaction entry; and

selecting a sequence of lane transaction pictures from the vehicle image data store using the time stamp of the landmark transaction entry, the sequence of lane transaction pictures comprising a sequence of pictures for the particular lane in the toll system without any intervening pictures that are not in the sequence of lane transaction pictures.

17. A non-transitory computer readable storage medium storing instructions executable by a data processing apparatus and upon such execution cause the data processing apparatus to perform operations comprising:

generating, using a first clock that is an internal clock of a lane transaction system and in response to detection of respective transponders of transacting vehicles by a sensor of the late transaction system, transaction time stamps of a set of lane transaction entities;

generating, using a second clock that is an internal clock of an image acquisition system and that is different than the first clock, and in response to separate detection of the transacting vehicles by a sensor that is different from the sensor of the lane transaction system, picture time stamps of a series of lane transaction pictures;

accessing the set of lane transaction entries, each entry in the set designating a toll transaction between a vehicle and a toll system and including a transaction descriptor and one of the transaction time stamps generated by the first clock;

accessing the series of lane transaction pictures, the series including a plurality of pictures, each of which is associated one of the picture time stamps generated by the second clock;

identifying, using a computer processor, a lane transaction entry from the set as a violation transaction entry based on the transaction descriptor;

selecting a group of lane transaction entries from among the set of lane transaction entries based on the time stamp of the violation transaction entry;

selecting a group of lane transaction pictures from the series of lane transaction pictures based on the selected group of lane transaction entries and at least one of the time stamps of the series of lane transaction pictures; and

identifying a lane transaction picture from the group of lane transaction pictures as a violation picture corresponding to the violation transaction entry by associating the group of lane transaction entries with the group of lane transaction pictures.

18. The computer readable storage medium of claim 17, wherein associating the group of lane transaction entries with the group of lane transaction pictures comprises:

matching a first picture of the group of lane transaction pictures with a first lane transaction entry of the group of lane transaction entries; and

matching a second picture of the group of lane transaction pictures with a second lane transaction entry of the group of lane transaction entries.