Electronic Vehicle Logbook

Field of the Invention

[0001] The present invention relates to registration certificate for motor vehicles. More specifically, the present invention relates to an electronic vehicle logbook having an electronic chip embedded therein and a method therefor.

Background

[0002] Motor vehicles registration certificate has been long used by governments as official proof of registrations and ownerships of motor vehicles. Many countries adapt logbook as the official registration certificate as the owners' possessions. A typical logbook contains information pertinent to the motor vehicle, personal identity the owner, vehicle identification number, engine specifications, parts serial numbers and etc. This information are provided visually on the logbooks for immediate verification. Such logbooks may require update or amendments in time as necessary. For example, the change of ownership of the vehicle, major modifications on the vehicle or the like.

[0003] It is expected that with the logbooks and the associated registrations system, government can keep good track on all vehicle registrations. The logbooks are also used as a form of law enforcement to prevent any car theft or crimes. Due to the advancements on imaging and printing apparatus, and the relevant skills that can be easily acquired at low cost, such logbooks are very prone to manipulations and falsifications. The fact that the recordation of the information in the logbook is done

manually increases the probability of manipulations and falsifications. These definitely lead to many problems, such as errors during vehicle information recordation, raising the number of vehicle thefts, usage of vehicles to conduct crimes, and improper vehicle tax recordation.

Summary

[0004] One aspect of the present invention provides an electronic vehicle logbook for motor vehicle registration certificate. The electronic vehicle logbook comprises a flat sheet and a smart chip embedded within the flat sheet as an inlay. The smart chip stores a number of data that provide registration information of the motor vehicle.

[0005] In one embodiment, the electronic vehicle logbook further comprises an antenna attached to the smart chip.

[0006] In a further embodiment, the flat sheet of the electronic vehicle logbook may be made of any material such as paper, plastics, etc. The smart chip embedded in the flat sheet prevents the electronic vehicle logbook from being falsified and mistreated by unauthorized parties.

[0007] In another embodiment, the registration information contained in the electronic vehicle logbook may include personal data of owner of the motor vehicle, vehicle registration number, engine specifications, etc. It may further include biometric data of owner of the motor vehicle.

[0008] In a further embodiment, the data stored in the smart chip can be retrieved by communicating the data to a smart chip reader through a communication protocol, the remote reader further communicates with a host provided with a software that converts the data stored in the smart chip into a readable format. The host may be a computer, tablet, laptop or any electrical communication devices having display screen.

[0009] In another further embodiment, the software is provided from an authorized party, wherein the software can be used to view the information retrieved from the electronic vehicle logbook, and/or print the information accordingly.

Brief Description of the Drawings

[0010] This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

[0011] **Fig. 1** illustrates a schematic diagram of an electrical vehicle logbook according to one embodiment of the present invention;

[0012] **Fig. 2** illustrates a schematic diagram showing data communication flow between the electronic vehicle logbook and a host through a remote reader according to one embodiment of the present invention;

[0013] **Fig. 3A** illustrates a schematic view of list of vehicle owner information that may be included in the electronic vehicle logbook, as one embodiment of the present invention;

[0014] **Fig. 3B** illustrates a schematic view of list of vehicle information that may be included in the electronic vehicle logbook, as one embodiment of the present invention;

[0015] **Fig. 4** illustrates a block diagram of the smart chip of **Fig. 1** in accordance with one embodiment of the present invention;

[0016] **FIG. 5** illustrates a key management lifecycle of an electronic Logbook (or eLogbook) in accordance with one embodiment of the present invention;

[0017] **FIG. 6** illustrates an enrolment process in accordance with one embodiment of the present invention; and

[0018] **FIG. 7** illustrates a eLogbook issuance diagram in accordance with one embodiment of the present invention.

Detailed Description

[0019]The following descriptions of a number of specific and alternative embodiments are provided to understand the inventive features of the present invention. It shall be apparent to one skilled in the art, however that this invention may be practiced without such specific details. Some of the details may not be described in length so as to not obscure the invention. For ease of reference, common reference numerals will be used throughout the figures when referring to same or similar features common to the figures.

[0020]The present invention provides an electronic vehicle logbook for providing information pertinent to a motor vehicle. It is preferable that the outlook of the

electronic vehicle logbook of the present invention is made identical to the outlook of the vehicle logbook currently set by the authority, so as not to create any public confusion.

[0021]Fig. 1 illustrates a schematic diagram of an electrical vehicle logbook **100** according to one embodiment of the present invention. The electronic vehicle logbook **100** has substantially the same appearance as a conventional vehicle logbook implemented by the relevant authority, such as transport authority, traffic police or the like. It is well understood that vehicle logbook can be defined in various form, such as a one page sheet, multi-pages booklet, and etc. The electrical vehicle logbook **100** illustrates in **Fig. 1** is adapted as a folded card form with one folded cover embedded with a secured digital chip. The electronic vehicle logbook **100** comprises a folded card **101**, an inlay sheet **104** and a smart chip **102**. The inlay sheet 104 is adapted for covering only one folded side of the folded card to sandwich the inlay therein. The smart chip **102** may contain volatile memory and microprocessor components.

[0022]The folded card **101** and the inlay sheet 104 may be made of any materials such as paper, plastics, polymers, etc. The shape and the size of the flat sheet **101** may be customized according to the authorities requirements.

[0023]The electronic vehicle logbook **100** further includes an antenna **103** electrically connected to the smart chip **102**. Preferably, the antenna 103 is also embedded within the inlay sheet. The antenna **103** transmits and receives electromagnetic waves for communication purpose.

[0024]The smart chip **102** provides a form of security and security related functions to protect the data stored thereto. These security and security related functions may prevent unauthorized changes to the information stored therein, such that only authorized reader may extract information therefrom. These security and security related functions may serve two main objective, i) to prevent falsified or mistreated electronic vehicle logbook being falsified by unauthorised parties, and ii) to allow verification of the holder of the electronic logbook to be the legitimate holder.

[0025]Still referring to **Fig. 1**, the electronic vehicle logbook **100** may allow information to be printed on its surface as of those conventional ones. Such surface imprint may allow an immediate visual verification. The imprinted information may include particulars of the owner, vehicle brand and type, vehicle registration number and engine specifications or the like. Apart from being visually shown in the front face of the flat sheet **101**, the information may also be encoded and stored as digital data in the smart chip **102** embedded within the flat sheet **101** of the electronic vehicle logbook **100**. In a further embodiment, the smart chip **102** may also store other information, which are not visually shown on the logbook **100**. This information may also be stored in smart chip **102** as a separate set of data, which are accessible with appropriate authentication. The stored information may include biometric data and etc. Such information may be used for verification purpose.

[0026]The electronic vehicle logbook **100** may also include information regarding all legal transactions related to the motor vehicle, such as current and past owners' information, accidents encountered by the motor vehicle, vehicle tax payment, vehicle insurance, etc. The information that may be included in the electronic vehicle

logbook **100** are provided above by way of example only and are not intended to limit the scope of the present invention. Any other information that is not specified above may also be stored as data in the electronic vehicle logbook **100**.

[0027]The information that is included in the electronic vehicle logbook **100** may be obtained through several ways during the vehicle registration. The owner of the motor vehicle may provide some personal information, such as, name, identification number, date of birth, address and citizenship of the owner, to be included in the electronic vehicle logbook. Other information, such as engine specifications, may be provided by car manufacturer. The information is then encoded and stored as digital data into the smart chip of the electronic vehicle logbook **100** by the relevant authority, who is also able to accordingly modify the data. Other parties or the owner of the motor vehicle can retrieve the digital data to obtain the information stored in the electronic vehicle logbook **100**, but they will not be able to modify the data stored in the electronic vehicle logbook **100**.

[0028]It is well known in the art that smart chip **102** may carry a high level of security of for restricting access of the information. Once the information is stored, only the relevant authority may gain full access to the smart to change, update, delete and etc. the information stored therein. It is also desired that only smart readers authorised by the relevant authority are able to access the data stored within the smart chip. Such smart chip reader can be used to verify the electronic vehicle logbook **100** to be a legitimate one through the information stored within the smart chip **102**.

[0029]In another embodiment of the present invention, the electronic vehicle logbook may be presented as a booklet with multiple in page sheets. The electronic vehicle

logbook of this embodiment comprises multiple flat sheets bound together along one side forming a booklet. At least one flat sheet further comprises a chip embedded there within as an inlay. The at least one sheet can either be the cover or any of the inner sheets of the booklet.

[0030]In yet another embodiment of the present invention, the electronic vehicle logbook may be presented in a card form, resembling a credit card or an identification card.

[0031]In yet a further embodiment of the present invention, the smart chip **102** preferably has a minimum lifespan of 15 years.

[001] **Fig. 2** illustrates a schematic diagram showing electronic vehicle logbook register network as another embodiment of the present invention. The network comprises a host **201** having a database **204**, and a mobile reader **202** for reading and scanning the electronic vehicle logbook **100**. The smart chip **102** embedded within the folded sheet **101** of the electronic vehicle logbook **100** communicates through the embedded antenna **103** with the mobile reader **202**. For field usage, the mobile reader **202** is only capable of reading some of the information stored on the electronic vehicle logbook **100**. The relevant information extracted from the smart chip of the electronic vehicle logbook **100** will be displayed on the mobile reader **202**, and this information can be used to match against the visible information presented on the electronic vehicle logbook **100** for a first level verification.

[002] The mobile reader **202** upon reading the information stored on the electronic vehicle logbook **100** may communicate with a host **201** to retrieve the

information stored on the database **204** for matching through a mobile communication network **203**. The host **201** is resided at the relevant authority, or a trusted network that authorized to host the relevant information. Accordingly, such network allows the authorized officer to verify if the electronic vehicle logbook **100** or the smart chip of the electronic vehicle logbook **100** is a genuine one. This provides a second level of verification.

[0032] The mobile reader **202** may further comprise a fingerprint scanner or biometric scanner. With the scanner, the on-site officer can further verify if the person holding the electronic vehicle logbook is the truthful holder through matching the person's fingerprint with the biometric information stored on the smart chip on-site. This provides a further level of verification for the vehicle logbook.

[0033] Depending on the storage size available in the smart chip, it is desirable that the information stored within the smart chip is synchronized with the register records available at the relevant authority, such that this information can be obtained at the time of essence.

[0034] **Fig. 3A** illustrates a list of vehicle owner information that may be included in the electronic vehicle logbook, as one embodiment of the present invention. The vehicle owner information is shown in tabular format. The vehicle owner information may include the name, date of birth, address, and the like, of a vehicle owner. The information can be further encoded as digital data stored in the smart chip, or can be written or printed in the flat sheet of the electronic vehicle logbook.

[0035] **Fig. 3B** illustrates a schematic view of list of vehicle information that may be included in the electronic vehicle logbook, as one embodiment of the present invention. The vehicle information may include year of production, model, colour, engine specifications, chassis number, and the like.

[003] **Fig. 4** illustrates a block diagram of the smart chip **102** of **Fig. 1** in accordance with one embodiment of the present invention. The smart chip **102** can be a secured contactless chip. The data is stored on the chip in a ISO flexible file system. Various file systems are available such as ICAO LDS. The smart chip **102** comprises a EEPROM **402** and a ROM **404**. The EEPROM **402** may reserved about 0.5K Bytes for personal information of the holder, such as name, company's name and etc. About 0.2K Bytes may be reserved for identity of the smart chip **102** such as serial number, access right, validity dates and etc. About 3K-5K Bytes may be reserved for holder picture in digital data form. About 1K Bytes may be reserved for the holder's biometric data such as finger print, etc., and about 0.2K Bytes may be reserved for security information such as digital signature. Preferably, the secured contactless chip shall be at least CC EAL4+ certified. It may also be FIPS 140 based chip, such as FIPS 140-2 Level 3 chip. The EEPROM **402** may further provide some spare memory, when necessary. The ROM **404** stored the required applications therein, such as file system application and user right manager, and EMC applications, or other e-pass applications. The applications may be Java applications supporting EAC (Extended Access Control) similar to that defined in the ICOA standard.

[004] **FIG. 5** illustrates a key management lifecycle of an electronic Logbook (or eLogbook) in accordance with one embodiment of the present invention. The

eLogbook is adapted for recording the register of a vehicle for issuance to the owner of the vehicle. The process starts with fabricating an inlay **501** of secure digital chip or smart chip. The secure digital chip can be a contactless smart chip or the like. Once it is fabricated, it is being assembled into the eLogbook **502**. The eLogbook **502** is formed by having at least two flat sheets sandwiching the inlay **501** as well as the connected antenna there between. The inlay **501** is fabricated with the secure digital chip with a file lock having a transport key **503** before actual informations is being embedded therein. The eLogbook **502** will then be delivered and distributed to the on-site authority for granting and issuing the eLogbook to the vehicle owner. The on-site authority inputs the relevant information into each eLogbook. The information are stored on the eLogbook encrypted with diversified key **504**. The information may include the holder's picture(s), thumbprint, etc. which are enrolled with the authority. Once the encrypted information of the vehicle owner is stored on the respective eLogbook, the eLogbook may further engrave or print with the visible information on the eLogbook as of an ordinary vehicle logbook issued by the relevant authority. Over at the on-site authority, the informations are also encrypted with a digital signature with a secret key **505** to protect the information stored therein. Once the eLogbook is granted and issued, it can be verified through a public key **506** with the authosized reader. The reader can be a Secure Access Module (SAM) based reader for reading the eLogbook.

[005] In an alternate embodiment, the secure digital chip may adopt a security standard similar to that adapted on e-Passport specification defined under International

Civil Aviation Organisation (ICAO) or the like. It is also possible that other standard or protocols can also be adapted for the electronic vehicle logbook.

[006] **FIG. 6** illustrates an enrolment process in accordance with one embodiment of the present invention. The enrolment process requires an enrolment station **602** which has an imaging device **604** and a biometric reader **606**. The enrolment station **602** can be any workstation or personal computer with an enrolment application **608** installed. The imaging device **604** can be any digital camera and the biometric reader can be a commercially available fingerprint reader for capturing fingerprint. If other biometric information is required, an appropriate biometric reader or scanner can be utilised. The enrolment application deployed on the enrolment station **602** may adapt known imaging tools to enhance the image captured through the imaging device **604**. Similarly, the fingerprint capturing tool can be used to capture a desirably good quality image of the fingerprint and the biometric information shall be captured and encoded for storing on the chip.

[007] **FIG. 7** illustrates a eLogbook issuance diagram in accordance with one embodiment of the present invention. The eLogbook issuance is provided with an eLogbook writer **702** to write the required information into the smart chip of the eLogbook. Preferably, the data is written into the smart chip wirelessly. The eLogbook writer **702** includes a data preparation engine **704** and a SAM module **706** for operationally acquiring the required information from the on-site authority, preparing the data which include encryption with unique encryption key, and writing the same onto the chip of the eLogbook with a fingerprint master key and an issuer key pair. The

data is also written onto the eLogbook with a personalised master key. The data will be signed by a certificate authority.

[0036] One will appreciate that the eLogbook is capable to deploy other applications thereto. It can be used for any applications that an ordinary smart card can be used for, such as door access, payment application where ID is required, and etc.

[0037] The above description illustrates various embodiments of the present invention along with examples of how aspects of the present invention may be implemented. While specific embodiments have been described and illustrated it is understood that many charges, modifications, variations and combinations thereof could be made to the present invention without departing from the scope of the present invention. The above examples, embodiments, instructions semantics, and drawings should not be deemed to be the only embodiments, and are presented to illustrate the flexibility and advantages of the present invention as defined by the following claims:

Claims

1. An electronic vehicle logbook for motor vehicle registration certificate, comprising:

a flat sheet; and

a smart chip embedded within the flat sheet as an inlay, the smart chip stores a number of data that provide registration information of the motor vehicle.

2. The electronic vehicle logbook of claim 1, further comprises an antenna electrically connected to the smart chip.

3. The electronic vehicle logbook of claim 1, wherein the flat sheet may be made of any material such as paper, plastics, etc.

4. The electronic vehicle logbook of claim 1, wherein the smart chip prevents the electronic vehicle logbook from being falsified and mistreated by unauthorized parties.

5. The electronic vehicle logbook of claim 1, wherein the registration information includes personal data of owner of the motor vehicle, vehicle registration number, engine specifications, etc.

6. The electronic vehicle logbook of claim 1, wherein the data stored in the smart chip can be retrieved by communicating the data to a smart chip reader through a communication protocol, the remote reader further communicates with a host provided with a software that converts the data stored in the smart chip into a readable format.

7. The electronic vehicle logbook of claim 6, wherein the host may be a computer, tablet, laptop or any electrical communication devices having display screen.

8. The electronic vehicle logbook of claim 6, wherein the software is provided from an authorized party, the software is used to view the information retrieved from the electronic vehicle logbook, and/or print the information accordingly.