

Analysis and Study of Machine to Machine (Real Time Data Management)

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Abstract—Machine to machine is a communication process in which two devices exchange information with each other to produce the required output without manual assistance of humans. Using this tool, business processes can be improved, business assets can be monitored in a more efficient manner and new revenues can be generated with ease.

In day to day life problems faced by the users in ATM i.e. absence of guards, thefts of ATM, lack of security, camera less ATMs etc. Machine to machine is of keen importance which makes life easy by linking mobile OS like android, ios, windows etc. phone as device with tracking devices as well as using fingerprint sensors with mobile devices. Therefore, real time GPS tracker is well versed in providing data to the mobile device. Individual users use this service to show their location to their family and friends in real-time. Business users use this service to manage their employees or to provide a track and trace service as bonus feature to their customers. The panic alerts that have been generated during the process are handled with great care and responsibility. Real time finger impression is the major provider of fingerprint core technology which traces the finger and gets the information on device. The machine to machine concept is a growing market. . In future, this utility with its updates will hit the market and create new security goals.

Keywords—Machine to machine communication, Mobile OS, Tracking and its usage, Panic alert, Finger print sensorsetc.

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I. Introduction

Machine to machine is the communication between two machines or exchanging data without human interaction. –It actually connects Machine to Mobile- Mobile to Mobile – and finally Mobile to Machines. M2M is the next Wave of technology revolution that connects people, systems, and Smart devices in new and transforming ways, providing substantial value addition in terms of utility. However, approaching M2M as a new growth area offers a clean slate on which you can define the next generation of the business. Not only can the vending route driver be informed, but inventory can be updated both on the truck and in the warehouse while suppliers are notified to restock. For any sector, the capability for any device to communicate wirelessly enhances its worth beyond imagination.

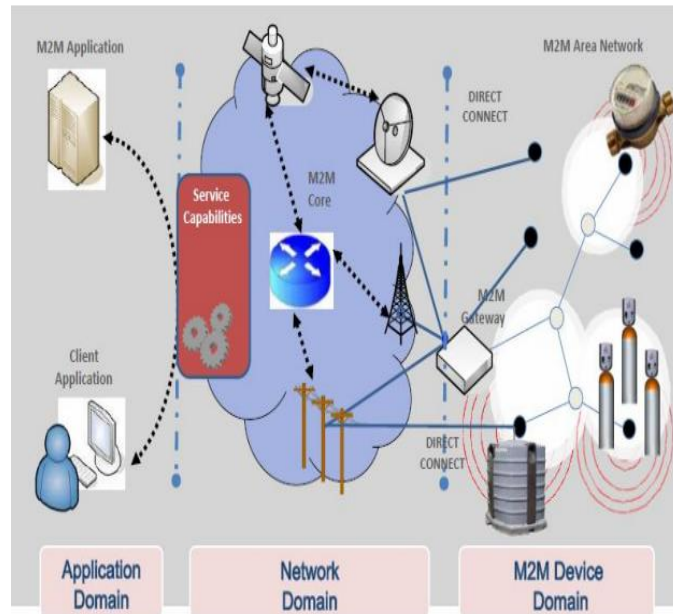


Fig1 Simple architecture of M2M systems with its components.

An example of consumer usage of M2M enabling services is introducing NFC tags to your fridge or on the back side of the remote control of your TV. With the NFC task launcher on your Android phone the apps of your favorite pizzeria or any other fast food restaurant will start. If they offer no app then you store the URL of your pizzeria on the NFC tag.

The various components and elements of an M2M system are briefly described below:

1. M2M Device: - Device capable of replying to request for data contained within those devices or capable of transmitting data autonomously.
2. M2M Area Network: -Provide connectivity between M2M Devices and M2M Gateways, e.g. personal area network.
3. M2M Gateway: - Equipment that uses M2M capabilities to ensure M2M Devices inter-working and interconnection to the communication network.
4. M2M Communication Network: - It covers the communications between the M2M Gateway(s) and M2M application(s), e.g. xDSL, LTE, WiMAX, and WLAN.
5. M2M Applications:-It contains the middleware layer where data goes through various application services and is used by the specific business-processing engines.

II. WORKING PROCESS

Machine understands the language of telemetry. The concept of telemetry -- remote machines and sensors collecting and sending data to a central point for analysis, either by humans or computers. In machine-to-machine communications, a remote sensor gathers data and sends it wirelessly to a network, where it's next routed, often through the Internet, to a server such as a personal computer. At that point, the data is analyzed and acted upon, according to the software in place.

M2M communications uses existing networks, such as wireless networks used by the public, to transmit the data.

Let us consider the case of water treatment facility, City engineers are charged with supplying the community with fresh drinking water. They need to monitor the raw water supply, the treatment process and the end product, which is drinkable water.

First, the engineers would place sensors in strategic locations. This includes placing sensors that can detect contaminants near or around the raw water supply, such as a lake or river, as well as near the water plants main intakes. They also would place sensors at various stages of the treatment process and more sensors on the plant's outflow pipes, which supply the treated water to the community. These sensors will send real-time data to a wireless network, which connects to the Internet. Engineers then monitor this incoming streaming data using computers loaded with specialized software. Finally, engineers can monitor the outflow water to ensure their treatment process is indeed resulting in high quality drinking water for the community.



Fig 2 municipal water plants

III. APPLICATIONS

Different applications where M2M is used widely:-

1. Manufacturing
2. Healthcare
3. Utility Sector
4. Automotive and Transport
5. Security and Surveillance
6. Agriculture

M2M applications in which we are into:-

1. Biometrics with Mobile
2. Card Reader with mobile
3. Smart DMS

Let us discuss all the above applications in detail:-

1. MANUFACTURING

There are many reasons why 'smart' manufacturing is a good idea: digital control systems, asset management and smart sensors can maximize operational efficiency, safety and reliability, while integration with smart building systems and smart grids can optimize energy consumption and reduce carbon footprint. RFID and M2M can come together and a huge opportunity can open up in subsectors ranging from aerospace to oil and gas to electronics across applications such as inventory management, shipping and delivery, tracking parts, work in progress and employee data. The smarter the manufacturing process, the quicker it can respond to changing customer demand.

2. HEALTHCARE

The global market for M2M healthcare applications is estimated to be substantially high. Monitoring vital signs, Supporting the aged or handicapped, Web Access Telemedicine points, Remote diagnostics etc have been taken into consideration.

Patients with non-life-threatening conditions can be issued with sensors (for blood pressure, or blood sugar levels for example), sent home and monitored remotely by medical staff — and can often be shown how to interpret the data themselves. This will free up hospital beds and physicians' time for more urgent cases.

3. UTILITIES

Huge opportunity exists for metering devices and measurement in case of power sector, oil & gas firms, etc.

Smart metering and grids: Smart meters for electricity, gas and water, and the smart grids they create, form a major component of the M2M market. Real-time data on resource consumption down to the household level allows utilities to manage demand and detect problems efficiently, while householders can save money by optimizing their usage patterns.

4. AUTOMOTIVE AND TRANSPORT

Today's cars routinely bristle with sensors and computing equipment, covering everything from engine management to navigation to 'infotainment'. Automobiles are rapidly becoming connected, context-aware machines that know where they are, where other vehicles are (both locally and in terms of regional traffic), who is driving (via driver face recognition) and how they are driving, and can warn of impending mechanical or other problems, and automatically summon roadside assistance or emergency services if necessary.

A 'smart' car can be remotely tracked or immobilized if stolen, and new business models such as 'pay-as-you-drive' insurance can be implemented

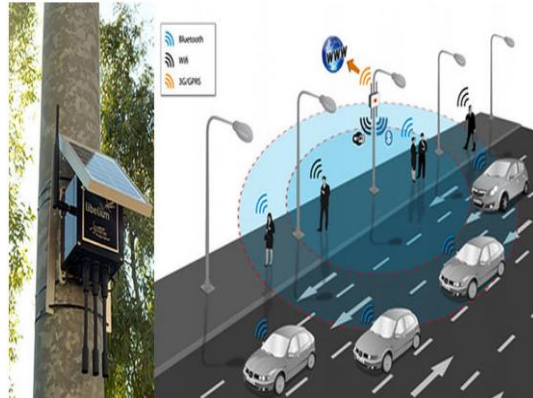


Fig 1: A lamp post mounted sensor and an illusion of its use in traffic monitoring in a smart city

The key application areas are tracking of high-value assets and vehicles, monitoring of entire supply chains, vehicle navigational systems (which has potential both for commercial vehicles as well as consumer cars), etc. The roads the cars drive on will become smarter too: in towns and cities, lamp-post-mounted sensors can monitor parking spaces, for example, and also warn drivers of congested areas.

5. SECURITY AND SERVEILLANCE

Smart buildings, including smart homes, can have connected smoke detectors that alert emergency services when triggered, and activate only the appropriate suppression systems; connected burglar alarms can immediately identify the point of entry and motion sensors can track an intruder's progress in real time (the same sensors can identify and track legitimate occupants via wireless access-control systems).

6. AGRICULTURE

Smart agriculture is a growing field with M2M technology available to track the location and condition of livestock, monitor the growing conditions of crops, and optimize the performance of farm equipment.

Used applications:-

BIOMETRICS WITH MOBILE

Any mobile OS can turn into a biometric scanner with a fingerprint device attached to it. In order to make attendance fingerprint scanner has been connected with android device thereby attaining M2M formulation and store the data of fingerprint recording its attendance in mobile app database. The addition of fingerprint scanner means you can simply use your finger to unlock your phone, sign into apps and authorize purchases. That's not all, as Android now also includes a fingerprint API for developers to make full use of the sensor in their apps.

The fingerprint reader on Android offers a host of use cases, such as document access & signing and location-based time & attendance for employees whose main workplace is out of a regular office. It can even be used for database collection of fingerprints using the functionality for fingerprint image exports. And our free toolkit ensures easy implementation.

Fingerprint scanners have become quite a secure alternative to remembering countless user-names and passwords, and the further roll out of secure mobile payment systems means that these scanners are likely to become a more common and crucial security tool in the future.

CARD READER WITH MOBILE

As the growth into technology and M2M market is into boom the card machine with mobile is of keen importance. The card machine is attached with mobile OS and the payment is done through swiping the card through it. This device entered the market for the sake of data theft that takes place when card details remains into the server.

The credit card is one of the easiest payment tools that could be thought up. It makes for easy transactions of large amounts, and minimizes your losses as you need not carry so much cash on you all the time. However, it can work only if the merchant accepts credit cards (and not all merchants accept all *kinds* of credit cards). Plus, you can only swipe your card if the merchant has a credit card machine. The customer needs

a mobile app and a card reader, which comes in the form of a piece of plastic (called a dongle). The card reader is plugged into the phone and the app activated. As the receiver of the payment, all you need to do is just punch in the amount for the purchase, swipe your customer's credit card through the reader, and then get their signature to authorize the payment. Electronic receipts can usually be sent to the buyer's emails for verification and book-keeping purposes.

For e.g. PayPal in which payment funds are deposited into your PayPal account within minutes of the transaction. It also offers you an optional PayPal merchant debit card which you can then use the funds to make eligible purchases and get 1% cash back from them.



PayPal Here also accepts cheques. All you need to do is take a photograph of the front and back of the cheque to process it. Similarly, you can take photographs of the credit or debit card if you do not have the reader with you, but you will still need to key in the security and zip code manually. PayPal will also charge you the keyed-in rate for that.

SMART DMS

Smart DMS support Machine to Machine communication and the communication among machines without human intervention is called Machine to Machine. Smart DMS is however used in various aspects of security.

For e.g. Security check in Face book. It has also been imported in various areas of transportation, energy and health sectors. It has been changing the market structure by using service data and maintaining the unified connection with the help of networks.

In SMART DMS system various sensor such as Palm sensor, Heat sensor, oil level detector are connected with DT which sense their respective reading and collect them, And a DT is connected with FFRTU, then collected data of different sensor is collected by FFRTU with a Energy meter data which is connected with FFRTU and this data is send through GSM where ever we want to send it.

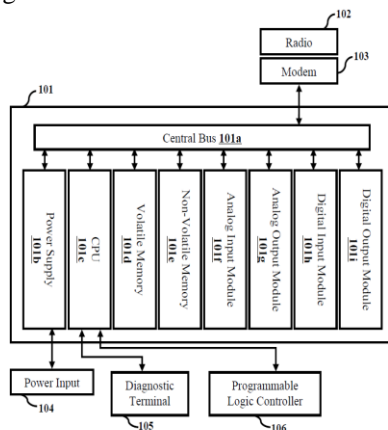


Fig 1: Process Description

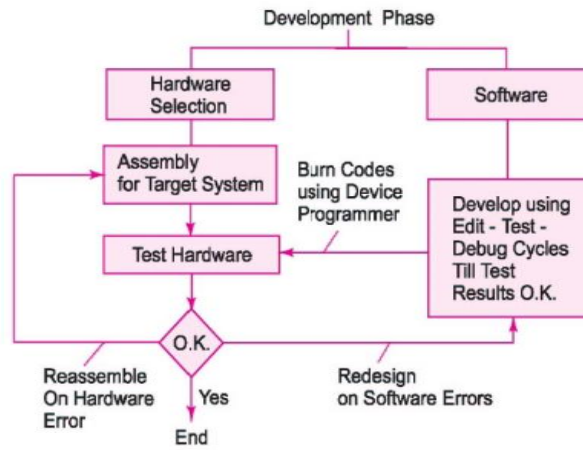


Fig 1: Stage of Development

During development of Smart DMS sub system i.e of FRTU,DT and RMU main problem facing is the connection between sub system and fetching data from a particular sub-system (DT) with FRTU, because there are a more number of sensor attached with DT and we have to save the data of every particular sensor of real time so the reading must be accurate and more reliable.

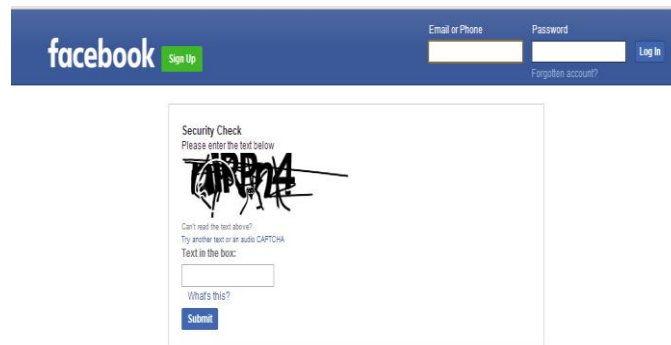


Fig 2: Application of Smart DMS

Problem in Existing System:-

- sensor reading accuracy is one of the main problem
- sometime date of a particular sensor is missed during sending
- data of a particular time is not possible to get more human effort
- require more serviced time to time

In present system we solve existing problem which are as follow:-

- sensor accuracy is good
- data of any sensor is not going to be forgotten
- required less servicing
- one time installation process

Salient Features:-

- Document Management - Provide storage, metadata, security, as well as indexing and retrieval capabilities
- Digital Library - Making document available with metadata search to end users
- Host System - Installed on Windows Server, uses MSSQL / Oracle / MySQL as database
- ODR - Online Document Reader -No native application required to read the document and prevention of unauthorized copy / paste / download of the text / images
- Policy Driven Secured Access - Login / password facility to access information, with selective authorization for viewing, printing and downloading
- Metadata Search - Documents can be searched on Metadata for fast retrieval. Metadata can be in English and or in Indian language.

- Advanced Search - Documents can be searched with advanced features using Boolean search for accurate retrieval.
- Reports - Generates and exports statistic reports on repository

Benefits:-

- Improved control over documents and document-oriented processes
- Streamlining of time-consuming business processes
- Security over document access and modification
- Documents are securely accessible any time from any web-enabled or intranet desktop
- Improved tracking and monitoring, with the ability to identify bottlenecks and modify the system to improve efficiency
- Improved Productivity and Profitability
- Powerful search capability to find information easily
- Reduction in operating costs
- Elimination of errors and delays
- Instant access to any document

IV. REAL TIME DATA USEFUL FOR MANAGEMENT

Real-time analytics is the use of or the capacity to use, data and related resources as soon as the data enters the system.

Types of practical real-time data management and analytics available to enterprises now.

1. Streaming Data Analysis involves ingesting and analyzing large volumes of high velocity data to detect patterns and trigger predetermined responses in real-time.
2. Individual Record Look-Up requires gaining near-instant access to individual records made up of multiple data points, such as customer name, account numbers and purchase history.
3. Extremely Low-latency Queries allow business analysts to perform multi-part analytic queries against large volumes of data stored in analytic databases with results returned within an acceptable amount of time, perhaps a few seconds at most.

In order to better understand the accuracy of economic data and its effects on economic decisions, some economic organizations, such as the Federal Reserve Bank of St. Louis, Federal Reserve Bank of Philadelphia and the Euro-Area Business Cycle Network (EABCN), have made databases available that contain both real-time data and subsequent revised estimates of the same data.

Real time data management has been used widely in various fields to get the best information from this data.

1. Traffic Management-Connecting Traffic Management System (Traffic signals and Traffic Command centers) with a GIS enabled digital road map of the city and using the power of analytics is a key to smooth traffic management. Using real time analytics of data from these sources and linking them to some trends, we can manage traffic flow much better.
 2. Hospitals - CBI is an IT system that collects and analyzes data and delivers the results to frontline clinicians in real time, helping them to make better decisions. It can be used to keep clinicians informed about everything from infections and iatrogenic injuries to whether units are over- or understaffed. As per their strategy real time data provides CBI with three building blocks i.e. change leader's mindset, standardize data and build a culture of transparency.
 3. Tracking – In case of tracking the user gets real time data at certain intervals of time which helps them get better location and regular latitude longitude increases the accuracy level to a great extent.
- After considering the uses of real time data in different departments it is very much formulated the essence of real time data in present scenario and its demands in future. It is the need of the hour to leverage enormous amount of data around us and create a more meaningful and smooth living for us.

V. CONCLUSION AND FUTURE WORK

There has been a significant growth and development of M2M within North America and Europe. However, the development of M2M in the developing & emerging countries has not yet shown the required level of maturity and growth as expected. The primary reason has been lack of technology awareness among potential customer-segments and less maturity within the telecom platforms that serve as a backbone of M2M.

M2M as an application holds the promise of bringing benefit to both telecom operators and vendors. For service providers it is an opportunity as low-bandwidth M2M services can be readily overlaid onto the current user services network.

In an ideal world, M2M equipment will interoperate smoothly, service providers will compete on a level open-standards playing field without attempting to lock customers into their ecosystems, and the Internet of Things will develop with the same explosive inventiveness as did the original internet. The future is now with Smart Energy Technology that will turn everything ‘Smart’ – ‘Smart Homes’, ‘Smart Grids’, and even ‘Smart Cars’

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