Relieve Climate - iOS application for encouraging motorists to change attitudes and behaviors on the trip using marketing techniques in mobility management

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ABBREVIATIONS:
MM Mobility management
BTS Bangkok Transit System

ABSTRACT

In this paper, I describe an iOS application namely Relieve Climate ,which supports mobility management (MM). Mobility Management measures is a pull, a new concept in a developed country is expected to effectively manage the growing amount of private car. The main idea is to give knowledge or publicity information related to travel through the cooperation between various departments. Along with the use of tools or measures to encourage motorists to change their attitudes and behavior on the trip (Voluntary Behavior Change). Relieve Climate responds to impulse daily car users to get involved to public transportation focusing on Bangkok Transit System (BTS) skytrain located in Bangkok Thailand. The application continuously keeps tracking user's trip data presenting in a quantity of saved Carbon Dioxide. After that, visualizes the data to become semi-tangible graphic on the device's interface. Furthermore, marketing technique is implemented to this MM. As a result , the applicants who cumulatively collect a bunch of Carbon Dioxide data would be rewarded with a prize from official sponsors collaborating with BTS skytrain. The expect result of the application is demanding less car use and convince to take a public transport.

INTRODUCTION

Globally, MM is a common criteria of not only macrodevelopment but also microdevelopement around the world, especially, metropolises in developed countries and would be slightly broader to developing countries.

From the European Platform on Mobility Management (EPOMM,) MM is a concept to promote sustainable transport and manage the demand for car use by changing travellers' attitudes and behaviour. At the core of Mobility Management are "soft" measures like information and communication, organising services and coordinating activities of different partners. "Soft" measures most often enhance the effectiveness of "hard" measures within urban transport (e.g., new tram lines, new roads and new bike lanes). Mobility Management measures (in comparison to "hard" measures) do not necessarily require large financial investments and may have a high benefit-cost ratio."

To give an impression what this means in practice: in a city where MM is implemented:

- you would notice campaigns and promotions for walking, cycling and public transport.
- you could be offered personalised travel assistance to help you see where and how you might be able to reduce your car use.
- your employer might pay your public transport tickets to encourage you not to drive to work.
- at home, you might have a carsharing service available on the street outside your house.
- at your children's school, there could be a mobility plan organising safe walking for the children's trip to school.
- for leisure trips by public transport you would have the option of using the consulting services of the local mobility centre.
- building permits might be connected to certain requirements to minimise the mobility impact of the new development, for example the development of a mobility plan for employees, visitors, and goods transport around the building site or limiting the number of parking spaces provided.

Typically, MM measures are rarely isolated, instead they often come as a bundle of measures, i.e. information campaigns combined with infrastructure, pricing policy or regulations.

According to definition and measures of MM, MM consists of a range of measures. In breif, the measure lists are earlier studied by EU then cross-referenced with a study from USA (Meyer, 1999),the Toolbox for Mobility Management Measure in Companies

(www.mobilitymanagement.be) and the Victoria Transport Policy Intitute's TDM Encyclopedia (www.vtpi.org). The list is a working paper, to be discussed and endorsed by the EPOMM-Board. As MM is a concept that is adaptive and developing, this definition does not claim to be all-inclusive and is open for change.

The measures could be listed from working paper as below:

- Information measures: the information is provided to potential traveller through many possible media including advertising and marketing techniques such as TV advertisment or online ads.
- Promotional measures: this aspect has its core the idea of encouraging voluntary behavior change through awarenes raising. For example, "European Car Free Day" campaign is usually launched to encourage people try walking, riding a bike or public transport to work. Some of these campaign concern with health promotion. "Bike to Work" is one of this category, which is implemented on a large scale in Denmark and Germany (Bike to Work campaign: www.eltis.org). Interesting instance in Atlanta, USA, the fact that a resident who switch to public transit from a solo car commute can earn up to 180 US dollars over 3 months through a community development program (Kelli Grant, 2008).

Figure I. *Bike to Work campaign launched by ELTIS in Germany, 2012.*

- Organization and coordination measures: Car Pooling or Carsharing(UK) are the best represent of this measurement. Two or more people share the same journey using one of participants' own private cars.
- Education and training measures: MM course provides for target groups such as travel center staff or mobility coordinator. Also, mobility education, where mobility and how to less use private car, becomes part of curriculum in school.
- Site-based measures: In most countries, MM is a site-based activity connected to a traffic generating site such as a company, a school, concerts, sports matches, fairs, hospitals, entire administrations based in a number of locations, recreational sites etc.
- Telecommunications and flexible time organization: Reduce the need to travel by substituting telecommunications for travel, or reorganize working place. For example, shopping, working, socializing, carrying out services by telephone or on the internet. Moreover, changing the opening hour of certain organization to reduce impacts on peak travel.
- Supportive/integrating actions: This measures don't apply directly to MM but they can have significant impacts on the effectiveness of MM. They can affect the cost of travel by car or other modes, or make the environment more conducive to the introduction of MM measures. For Instance, raising anual car tax make people may act as a disincentive to purchase new car or rather use public transport.

From above measure aspects, Relieve Climate has been developing along with the particularly emphasizing information mesures and promotional measures. To support future MM information measures, Relive Climate project would be lauched with an Environmental Consevation and Energy Conservation campaign which annual organized by BTS Skytrain. Already, most of society and environment activities provided by BTS encouraged people in Thailand especially in Bangkok aware of environment conservation. Unfortunately, each of activity result was assumed that benefit outcome was not worth comparing with financial funding which invested per each project. For example, Car free day event in 2010 was coorperated with BTS and Bangkok Metropolitan Administration. For short term awareness, this event successfully achieved environment and society benefit, however, for long term purpose is now seemed to be questioned. Perhaps, a factor such as high temperature weather or inefficient bike lanes including utter traffic problem in Bangkok causes this displeasing result.

Figure II. *Car free day by BTS skytrain co-operated with Bangkok Motropolitan Administration, Thailand 2010.*

Relieve Climate iOS application would be a part of MM in BTS, however, in more efficient and productive way. At present day, we cannot reject that mobile application influences our daily life. Day by day, we spend hours using mobile application not only for working but including in leisure time. An old-fashioned telegraph is permanently replaced by Short Message Service(SMS), whilst Electric mail(e-mail) convinces people rather than paper-based mail when a long massage required. We could briefly assume that almost all of people have mobile phone in their pockets. If we look more closely to mobile penetration rate of population which was had

been surveying in Q3, 2011 by Ministry of Information and Communication Technology of Thailand or ICT posting on www.veedvil.com. The statistics illustrates a number of mobile subscribers market share, revenue market share and industry subscribers of 3 telecommunication service providers in Thailand: AIS, Dtac, Truemove.

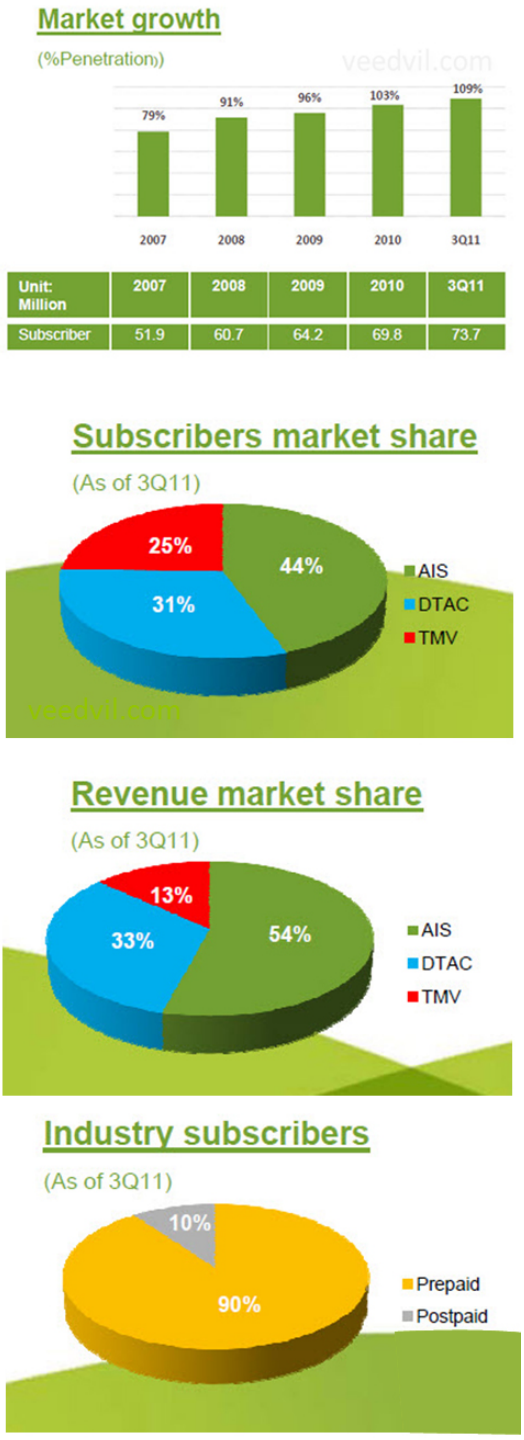

Figure III. *Mobile Penetration Rate of Population, Thailand, 2011.*

In the end of 2011, mobile population reached 75.5 million subscribers. Back to 2001, in Thailand, there were 7.5 million mobile numbers that means 10 times growth rate utterly increased along 10 years. Meanwhile , approximately Thailand populuation in 2011 is 67.7 million people. The fact that, if we compare mobile subscribers with population, mobile penetration rate of population now increase to 109%. Besides, 35% of sample group hold multiple sim card.

Furthermore, there is an interesting information that informs about smartphone owners in Thailand use Foursquare application, which allow users realtime locate their current postion on map via mobile internet connection . The graph is displayed as below:

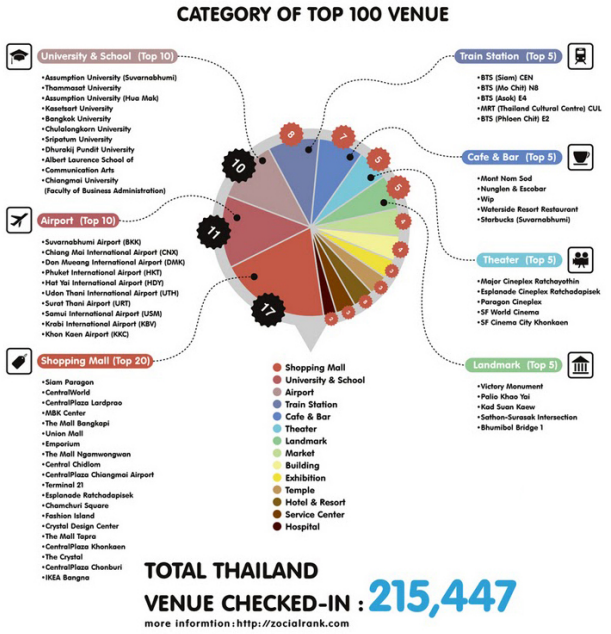

Figure IV. *Total Thailand Venue Checked-in by Foursquare Application, 2011.*

Approximately, 15% of 215,447 times, Foursquare checkers checked current location at BTS skytrain station. Roughly, We are able to claim that most of BTS skytrain passengers own a smartphone which includes an internet package.

Furthermore, top 20 Thailand check-ins venue survey (see Figure V.) describes that most of areas, where Foursquare user frequently check-ins are in center of Bangkok:- Pathum Wan, Chatuchak and Ratcha Thewi. In these center areas, there have high rate of automobiles along these venues. Dense traffic daily presents particularly during prime time. Despite, BTS skytrain route crossed along these severe traffic area (see Figure VI.). Nevertheless, an automobile rate per day seems not to decrease but tend to rise up. Why?

Because of an increase of personal automobile in Bangkok continuously grow while the people prefer to use their own private cars to get into city center rather than taking a public transport. As a result, traffic problem take a serious action to Bangkok habitants not only causing mental sickness but also a physical health problem especially respiratory system disease from air pollution including noise pollution and car accident.

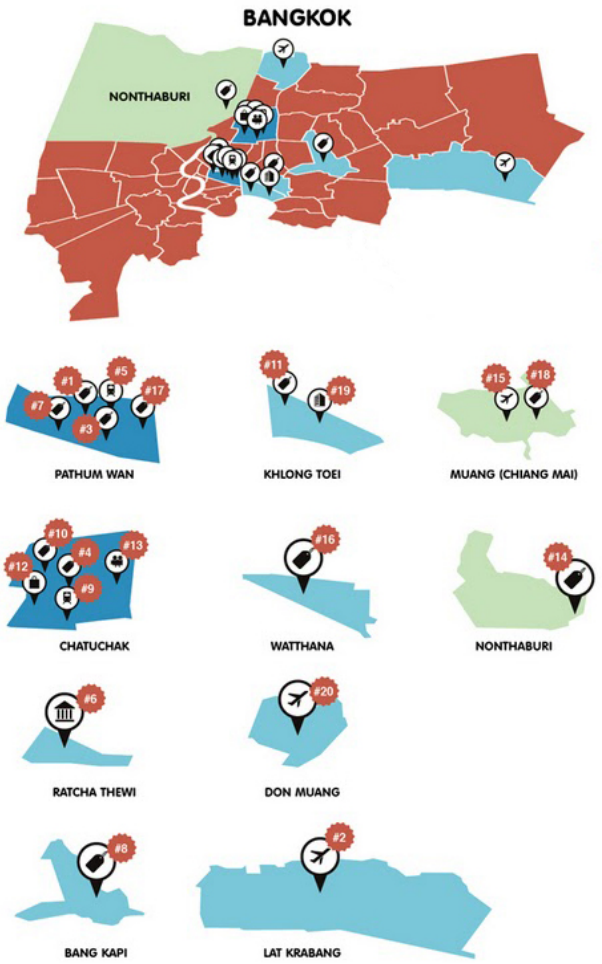

Figure V. *Top 20 Thailand venue most check-ins, 2011*

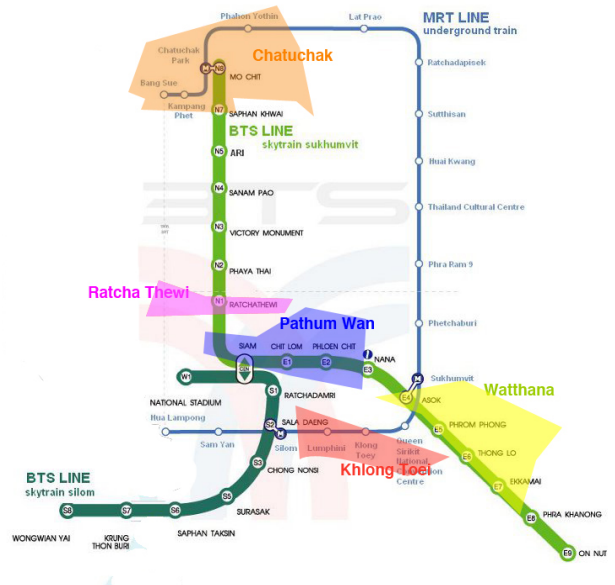

Figure VI. *BTS skytrain route map.*

As a result of each survey above, Relieve Climate iOS application could be reasonably applied to Bangkok MM. To improve voluntary behavior change, the application plans to be avialable on Apple Store with free download policy. Apple Store provides simple download method, which is simply familiar to smartphone users. To download Relieve Climate, user open Apple Store on own iOS device then search for keyword 'Relieve Climate'. After that, start downloading by touching a button labeled 'free download'. Freely download would improve a number of application users conforming with opportunity to attend this MM privacy. At the demonstration phrase, At first, focusing on a target group who hold 3rd and 4th generation iOS device which GPS navigator embeded: iPhone3G, iPhone4, iPhone 4S, iPod Touch 3G, iPod Touch 4G and iPad I&II. Furthermore, Relieve Climate convinces people to use more public transport by promoting a marketing promotion. Push and Pull marketing strategies get involved to Relieve Climate MM campaign as described below:

- Push Strategy: A push promotional strategy involves taking the product directly to the customer via whatever means to ensure the people(now referred to passangers who supposed to take BTS skytrain) is aware of Relieve Climate campaign at the point of download portal: Website, Ads, Magazine and etc. For example, BTS could do a trade show promotions to encourage retailer demand. Or, promote a campaign with co-operate with telecommunication service providers.
- Pull Strategy: A pull strategy involved motivating Relieve Climate users to seek out BTS's MM campaign in an active process. For instance, Establishing advertising and mass media promotion via TV spot or Hard media at BTS skytrain stations. Also, making a talk of the town by word of mouth referrals. Importantly, Relieve Climate would reward back to user who can achieve a target of application purpose.(see How Relieve Climate Works section)

In addition, Enterprise Currency Marketing(ECM) strategy would be combined to MM. As a case study in UK. The Tesco Clubcard, which is a points program in the retail business, has been functioning as a tool for increasing customer loyalty and promotion sales. In addition, in tie-ups with more than 20 kinds of other businesses such as financial services, airline mileage and leisure facilities and fitness clubs, Tesco has been increasing customer convenience as well as customer satisfaction.

Tesco has successfully developed its enterprise currency into "quasi-currency" that has been used not only for products and/or services provided by its group conpanies byt also those provided by partner comparies. As such, its enterprise currency is now becoming one of ket enterprise currencies in the UK. Furthermore, in accordance with each customer's purchase, Tesco sends customized coupons to each customer 4 times a year together with a notice of point earned and used. What is noteworthy is that 70 percent of the coupons have different message, giving the impression that "you are special customer for us."

What unferlies the success of Tesco's point program is the establishment of the principle that "customers that Tesco should appreciate are 'very good customers' for Tesco." and daily efforts based on this principle were made to discover good customers and identify customer needs. (Yasuoka, Kajino, 2008)

From the study we have learnt that promoting a Relieve Climate user who can perfectly achieve Relieve Climate MM main purpose should be strongly rewarded by BTS organization and partners. Moreover, the prize which provides to the user must contain with high value product and complimentary from BTS service provider and partners.

HOW RELIEVE CLIMATE WORKS

After download the application from App Store and install Relieve Climate to iOS device, user would access splash screen for 3 seconds then the index screen appears.

Figure VII. *Relieve Climate index screen*

Index screen informs user about all-time statistics which cumulatively collect a journey data. The data contains with 3 key datas:- total distance, amount of Carbon Dioxide which user have already saved and fuel saved quantity.

These key datas are the main factors to convince people to get involve to BTS MM system. Firstly, a distance concerns about Enterprise Currency Marketing that when a BTS passanger buy ticket. They would absolutely take BTS skytrain in a range of distance. Relieve Climate collects a distance information everytime user take the train. While a passager spends money purchasing ticket, the distance data is needed to be kept in order to evaluate payback reward. Secondly, people always aware of Carbon Dioxide gas, which is one of main factor cause a global warming. A global warming issue is broader referred to environment fact-sheet evidences not only in Thailand but globally. Rely on personal accountability, many environment organization create awareness on global warning by integrate the climate crisis to MM. The traffic issue simultaneously conform with the crisis issue since these factors influence a metropolis environmental and healthy concern. Lastly, fuel information is one of key value, which can motivate people to take part in BTS. Because fuel price crisis in Thailand becomes more serious over the time. Automobile fans are nowadays suffered from heavy increase of fuel cost. Therefore, I use these 3 informations to be a dominant factor applying to Relieve Climate in order to achieve early experimental phrase.

To start using Relieve Climate, user have to touch at 'Check-in Journey' button to activate QR-Code scanner in order to begin a journey. At each train station, QR-Code would be clearly installed at the point of view where user is easily able to notice, for instance, at media billboard, elevator, ticket vending machine, station sign and etc.

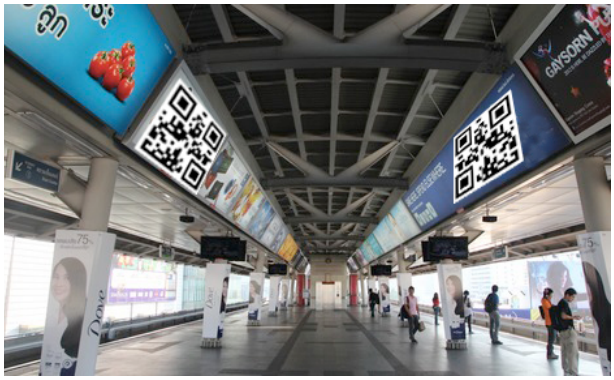

Figure VIII. *BTS Siam Square Station and QR-Code billboard example*

Figure IX. *QR-Code scanner is activated, seeking code*

QR-Code scanner embeded with Relieve Climate quickly recognize QR-Code shape. Once user turns scanner findviewder capture the code, the code would be fast detected then inform departure station where user begins a journey.

After collectly detecting code, screen changes to Outward Jouney page and informs user current departure station location. GPS navigator embeded in iOS device enables updating realtime position of user along each journey.

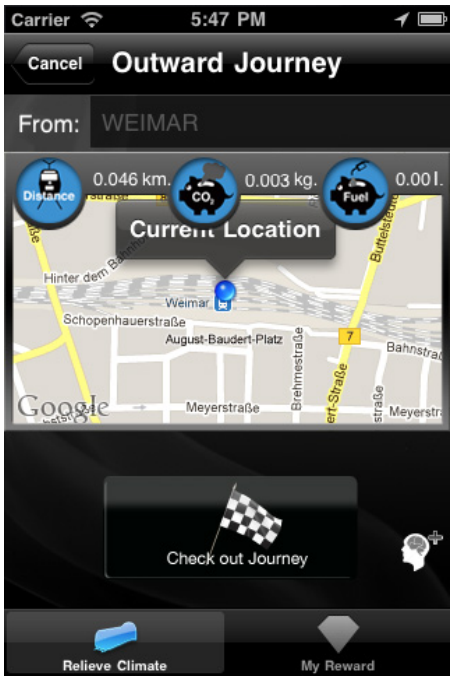

Figure X. *GPS is enabled,current user position would be updated realtime on map.*

Moreover, 3 key informations are realtime updated according to the position and distance, which user head out to. To improve productivity along the trip, Relieve Climate also provides a 'Brain Train Tip'(see Figure XI), which randomly displays each time of check-in. A content gets relevant to a daily tip such as healthy knowledge, hint of sciences, history issue, technology, psychology knowledge and etc. This feature is the first reward to user taking travel. Each article consume not too long to read, plus, user can re-open this page again to random a new article from online database.

When user arrives at arrival station, the user needs to re-check the QR-Code again to confirm check-out and get the summary of outward jouney. Scanning QR-Code at arrival station would sum up information along the trip and report in 'Journey Summary' screen. (see Figure XII) The summary screen would inform a estimate distance from departure station to arrival station. Also, conserved amount of Carbon Dioxide and fuel would be displayed and calculated, then, summarized to all-time statistics in the index screen.

The Carbon Dioxide and fuel calculation are based on comparison between taking a skytrain and middle class car ride; PC Diesel Euro 4; (source ADAC and www.bahn.de). The skytrain model drives by third-rail 750 Vdc electric voltage, which is used for most modern tram systems.

Figure XI. *'Brain Train Tip' screen*

Figure XII. *'Journey Summary' screen*

Finally, after use touches 'Done' button and datas summarized. On the bottom right of application screen, 'My Reward' tab leads to a visualization screen, where the collected data represented in a graphic from. Shapes of diamond substitutes all-time statistics which user cumulatively collect once each time finishing journey.

Figure XIII. '*My Reward' screen*

User could interact with shapes by rotating an iOS device freely. Accelerometer in iOS device detects current axis, then affect to graphic on the screen. I so far applied a physic collision to each of diamond shape, so thus, each diamond against to each other according to real world physic force. The more user takes a trip by BTS skytrain, the more getting a number of diamond.

Why diamond? If we talk about Carbon Dioxide emission, using BTS public transport trip is a solution to less emit Carbon Dioxide to the atmosphere. More, If we look closely to Carbon Dioxide molecule, we would discover that Carbon Dioxide gas contains with 1 atom Carbon and 2 atoms Oxigen. And, when many Carbon atoms are compressed together, it would form a hard substance, which could be formed to diamond shape. That means the more Carbon Dioxide collected, the more diamonds and Oxigen gases would be produced.

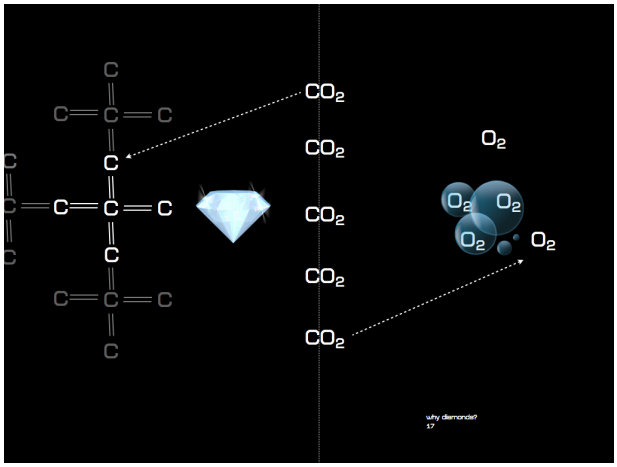

Figure XIV. *Relation of Carbon Dioxide and diamond.*

'Reward Me!' button which lays on top right of 'My Reward' screen is the feature that links to Enterprise Currency Marketing. Supposedly, user would obtain a promotion code which can directly exchange for a reward via BTS counter service. As a result of collecting diamond, user could also exchange a number of diamond with a reward or get a promotion provided by BTS or business partner. Pull stretagy involves motivating user for instances:

- a small amount of diamond could claim a retail reward e.g. Soft drink, movie ticket or discount coupon.
- a medium number of diamond could exchange with gift voucher which co-operated with super department store according to sited-based MM measures.
- a large number of diamond, a holder could be promoted in the mass media promotion such as nation newspaper as an successful environmentor and win a jackpot i.e. abroad tour package or sponsored money from government.

Nonetheless, this reward system would be a part of future research of Relieve Climate project.

RELATED WORK

In 2006, An Inconvenient Truth is a documentary film directed by Davis Guggenheim about former United States Vice President Al Gore's campaign to educate citizens about global warming via a comprehensive slide show that, by his own estimate made in the film, he has given more than a thousand times. Premiering at the 2006 Sundance Film Festival and opening in New York City and Los Angeles on May 24, 2006, the documentary was a critical and box-office success, winning 2 Academy Awards for Best Documentary Feature and Best Original Song. The film also earned $49 million at the box office worldwide, becoming the sixth-highest-grossing documentary film to date in the United States.

Figure XV. *An Inconvenient Truth by Al Gore, 2006*

The idea to document his efforts came from Laurie David who saw his presentation at a town-hall meeting on global warming which coincided with the opening of The Day After Tomorrow. David was so inspired by Gore's slide show that she, with Lawrence Bender, met with Guggenheim to adapt the presentation into a film.

Since the film's release, An Inconvenient Truth has been credited for raising international public awareness of climate change and reenergizing the environmental movement. The documentary has also been included in science curricula in schools around the world, which has spurred some controversy.

In 2011, while the smartphone trend rise up, Al Gore launched the iOS application namely 'Al Gore - Our Choice: A Plan to Solve the Climate Crisis'. Al Gore doesn't stop at the printing press when it comes to offering his book, Our Choice, to the masses. Taking a cue from the popularity of both digital books and apps, Gore's book has been turned into an interactive adventure for reading. Check out a video of the app, and an audio interview between Graham Hill and Al Gore from earlier this week. The Our Choice App is the first effort from PushPop Press, in collaboration with Rodale Inc. and Melcher Media, and they've created something very unique in this new app. The goal is that audience get involved with the information from the book, that lead to make a change in understanding of and behavior toward planet's resources.

Figure XVI. *'Al Gore - Our Choice: A Plan to Solve the Climate Crisis' iOS interactive book, 2011*

Although, 'Al Gore - Our Choice' application is an interactive program. However, it is such a one-way communication which user can only percept and perhaps change attitude while or after reading. Meanwhile Relieve Climate stimulates user to visit real site and take a real action simultaneously when using the applicaiton.

The Al Gore application and Relieve Climate are both new media which have the same proposal that creat aware of climate crisis. Nevertheless, Relieve Climate not only for climate crisis awareness but additionally applies for supporting MM.

I believe that creating an awareness of global warming stimuluses people to taking care of environmetal problem. Relieve Climate would encourage people in both sustainable MM, besides, able to relieve a climate crisis.

RESULTS OF THE PROJECT

See Relieve Climate application demonstration video.
First experiment using Relieve Climate application running on iPad II iOS 4.2 at the real site, I experimented at the train station in Weimar, traveled to Jena Germany. To test an accuracy of GPS, I set the most accurated GPS indicator. The distance between Weimar and Jena is 23 kms and spent approximately 24 minutes long. The details of test run are explained as below:

- Once I opened the application, Relieve Climate was launced and splash screen worked properly lasting 3 seconds.
- To activate QR-Code scanner, I touched the 'Check-in Journey' button and QR-Code scanner worked properly. The application called iOS device's camera viewfinder by ImagePicker subclass from UIKit superclass in iOS programming section.
- To scan the QR-Code, I scanned the QR-Code via the viewfinder. Not over than 1 second, QR-Code was detected. I tested from the distance between iOS device and QR-Code sign from 1 meter to 7 meters, the scanner worked accurately.
- After scanning QR-Code, GPS navigator indicated the current user postion accurately. Sometimes, location pin swinged at the beginning and the distance indicator was unstable between 1 meter - 5 meters. According to the Apple Developer community, plenty of developer complained this GPS instability. Finally, in iOS 4.3 this problem was dissolved by Apple Inc.
- While traveling, GPS navigator worked properly, however, somewhere, where was lack of signal causing inaccurated distance evaluation.
- 'Brain Train Tip' feature recalled properly and did not affect to main process.
- When arrived at arrival station Jena, a journey result was evaluated properly, eventhough, Carbon Dioxide quantity result slightly deviated from bahn.de reference.

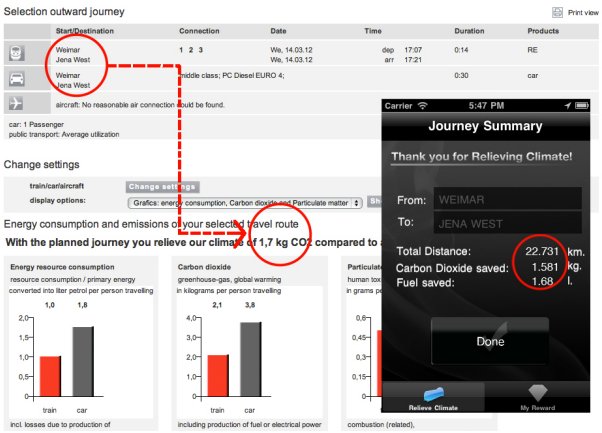

Figure XVII. *Journey summary result compared with bahn.de reference.*

- A data visualization part typically worked. A number of diamond evaluated correctly according to formular which applied in the programming code.

CONCLUSION

There are many avenues for future work. Obviously, Relieve Climate interface could be change to cover broader target audiences. In the demonstration phrase, screen appearance displays in a serious dimension and may be tedious. The interface could be replaced with relaxing graphic or more comfortable look and feel.
Furthermore, an accuracy of GPS is still needed to be improved. Because of some positions, GPS navigator does not display correctly. This aspect is one of most important issue to be fixed in the future phrase.

I have presented a new media mobile application, which would create a trend of environmental conservation simultaneously with voluntary behavior change in traffic issue in Bangkok. Marketing techniques are supposed to encourage people to get involved to use this application. Hopefully, the Relieve Climate trend would become talk of the town, then, finally become people typical behavior. In addition, I hope that BTS and co-partners foresee a potential of this project, then, pushing this media as one of annual activities which support society and environment campaign. I strongly believe that, this project has so far potential to develop a trust of BTS orgazation and show how BTS reponds to local and global environmental and social problems .

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