

Title	System design for dissemination of "Careful driving for senior drivers" : System design for dissemination of Careful driving training for senior drivers
Sub Title	
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Abstract	<p>Nowadays, there're more and more elderly people all over the world, especially in developed countries. Japan, one of the most striking nations in Asia, can't avert this kind of inevitable trend and just sit on the sidelines. Faced with the circumstances that the number of aged drivers in Japan is ever-increasing, we've perceived the importance of taking the issue into consideration seriously. In other words, the reason why we chose the subject to investigate is not only based on potential prospect of capitalist economies, but in an effort to reinforce the driving security for elderly people.</p> <p>We've perceived the fact that the number of traffic accidents is increasing significantly with more aged drivers, a phenomenon which may have something to do with the current law in Japan. According to the law, those who over 70 can update their driver licences with little difficulty, merely by attending some training courses. This has resulted in rising rates of accidents, dangers looming ahead.</p> <p>Surprisingly, we found in our interview results that automobile makers and insurance companies don't have any business model for senior drivers on hand. The elderly, however, are fully aware of the decline in driving ability and the prolongation in reaction time. They responded that they need an easy and enjoyable driving tool.</p> <p>We managed to deal with the problem mentioned above and try our best to find a resolution by developing our product, meanwhile using Customer Value Chain Analysis to confirm the connections of products and its stakeholders. We found that our stakeholders are senior drivers and their families, another person, advertiser, mobile phone carrier, mobile application provider. Once we have clarified our stakeholders, we're able to progress step by step. The mission of our business is to eliminate traffic accidents directly associated with aged driving. To achieve it, we set our goal to offer the safety-security information assisting senior drivers with a brief glasses tool which linked a mobile phone (Eye-Vision). We believe the technical device will surely make a difference.</p> <p>In financial prospect, we get an income by displaying an advertisement when it displays safety-security information, which ought to cover relevant costs.</p> <p>To make Eye-Vision to the market, we still have to go through validation and verification test, in order to make sure the efficiency of this system. One of the key points we have to test is that this system has no interference to the drivers while they are driving, while providing them supporting information of the road and traffic condition.</p>
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# Group 14



## Group 14's Theme Proposed by Tokio Marine & Nichido Risk Consulting Co. Ltd.

### Theme 10:

### System design for dissemination of “Careful driving training for senior drivers “

Proposer Organization's Name: Tokio Marine & Nichido Risk Consulting Co. Ltd.(TRC)

Supporter Name and contact info: Noriyasu Kitamura <n.kitamura@tokiorisk.co.jp>

#### 【The contents of the theme】

On the basis of fundamental researches of "careful driving training for senior drivers", We perform the systems design that how work the results of research into social infrastructure such as car insurance products, a driver's license system, the self-culture for senior citizens.

#### 【Fundamental researches】



- I investigate a weak point in the careful driving of the senior driver by TRC and make a training hypothesis.
- I join a Nishimura laboratory "driving simulator" to Ogi laboratory "devotion type three dimensions projector system" and demonstrate them in real driving environment and develop appropriate training software.

#### 【A point to study in ALPS】

The study is based on marketing researches and performs the systems design that I continue careful driving training routinely and can perform although an senior driver is a pleasure.

- (1) The training which an senior driver is easy to receive most
- (2) A device of the training that an senior driver can enjoy and consideration of effective incentive
- (3) It is devised the training system to be able to incorporate it in life without an senior driver getting tired
- (4) We consider how I perform the fusion with the social infrastructure such as automobile insurance, the driver's license system
- (5) We will think how is the self-culture which a senior citizen likes in future. And We I consider how We perform fusion with the careful driving training.

# ALPS Final Report 2010

Group 14

PROJECT TITLE:

“System Design for Dissemination of “Careful Driving  
for Senior Drivers” ”

Theme:

“System design for dissemination of Careful driving training for senior drivers”

Proposer Organization: Tokio Marine & Nichido Risk Consulting Co. Ltd.

Proposer Organization’s Supporter: Noriyasu Kitamura

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# **System Design for Dissemination of “Careful Driving for Senior Drivers”**

ALPS 2010 Final Report

**Group 14, Love Life**

**Wei LIN Junpei NOYORI Kazuyuki IWASAKI Hideki URABE**

2010/11/28

## 1. Executive Summary

Nowadays, there're more and more elderly people all over the world, especially in developed countries. Japan, one of the most striking nations in Asia, can't avert this kind of inevitable trend and just sit on the sidelines. Faced with the circumstances that the number of aged drivers in Japan is ever-increasing, we've perceived the importance of taking the issue into consideration seriously. In other words, the reason why we chose the subject to investigate is not only based on potential prospect of capitalist economies, but in an effort to reinforce the driving security for elderly people.

We've perceived the fact that the number of traffic accidents is increasing significantly with more aged drivers, a phenomenon which may have something to do with the current law in Japan. According to the law, those who over 70 can update their driver licences with little difficulty, merely by attending some training courses. This has resulted in rising rates of accidents, dangers looming ahead.

Surprisingly, we found in our interview results that automobile makers and insurance companies don't have any business model for senior drivers on hand. The elderly, however, are fully aware of the decline in driving ability and the prolongation in reaction time. They responded that they need an easy and enjoyable driving tool.

We managed to deal with the problem mentioned above and try our best to find a resolution by developing our product, meanwhile using Customer Value Chain Analysis to confirm the connections of products and its stakeholders. We found that our stakeholders are senior drivers and their families, another person, advertiser, mobile phone carrier, mobile application provider.

Once we have clarified our stakeholders, we're able to progress step by step. The mission of our business is to eliminate traffic accidents directly associated with aged driving. To achieve it, we set our goal to offer the safety-security information assisting senior drivers with a brief glasses tool which linked a mobile phone (Eye-Vision). We believe the technical device will surely make a difference.

In financial prospect, we get an income by displaying an advertisement when it displays safety-security information, which ought to cover relevant costs.

To make Eye-Vision to the market, we still have to go through validation and verification test, in order to make sure the efficiency of this system. One of the key points we have to test is that this system has no interference to the drivers while they are driving, while providing them supporting information of the road and traffic condition.

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\*The final report is combining the work with each group member rater team work result.

The workload assignment as following:

Wei LIN	1. Executive Summary 2. Table of Contents 3. Problem Statement 5. Design Recommendation 6. Competitive Analysis 7. ALPS Roadmap and Reflections 8. Conclusion and Future Work 10. References 11. Appendix Integration of the final report
Junpei NOYORI	4. Analysis and Discussion of ALPS Methods 9. Acknowledgments
Kazuyuki IWASAKI	4. Analysis and Discussion of ALPS Methods
Hideki Urabe	

### 3. Problem Statement

Population aging has become an ignorable issue, especially among developed countries. The ever-increasing number of aged drivers is one of the results of this tendency. According to the current law in Japan, people over 70 have to attend a training course while updating their driver licences; otherwise their driver licences will be cancelled. As shown in Figure 3.1, the percentage of driver license owners over 65 is annually increasing. However, accompanying with this phenomenon, the traffic accidents are also increased by aged drivers. Moreover, the most significant increasing of traffic accidents is induced by aged people (over 65, Figure 3.3), as well as the highest death rate (Figure 3.2).

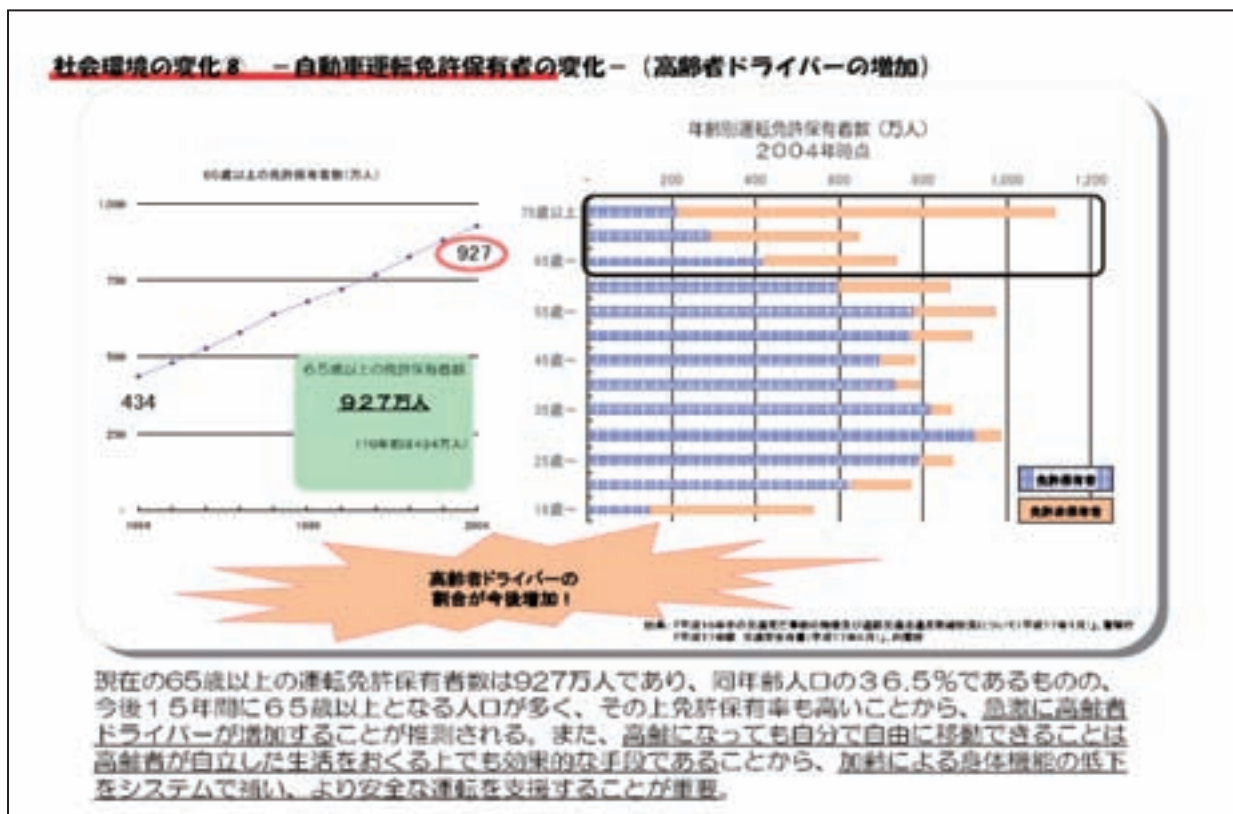


Figure3.1 the percentage of driver license owner -i

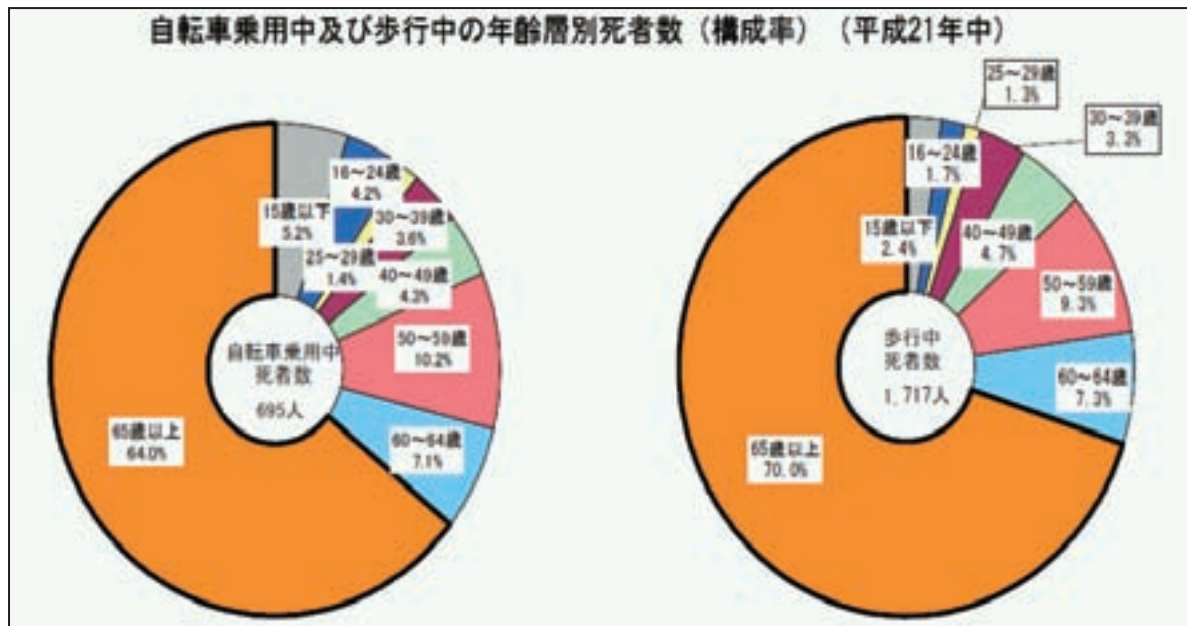


Figure3.2 the death rate of traffic accidents in Japan - iii

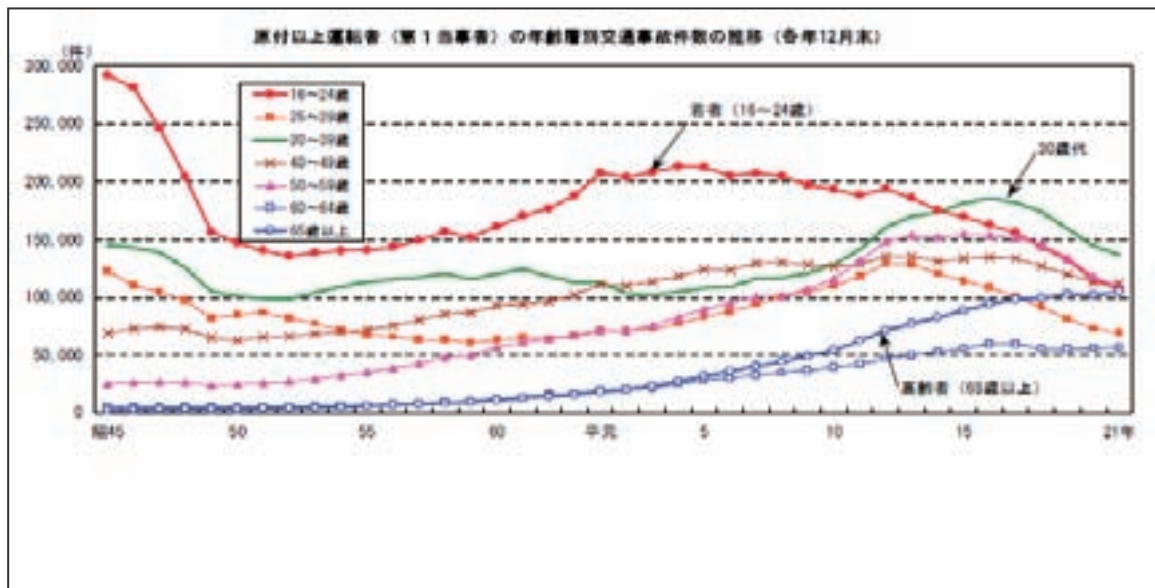


Figure3.3 the number of traffic accidents in Japan -ii

In order to understand the demands of the elderly, a questionnaire survey was conducted in Sugamo, Tokyo and.... (see Appendix). The most important outcome from this survey is that aged people don't want to be forced to attend the driving training. What they really want is a tool to improve their driving capability while increase the satisfaction and enjoyment of their driving experience. On the other hand, there are some requirements from our sponsor Mr. Kitamura from Tokyo Marine and Nichido Risk Consulting Co. Ltd.:

1. The training process is relaxed and results are easy to achieve;
2. Self-realize of the dangers during driving, and able to compare the difference in safeness before and after training;
3. One step further than basic training (more advanced functionalities).

The most favourite option is the mobility of the training system, which is supposed to conduct the process in any place at anytime. The reason is that it will be too pricy to construct a physical training centre for the elderly, regarding both financial and social expenses.

The target market of this project is aiming for the so called pre-phase elderly, which is aged between 40 and 60. The reason why we pick up this particular group is because the people over 65 has already passed the golden age to reap the fruits from training, and they are more likely to abandon their right of driving, based on our survey and the experience from our sponsor.

4. Analysis and Discussion of ALPS Method

4.1 Mind Map

By using Mind Map, we can express our mind in a creative way. Figure4.1.1 is our mind map’s output. From this Mind Map, we found some key items of careful driving for senior drivers.

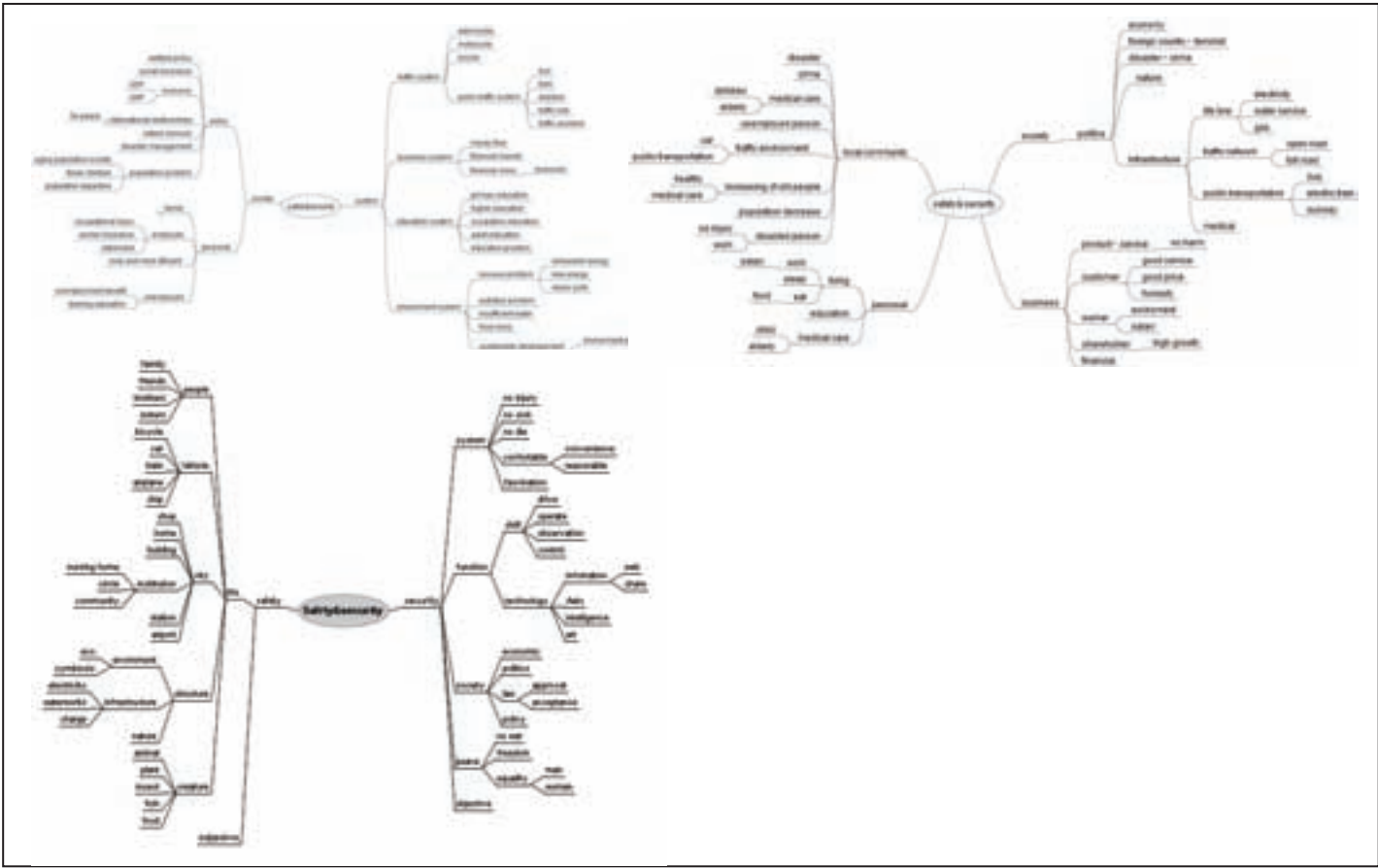


Figure4.1.1 Mind Map -iv

## 4.2 VOX

By using VOX, we can get various information. We investigated it about senior drivers in particular, and found some tendency as follows:

- I want to drive a car even if I get old
- I admit a fall of the ability for driving
- I want the training that can maintain ability for driving
- I dislike the forced guidance
- If it is the driving training that it is easy to accept and enjoyable, I am continued it for a long time

(From the interview to the senior drivers in Sugamo, Tokyo. <June 13, 2010>)

Therefore, we created the solutions in reference to the opinion of the senior drivers.

### 4.3 Scenario Graph

By using Scenario Graph, we decided whether it is a possible scenario for our project. The first and second time, our scenario's key concept was "Senior driver of the over-sixties", "Specialized Agencies" and "Instruction of the driving technology". The second time, we had consideration of the following points, we selected scenario's key concept "Senior drivers of the around sixties (from forties to sixties)", "A place of the everyday life" and "Offer the information of safety-security (not only driving but healthy)".

- An immediate effect to the senior drivers of the current over-sixties
- An a population of change
- An interview result to the senior drivers

Therefore, by using Scenario Graph three times, offer the information of safety-security to senior drivers of the around-sixties where place of the everyday life becomes our core scenario.

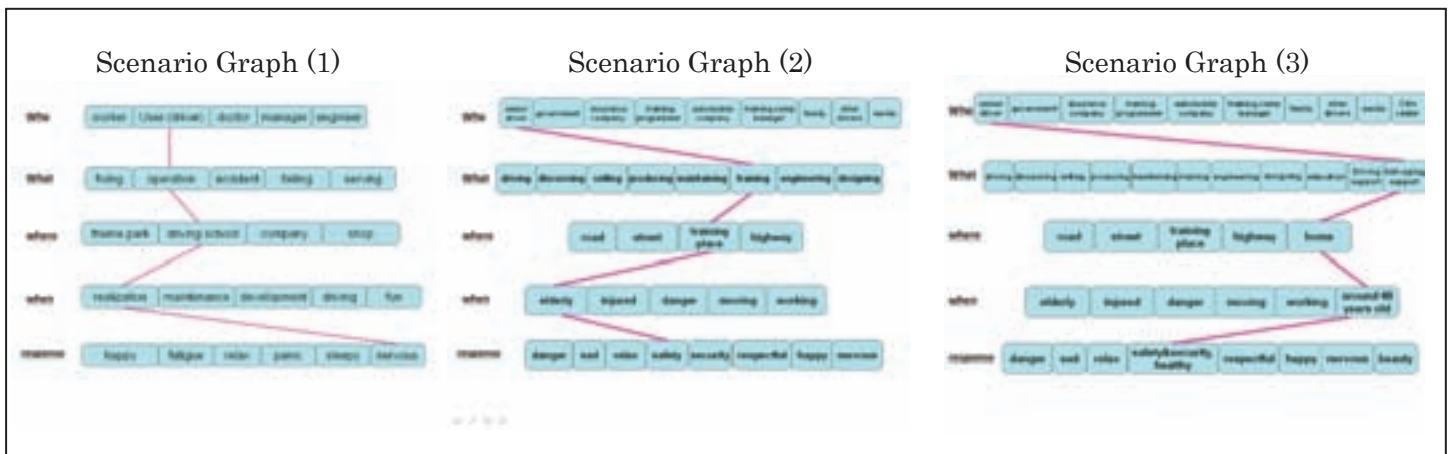


Figure4.3.1 Scenario Graph -v



#### 4.4 Customer Value Chain Analysis (CVCA)

By using Customer Value Chain Analysis, we could confirm the connections of products and its stakeholders. It clarifies the flow of information and financial resources, service and any other relevance. Our business is offer the safety-security information assisting a senior drivers with a brief glasses tool which linked a mobile phone (Eye-Vision), and we also get an income by displaying an advertisement when it display safety-security information. We found that our stakeholders are senior drivers and their families, other people, advertiser, mobile phone carrier and mobile application provider.

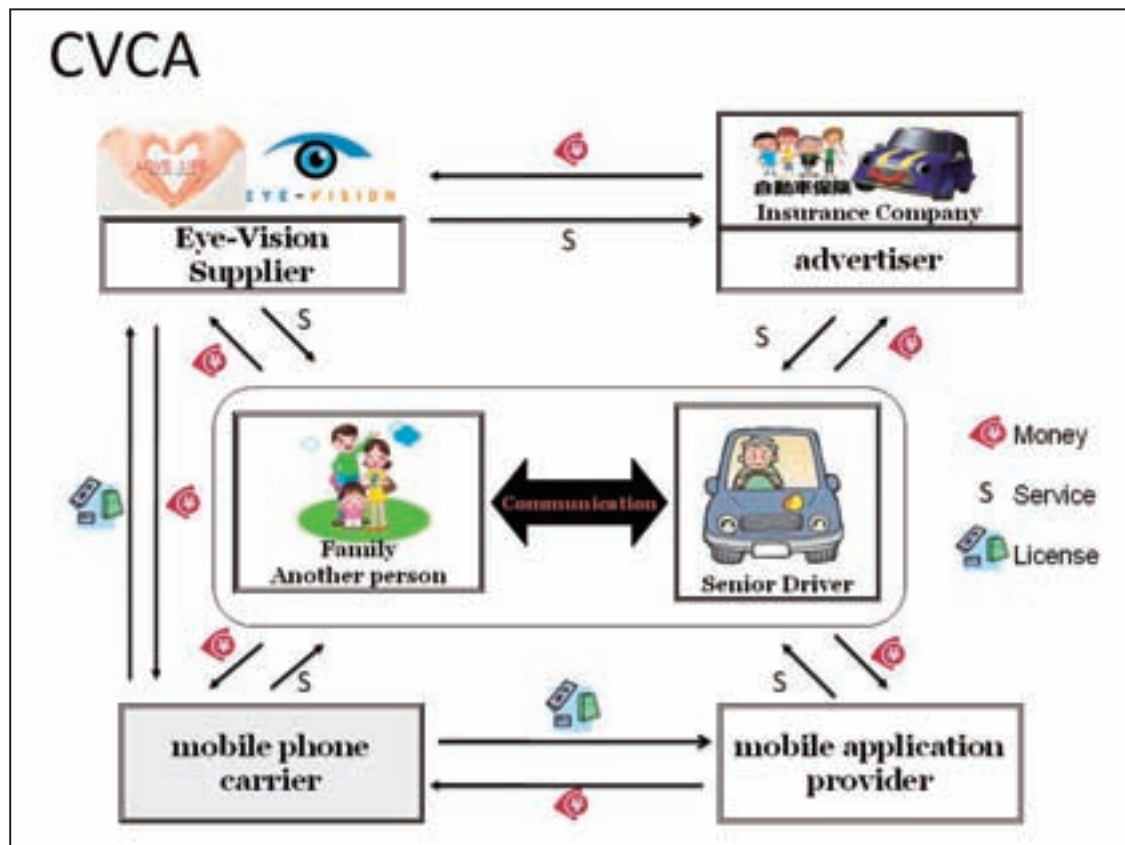


Figure4.4.1 CVCA -vi

## 4.5 Interview Observation

We interviewed some stakeholders. Interview purpose, result, unexpected answers are summarized in the list below (Figure4.5.1).

Interview and Observation			
stakeholders	target	purpose	result
Senior	<ul style="list-style-type: none"> <li>•Elderly people at Sugamo</li> <li>•The local city which uses a car routinely</li> </ul>	<ul style="list-style-type: none"> <li>◆To know how senior care about driving</li> <li>◆To analysis requirements</li> </ul>	<ul style="list-style-type: none"> <li>◆Elderly people...</li> <li>◆have bad image about training because be forced to do</li> <li>◆want to drive a car even if they get old</li> <li>◆admit a fall the ability for driving</li> <li>◆want the training that can maintain ability for driving</li> <li>◆dislike the forced guidance</li> <li>◆wants easy to accept and enjoyable driving tool</li> </ul>
Car maker	Participant of car maker	To realize the business model for senior drivers (ex: technology, design...)	Don't have business model for senior drivers now
Insurance company	participant of Insurance company	<ul style="list-style-type: none"> <li>◆To realize present condition</li> <li>◆to confirm the demand(ex: possibility of senior driving market)</li> </ul>	Having interest of senior driving training, and require more information. But don't exist the business model now.

Figure4.5.1 Interview and Observation -vii

## 4.6 Object-Process Methodology

OPM is a holistic, integrated approach to the study and development of systems in general and information systems in particular.

The basic premise of the OPM paradigm is that objects and processes are two types of important classes of things.

The one connected in a black line is a current state. A red line shows to be. It should be important that the service of driving training by the backup such as insurance companies and governments be provided for the senior citizen driver, and establish the business model.

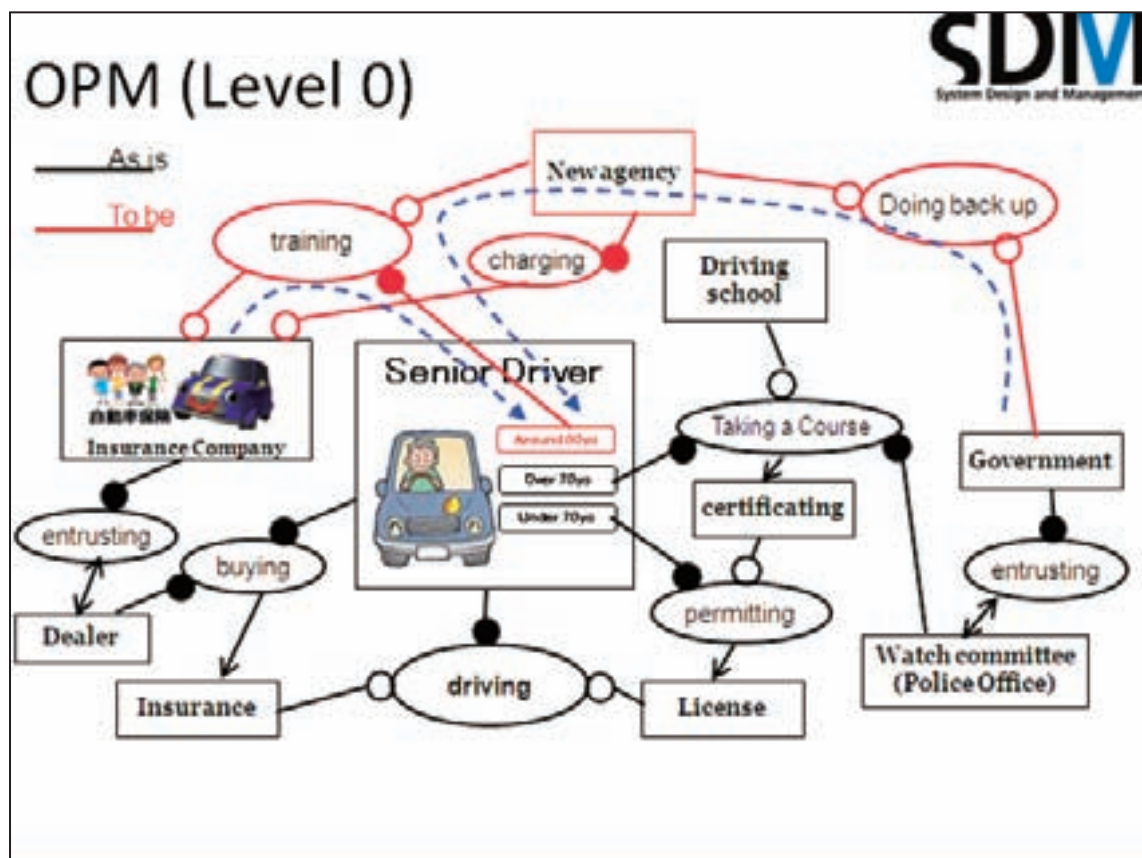


Figure 4.6.1 Object-Process Methodology -viii

4.7 Prototyping Rapidly

By using Prototyping Rapidly (Figure4.7.1), we found that there is a problem in the usability by the daily life. Considering about the convenience of the user, we developed user interface glasses. (Figure4.7.2)

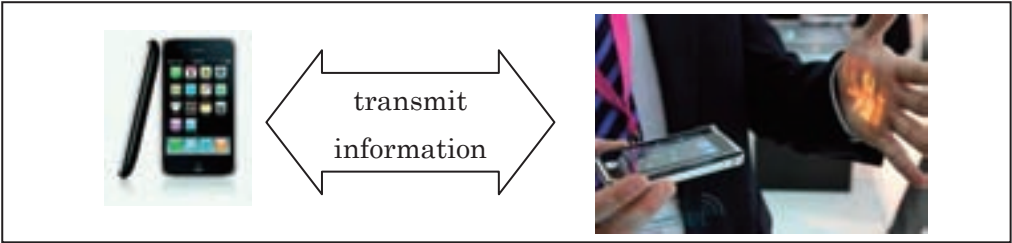


Figure4.7.1 Prototyping Rapidly1 -ix

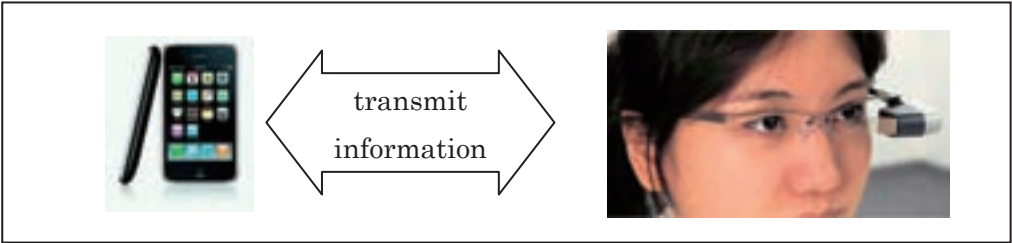


Figure4.7.2 Prototyping Rapidly2 -x

4.8 Morphological Analysis

By using Morphological Analysis, we found that in consideration of the convenience of the user, using glasses as user interface would be better.

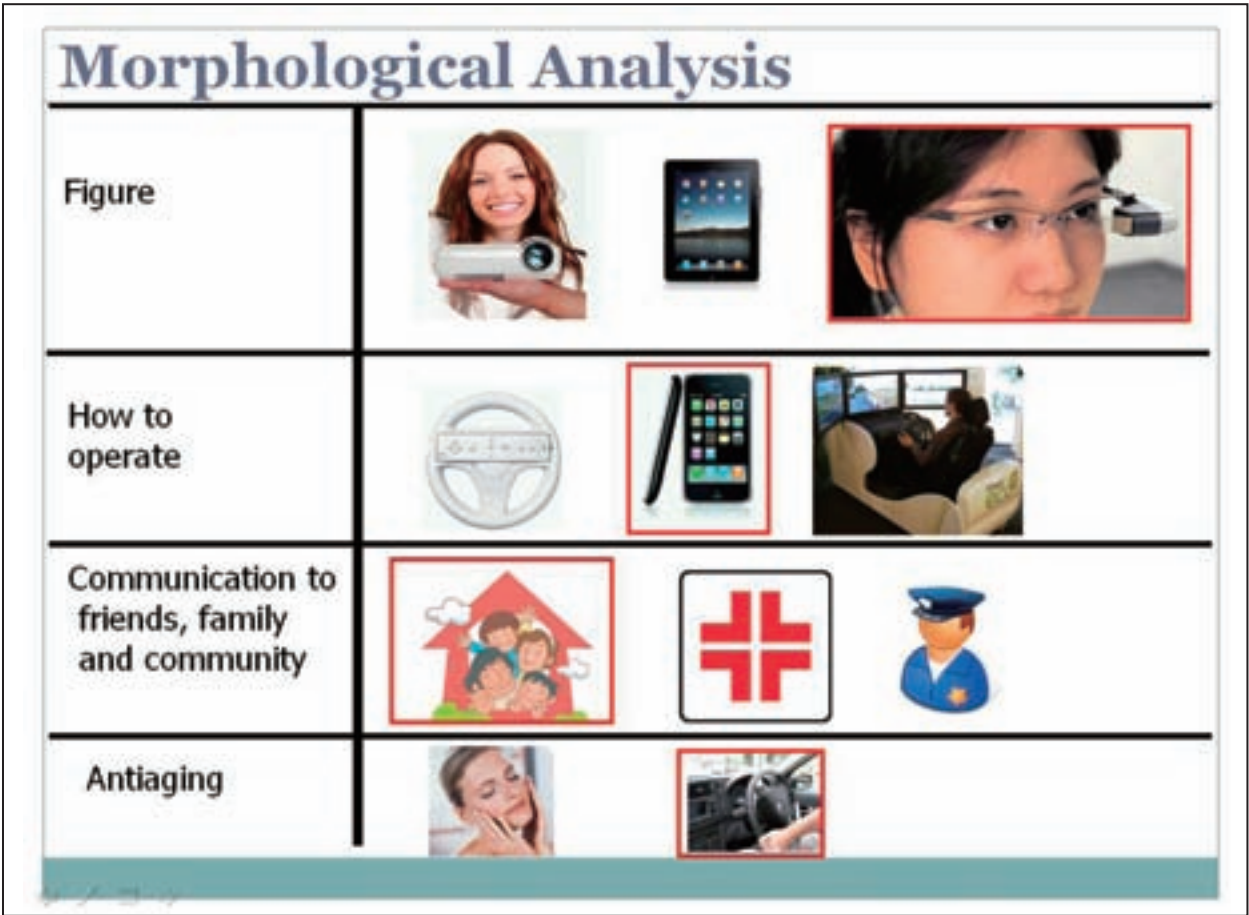


Figure4.8.1 Morphological Analysis -xi

## 4.9 Quality Function Development (QFDI)

In our business model, most important stakeholder is customer, especially senior drivers of the around sixties (from forties to sixties). In order to clarify their requirements, we conducted QFD I (Figure4.9.1).

The most requirements are driving training, supporting and anti-aging. The function and the contents of the Eye-Vision are important.

QFDI

		Engineering Metrics										
	customer weights	consequence	driving training&support	evaluation&indication	record	anti-aging	easy system	3D	sound effect	communication&competition	pricing	
Customer Requirements												
cost of DS	9	9	9	1	1	3	9	9	9	1	9	
the market of automobile insurance	9		3									
fun and happiness	9	3	9	3	1	9	9	9	9	9	3	
active	9	1	9	9	3	9	3	3	3	9	3	
recognition	9		9	9	9	9	1	1	1	1	3	
incentive	9		1	3	3							
the population of entering insurance	9		3	1	1							
automobile insurance fee	3											
amount of senior drivers	3		3			3	3			9		
amount of car licences	3		3	1		1	1					
ocation of communicating with elderly people	3	3					3			9	9	
use in home	3	3	3	9	9	9	9	9	9	9	3	
anti-aging	3		1	1		9	3	1	1		9	
discount of insurance	3		1	1		3						
amount of car in Japan	1											
image up for insurance company	1		3	3		1	3	1	1			
Raw score		19	57	41	27	56	44	33	33	47	39	
Relative Weight		0.05	0.14	0.10	0.07	0.14	0.11	0.08	0.08	0.12	0.10	

Figure4.9.1 Quality Function Development(QFDI) -xii



#### 4.10 Quality Function Development(QFDII)

In order to clarify that what the customers think about the engineering metrics and the product's characteristics, we conducted QFD II . For an Eye-Vision, software and the function of the display are important.

QFDII												
Engineering Metrics	Phase I Relative Weights	Part Characteristics										
		cable	LAN	soft	total	microphone	stereo	display	brake	eye glass for 3D	handle	projector
correspondence		9	9	12		9	12			12		12
driving training&support		9	9	9	9	12	9	9	9	12	9	9
evaluation&indication				1				12			12	1
record				12				1				
anti-aging				9				1		12	12	1
easy system		1	1	9		1	1	9		1	9	3
3D				9				9		9		3
sound effect							9					
communication&competition		3	3	3		9	12	3		12		3
sensing		9	9			9	9	9	9	12	9	9
Raw Score		31	31	46	9	31	34	44	18	23	33	32
Relative Weight		0.093	0.093373	0.13855	0.027108	0.093373	0.10241	0.13253012	0.054217	0.069277	0.099398	0.096386

Figure4.10.1 Quality Function Development(QFDII) -xiii

## 4.11 FMEA

Failure model in Scenario graph is that the senior citizen driver doesn't continuously do the driving training, and the driving training is not effective. Moreover, it is possible that it is safe of the senior citizen and it doesn't tie safely the drive assist as the element of Failure model.

It is understood not to establish the business model that we regard for the flow of this scenario graph not to function well.

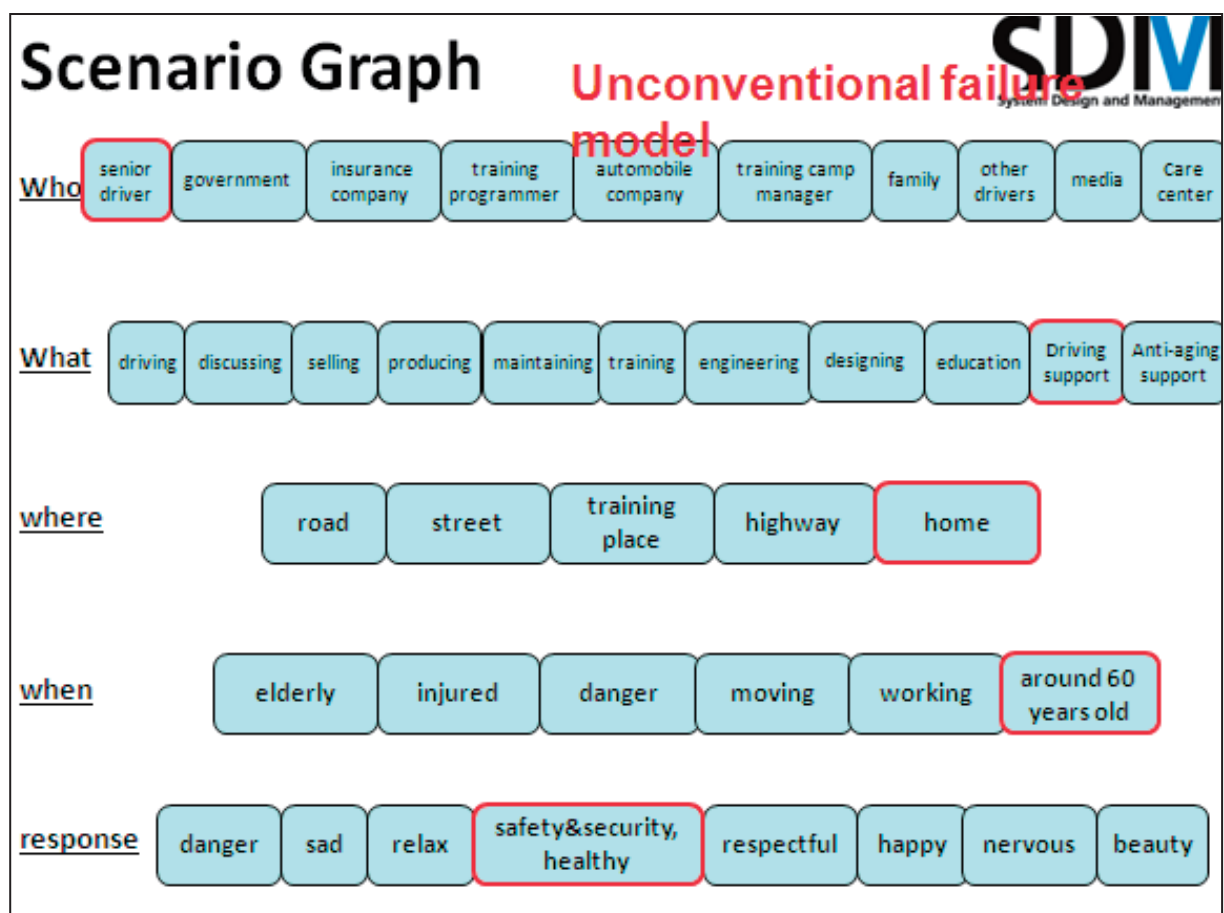


Figure4.11.1 Scenario Graph- FMEA -xiv



#### 4.11.1 FMEA: Object-Process Methodology

Failure model in OPM is that the senior citizen driver uses neither the driving training nor the service of the drive assist. It is thought that these services and processes become failure model when the senior citizen driver returns, and doesn't drive the license.

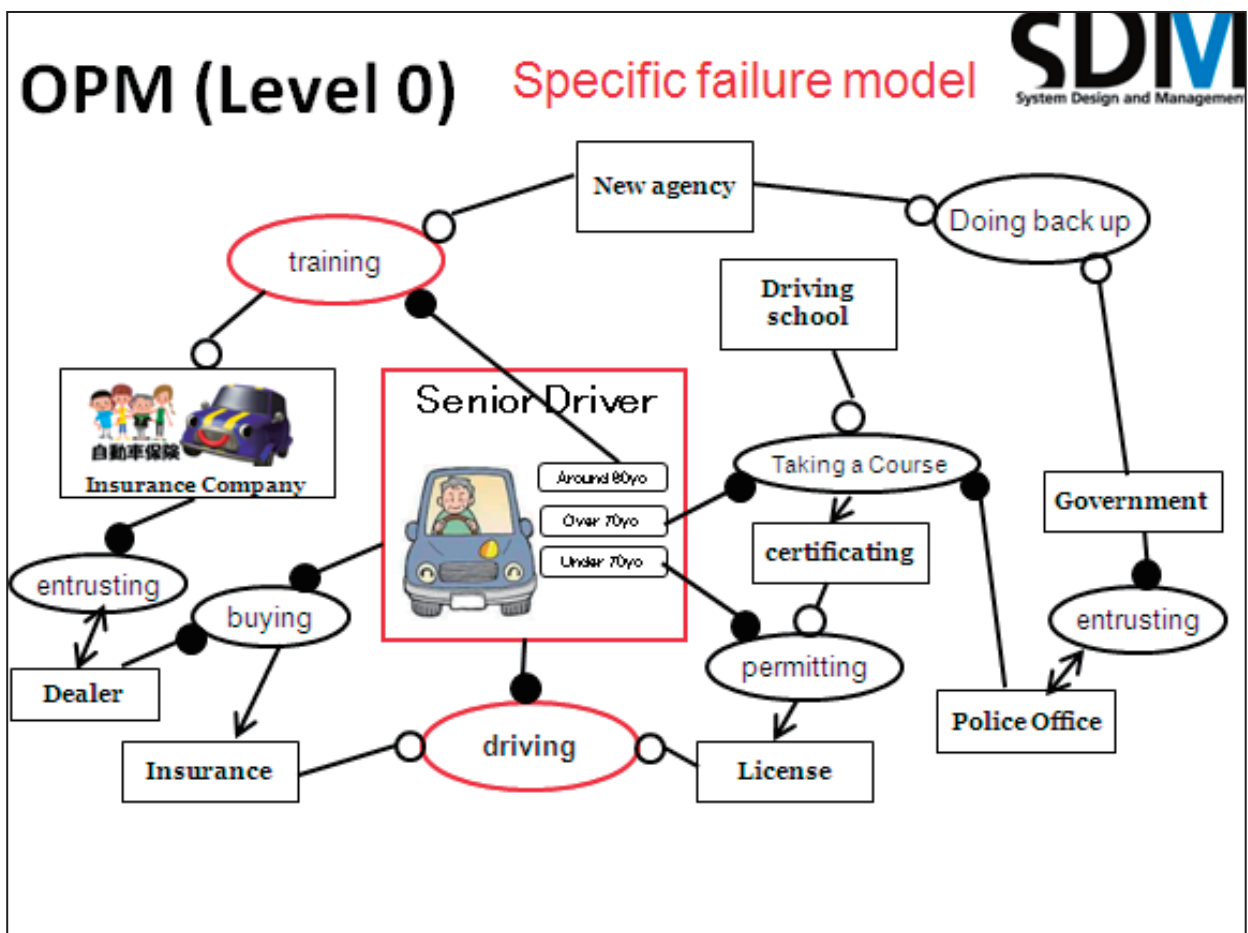


Figure4.11.1.1 OPM-FMEA -xv

#### 4.11.2 FMEA: Use Case

Failure model in Use Case is not to be able to accept to the senior citizen driver even if the driving training software for the senior citizen driver is developed, and it offers it.

End effect is "soft for elderly people" as understood from figure of Use Case. And Local effect is "Driving simulator". And, Failure model is "Failure model".

It is understood that it is important whether to accept the service that we proposed from this to the senior citizen driver as follows.

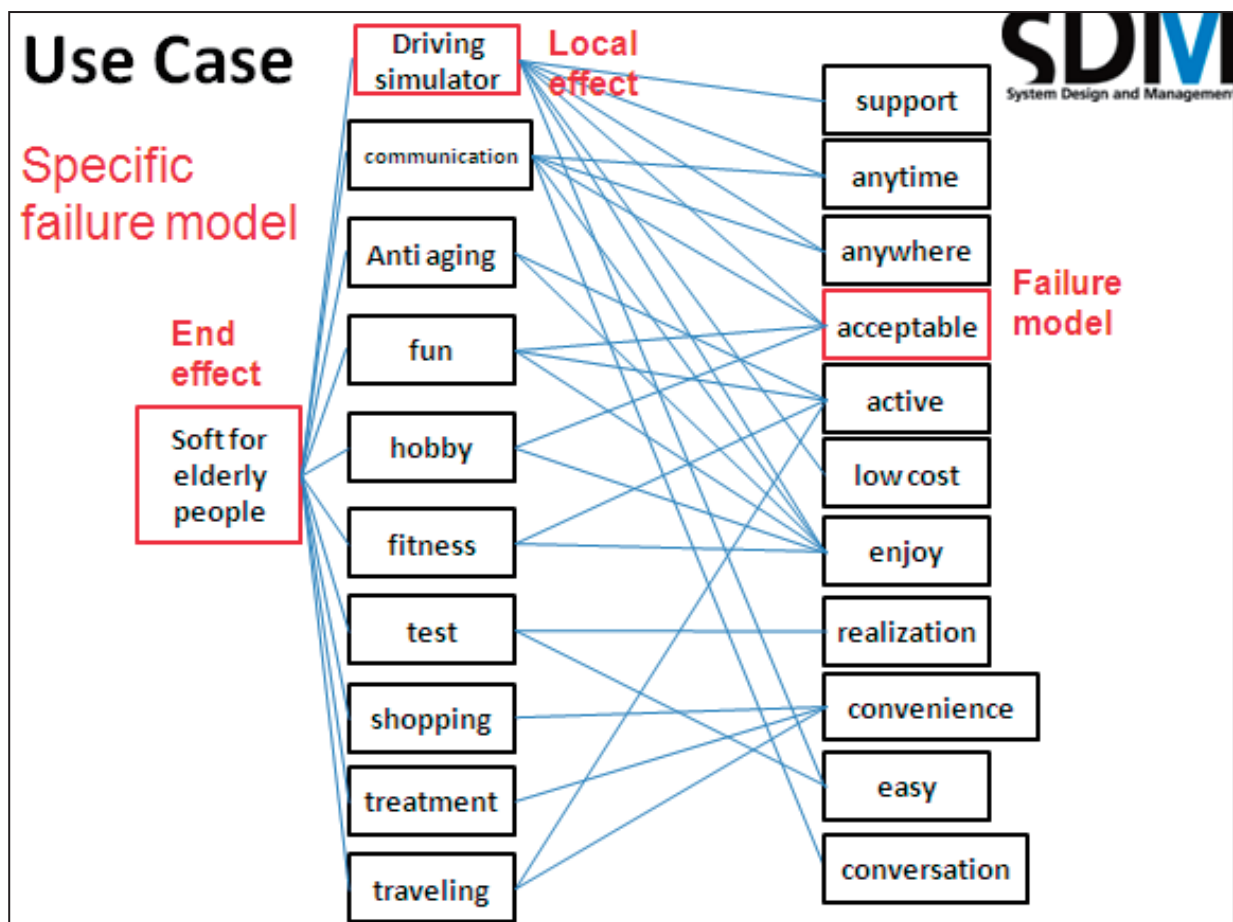


Figure4.11.2.1 Use Case-FMEA -xvi

## 4.12 Design Structure Matrix

Making the design of the user interface clear, software design and communication design become more effective.

Activity		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Plan	A	A																	
Decide specification	B	X	B																
Software design (OS/DS/Contents etc)	C		X	C		X		X											
Software development	D			X	D	X													
Software test	E				X	E													
Software unification	F				X	X	F										X		
Communication design (Internet/LAN etc)	G		X					G				X							
Communication development	H							X	H	X									
Communication test	I								X	I									
Communication unification	J								X	X	J							X	
User interface design (Glasses/Controller/Display etc)	K		X									K		X					
User interface development	L											X	L	X					
User interface test	M												X	M					
User interface unification	N												X	X	N		X		
Software +Communication +User interface unification	O		X				X				X			X	X	O	X		
Software +Communication +User interface operation test	P															X	P		
Measure the product effect	Q	X	X														X	Q	
Operative start	R																	X	R



Activity		A	B	K	L	M	N	C	D	E	F	G	H	I	J	O	P	Q	R
Plan	A	A																	
Decide specification	B	X	B																
User interface design (Glasses/Controller/Display etc)	K		X	K		X													
User interface development	L			X	L	X													
User interface test	M			X	X	M													
User interface unification	N					X	N											X	
Software design (OS/DS/Contents etc)	C		X					C		X									
Software development	D							X	D	X									
Software test	E							X	X	E									
Software unification	F									X	F							X	
Communication design (Internet/LAN etc)	G		X				X				X	G		X					
Communication development	H											X	H	X					
Communication test	I											X	X	I					
Communication unification	J												X	X	J			X	
Software +Communication +User interface unification	O		X				X				X				X	O	X		
Software +Communication +User interface operation test	P															X	P		
Measure the product effect	Q	X	X														X	Q	
Operative start	R																	X	R

Figure4.12.1 Design Structure Matrix -xvii

## 5. Design Recommendation

From previous analysis, we get to our prototype, which is called Eye-Vision. As its name, Eye-Vision is an integrated and multi-functional system based on visional information support and feedback. The main component of our system is just a glass, as you can see in Figure 5.1.

As mentioned before, regarding the pre-phase aged people as our target customer, the main function of this system is to support their driving, by providing the alert of key points on their road where they have to pay attention to. Moreover, information support for nearby eating and shopping places is available, by only voice control (saying out a key word while driving). It also has other functions like precise navigation, making a phone call and automatically making an emergency call during particular situations (ex. traffic accident).

More than driving supports for the elderly, the entertainment element of this system can not be ignored. Wearing it, the customers can enjoy music, video and even live sports to cheer up yourself and kill time. The connection capability between Eye-Vision and mobile phone will enable the customers to use all the functions in their mobile phones via our system, with a better visional experience.



Figure5.1 Prototype: Eye-Vision -xviii

## 6. Competitive Analysis

The business model of our product is very straightforward, as illustrated in the diagram below. As the supplier of Eye-Vision, our product will be supplied first to senior drivers, to ensure their safe driving and decrease the traffic accident rate. After that it will hopefully seize the change to penetrate into families for everyday enjoyments and finally become famous. Basically, there are two kinds of revenues sources, the charge for the equipment (Eye-Vision) and advertisement income. The advertisement income is very similar to Google's strategy: pay for high-rating of your store or restaurant, instead of link. Therefore when the customer searching for a nearby entertainment place, the stores or restaurants who pay have priority to show up first. A rudimentary prediction of our revenue is shown in table 6.1.

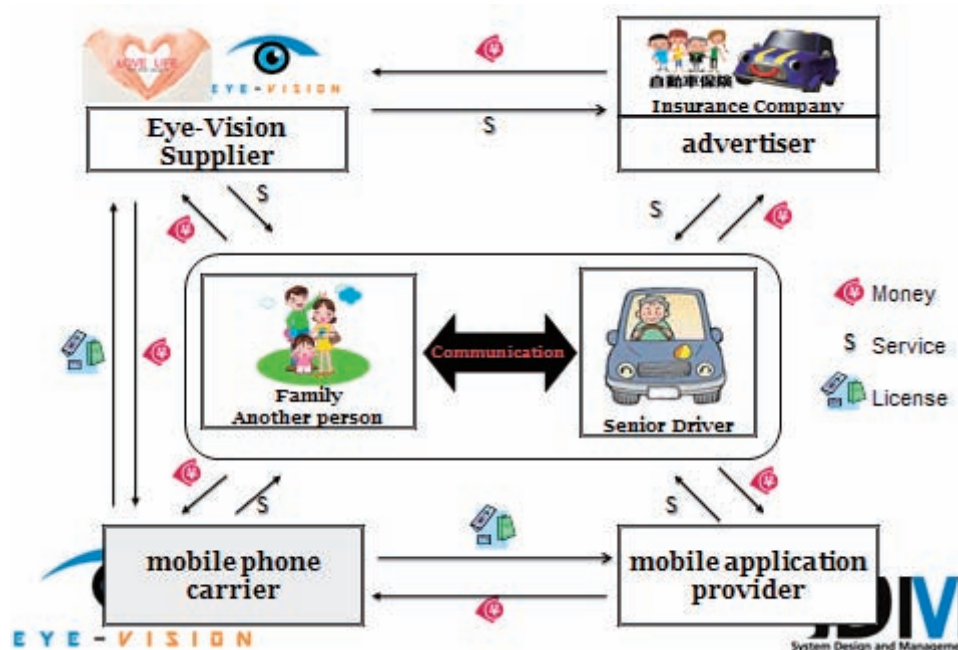


Figure6.1 CVCA -xix

	1st	2nd	3rd
Net sales	12,000	30,000	90,000
Operating Income	3,000	9,000	10,500
Ordinary income	▲ 1,500	200	3,300

Table6.1 Revenue -i

## **7. ALPS Roadmap and Reflections**

In our roadmap, we have 2 “Aha!”, 4 “Oops!” and 4 “Eureka”. The one of “Aha!” is happened in the Brainstorming. In that time, we noticed that our project propose is not only provide training service, but also should support the lives for elderly people. The other one is happened from doing the prototype. Although we modify our prototype third times, when doing the prototype we realized the real needs for elderly people.

About “Oops!”, when our group use tools, OPM, interviews, and prototype, we always notice the deficiency about our project, it helps us to rethink other way to solve the problem early.

Finally, using tools—To-By-Using, use-case, morphological analysis and DSM— improving the efficiency of the project and providing new thought into prototype result.



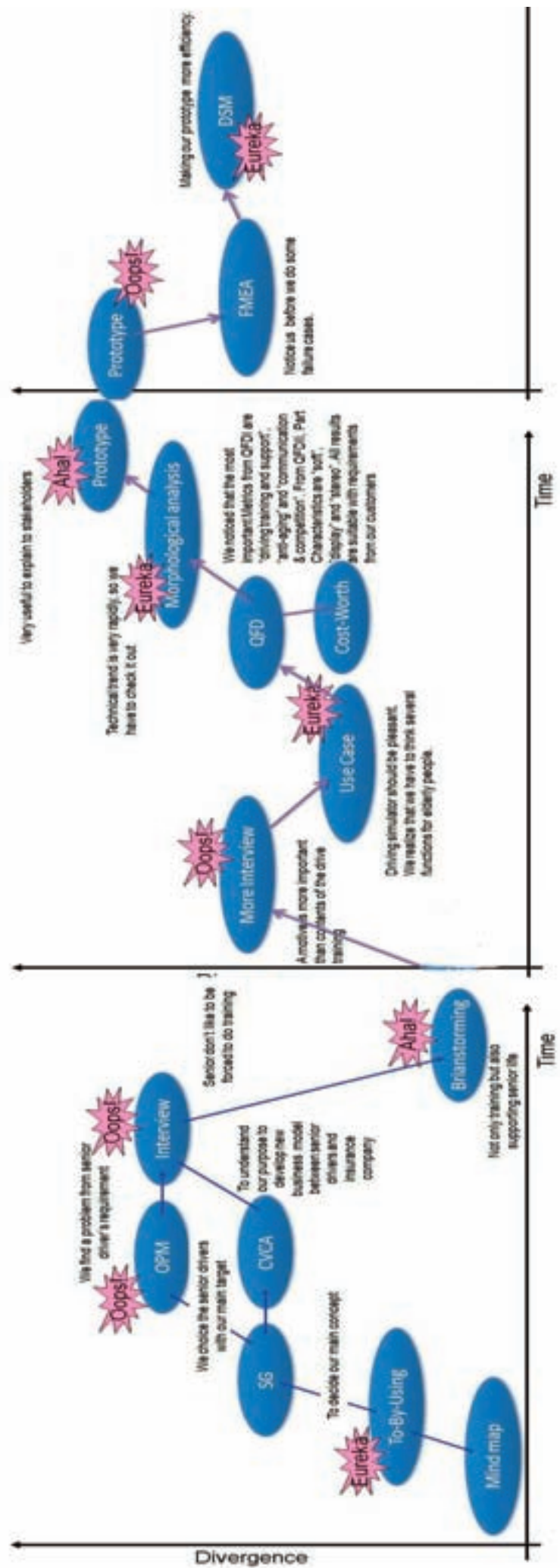


Figure7.1 Roadmap -xx



## 8. Conclusion and Future Work

During the process of our project, we have to change our research direction, compromising between the requirements of our sponsor and our own research interest. Actually, we have to change our direction three times, the good point is, each time we change, knowledge and experience gaining from previous trials can also be used and finally integrated into our final prototype.

To make this product to the market, we still have to go through validation and verification test, in order to make sure the efficiency of this system. One of the key points we have to test is that this system has no interference to the drivers while they are driving, while providing them supporting information of the road and traffic condition.

The other function we want to achieve is to enable that the users can attend driver training anywhere at anytime. A motion sensor will be added to sense the movement of users while they are doing the simulation.

One aspect we have to mention is that the enabling technologies are not mature enough to get to our final product. Thus the timeline for our project is very difficult to predict. And there is also a risk that during this time some more advanced breakthrough technology will emerge. However, we believe that our final product is achievable and very helpful; at least it is already demonstrated and proved in the movie (the 007 series). As an important weapon of James Bond, it will soon be a “weapon” for the elderly and famous all over the world.

## 9. Acknowledgments

My heartfelt appreciation goes to Prof. Sum Kim whose enormous support and insightful comments were invaluable during the course of my study. I am also indebt to Prof. Haruyama whose meticulous comments were an enormous help to me.

## 10. References

### Essay

1. Kenji Tanaka and Midori Inaba (2007) , Study on Effects of Instruction Methods on Learning of Risks for Elderly Drivers by Driving Simulator, *国際交通安全学会誌*, 32, 4, 309-316.

### Web Site

1. Traffic accident situation of the occurrence in 2009  
<http://www.e-stat.co.jp>
2. Bluetooth  
<http://ja.wikipedia.org/wiki/Bluetooth>

## 11. Appendix

### 11.1 The result of interview in Hannou, Saitama

平成 22 年 11 月 29 日実施

実施エリア：埼玉県飯能市

居住エリア：中山間地域、最寄り駅まで約 20～30km、バスは便利な場所で 1 日 1～2 便

対象者：男性 2 名（61 歳・67 歳）、女性 5 名（54 歳・56 歳・56 歳・59 歳・60 歳）

現時点でのサービスイメージ、プロトタイプイメージは明示

#### ■ 意見：

##### 1) 車の存在・シニアドライバーについて

- 車は必須。乗らない日は無い。無くなる、乗らないなんて想像できない。
- 車が無ければ買い物もできない。死活問題に直結する。
- 駅に近かったり便利な場所に住めばよい、という意見も聞くが、今更何十年も住んだ土地を離れられない
- 毎日、運転はしているが、特に反射や認識などの点で反応が鈍くなったと感じる  
→運転中に鹿をひいた、タヌキとぶつかった：運転技術の低下が原因、昔は避けられた
- 今更、訓練といわれると重たく感じる
- 実際に年寄りだが、だからといって年寄り扱いされると、良い気持ちはしない

##### 2) こんなことができれば嬉しいこと、欲しいサービス

- 離れている子や孫と接点がもちたい
- 安否確認
- 病院とすぐに連絡が取れる
- 商店街と連絡が取れる→配達までしてくれる
- 沖縄・北海道をドライブしたい。リアルに表現できてればバーチャルも OK。本当に行きたくなるかも
- 同世代だからわかる心配や悩み事などの世間話をしたい  
→話し相手が医者と同世代とでは雲泥の差があるらしい

##### 3) シニアになって感じること

- 人との繋がりが年々恋しくなる

- 孤独がいちばん老化を早める
- 免許はもっているがペーパードライバー。いつも夫に運転してもらっている。夫が亡くなって1人になった場合を考えると、車中心の生活は不安

#### 4) サービスイメージ・プロトタイプから感じること

- 携帯電話等で手軽に遊べるからといって、「運転上手になるよ」という勧誘・動機ではやらない
- アイフォンのサイズだと何をするにも見にくい
- どんなサービスでも良いが、シニアにとってそのサービスを受けようと思う初動と継続させるための動機付けが重要では。その先に運転技術の向上効果が続くのでは
- 今まで存在していなかった（シニアが知らないだけかもしれないが・・・）全く新しいもの（ツール）を使うのは抵抗がある。それならば、既に存在しているもの（シニアが知っているもの、慣れているもの）を最新版にして使ってもらったほうが、最初のハードルが下がる気がする  
→ アイフォン：×見たことも触ったことも物体だから。携帯電話の最新版といわれても、そもそも携帯電話でさえ最近登場したものでしょ！画面小さいし！！

3Dテレビ：○所詮テレビの最新版でしょ

3Dメガネ：○メガネが新しくなったようだね～

#### 5) 会話で多く出たキーワード

余暇・観光・旅行・人とのふれあい・家族・子供・孫・健康・趣味・畑・遊び

#### ■ 感想：

- ・ とにかく分かりやすく、使いやすいインターフェース
- ・ トレーニングも重要ながら、コミュニケーション（子・孫・同世代）、健康というキーワードはより重要。こういったコンテンツもやはり必要。
- ・ シニアにとって、コミュニケーション、人とのふれあいはアンチエイジングに繋がる。
- ・ ハード（シミュレーター）＋コンテンツ（コミュニケーション・健康・生活＜買い物＞）という括りはウケが良かった。そうすると生活の一部（生活必需品）だ、という意見もあり。

## 11.2 The questionnaire of interview in Sugamo, Tokyo

### アンケート

このアンケートは慶應義塾大学大学院システムデザイン・マネジメント研究科の講義における、「高齢者の、より安全で快適な自動車利用の出来る生活」についての参考とさせていただき、それ以外の目的に決して使用いたしません。

お忙しいところ申し訳ありませんが、ご回答のほどよろしくお願いします。

問 1. お車の免許はお持ちですか ( はい / いいえ )

「いいえ」の方は問 5 へ

問 2. 普段、お車の運転を行っていますか? ( はい / いいえ )

「いいえ」の方は問 5 へ

問 3. お車はお持ちですか? ( はい / いいえ / その他 ( ) )

問 4. 自動車の運転は、1 日あたりどの位の時間行いますか? ( \_\_\_\_\_ 時間 )

問 5. 免許をお持ちでない方、お車を運転されない方にお伺いします。

お車を運転されない理由がありましたらお教えてください。

- ・ 必要ない、移動は公共交通機関や家族の運転で十分
- ・ 運転に危険を感じるようになってきた。
- ・ その他 ( )

問 6. お車の運転中や歩行中に、自動車でのヒヤリ・はっとしたことがありますか?

差し支えなければお教えてください。

( )

問 7. お年を重ねてからのお車の運転に、困ったことがありましたか? また、「こうした方がいい」

「こうであればよい」などのご意見がありましたらお聞かせください。

( )

問 8. 自動車免許を更新するにあたって、70 歳以上の方は「高齢者講習」の受講が必要となります。

この「高齢者講習」についてご存知でしたか?

( はい / いいえ )

### 11.3 The result of open question interview in Sugamo, Tokyo

■ 問5. お車の運転中や歩行中に、自動車でのヒヤリ・はっとしたことがありますか？

- 信号の無い所での右左折 (60歳以下 女性)
- 夜道で歩行者がいることに気付かなかった (53歳・男性)
- 人の多い交差点 (58歳・男性)
- 赤信号でも走行してくる (70～74歳・女性)
- わき道から急に自転車が目の前を走りぬけて行った時 (60～64歳・女性)
- 運転中の対向車の車線オーバー (58歳・男性)
- スピード出しすぎでカーブが曲がりきれず自損事故。50歳のときには十分曲がれたカーブなのだが・・・ (58歳・男性)
- 最近の車は音が静か過ぎて、歩行時に自分に接近していることに気づかないことが多い。ぶつかったこともある (82歳・女性)

■ 問7. お年を重ねてからのお車の運転に困ったことがありましたか？

- 反応が鈍くなって、視力も落ちた (77歳 男性)
- 自分勝手な運転している。後ろもみない、ウィンカー出さない人がある (65～69歳 女性)
- 自分の運転の問題を指摘ほしい (53歳・男性)
- 最近の車は安全装備がありすぎて、逆に使い方や性能がよく分からない (58歳・男性)
- 車の安全装置を使用する場合に押すボタンの仕様や見た目を見やすく、分かりやすくしてほしい (58歳・男性)
- 各メーカーに共通して装備されている安全装置等のボタンの仕様を統一してほしい。車を他社に乗り換えるとイチから覚え直す必要がある (58歳・男性)
- 瞬間の判断力の衰えが著しい (68歳・男性)
- 安全装備（自動減速システム等）といえども、本当に作動すると運転していてかえって慌てることが多い (68歳・男性)
- 夜の運転の際、周囲の状況が以前にもまして見えにくくなった。運転時に視力低下をサポートしてくれる装備が欲しい (83歳・男性)
- 耳が遠くなり、運転時の周囲の状況判断が鈍くなった。聴力をサポートする装備が欲しい (61歳・女性)

## ■ その他

- 駅の近くに住んでいるから、あまりひつようがない。無料バス券を使ってる。(77 歳 男性)
- 車が無いと不便 (65－69 歳 男性)
- トレーニングシステムがあったら利用してみたい
- 車はないと不便(特に田舎)
- 若い時に比べ視力が特に衰えた
- 60 歳で免許取得、80 歳で自身の能力低下に運転の危険性を感じ、83 歳で免許を返納した (83 歳・男性)
- 70 歳を超えた夫が、高齢者講習を気にしなければならい年齢となったため、思い切って免許を変更した (80 歳・女性)
- 公共交通機関、シルバーバス、高齢者向け無料チケット (バス) の利用だけで十分生活できる (66 歳・女性)
- 「70 歳になったら、とにかく年寄りには運転するな」ということ。運転させないための高齢者講習である (84 歳・男性)
- 車を使わなくても良い生活環境の場所 (駅近) に引越しをした (76 歳・女性)

#### 11.4 The poster for prototype exhibition



Figure11.4.1 the poster for prototype exhibition -xxi



## 11.5 Bluetooth

Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each) in the range 2402-2480 MHz. This range is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

Originally Gaussian frequency-shift keying (GFSK) modulation was the only modulation scheme available; subsequently, since the introduction of Bluetooth 2.0+EDR,  $\pi/4$ -DQPSK and 8DPSK modulation may also be used between compatible devices. Devices functioning with GFSK are said to be operating in basic rate (BR) mode where a gross data rate of 1 Mbit/s is possible. The term enhanced data rate (EDR) is used to describe  $\pi/4$ -DPSK and 8DPSK schemes, each giving 2 and 3 Mbit/s respectively. The combination of these (BR and EDR) modes in Bluetooth radio technology is classified as a "BR/EDR radio".

Bluetooth is a packet-based protocol with a master-slave structure. One master may communicate with up to 7 slaves in a piconet; all devices share the master's clock. Packet exchange is based on the basic clock, defined by the master, which ticks at 312.5  $\mu$ s intervals. Two clock ticks make up a slot of 625  $\mu$ s; two slots make up a slot pair of 1250  $\mu$ s. In the simple case of single-slot packets the master transmits in even slots and receives in odd slots; the slave, conversely, receives in even slots and transmits in odd slots. Packets may be 1, 3 or 5 slots long but in all cases the master transmits will begin in even slots and the slave transmit in odd slots.

Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, Global Positioning System (GPS) receivers, digital cameras, and video game consoles.

The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group (SIG). The Bluetooth SIG consists of more than 13,000 companies in the areas of telecommunication, computing, networking, and consumer electronics.



Figure11.5.1 Bluetooth -xxii

A master Bluetooth device can communicate with up to seven devices in a piconet. The devices can switch roles, by agreement, and the slave can become the master at any time. Various performances can be demonstrated by installing these systems in Eye-Vision. When this system is driven, it is possible to use it. It can detect driver's visual information and where to be seen and to drive by Bluetooth.

## 11.6 The logo of Eye-Vision



Figure11.6.1 logo design for Eye-Vision -xxiii

## 11.7 The logo of Group 14

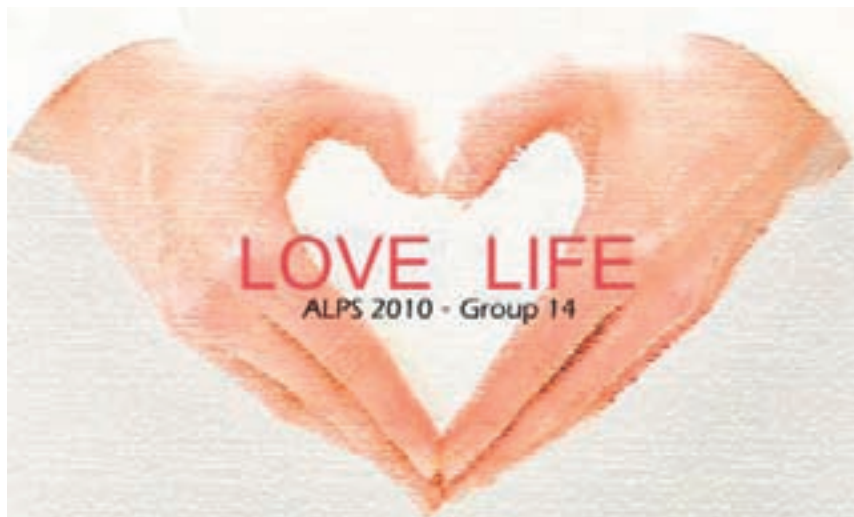


Figure11.7.1 logo design for Group 14 -xxiv

## Group 14's Final Presentation Slides



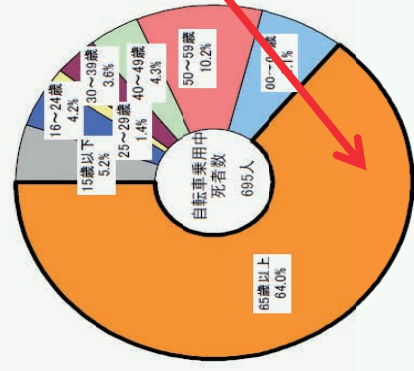
System design for dissemination of  
"Careful driving for senior drivers"

CEO/COO Noyori Junpei  
CCO/CDO Lin Wei  
CFO Iwasaki Kazuyuki  
CTO Urabe Hideki



# What's the problem

自転車乗用中及び歩行中の年齢層別死者数（構成率）（平成21年中）

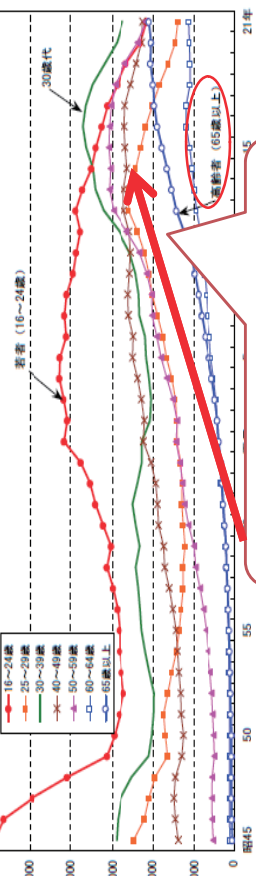


The population of senior people dying from car accident is the most.



EYE-VISION

# What's the problem



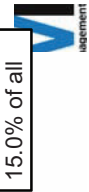
Car accident of senior drivers are increasing every year!!

年齢層別	11年	12年
15歳以下	528	532
16~19歳	50,478	52,085
20~24歳	15,113	14,141
25~29歳	118,455	124,143
30~39歳	141,709	160,704
40~49歳	129,068	135,174
50~59歳	131,925	148,472
60~64歳	42,801	47,489
65歳以上	30,488	34,621
合計	815,812	886,124



EYE-VISION

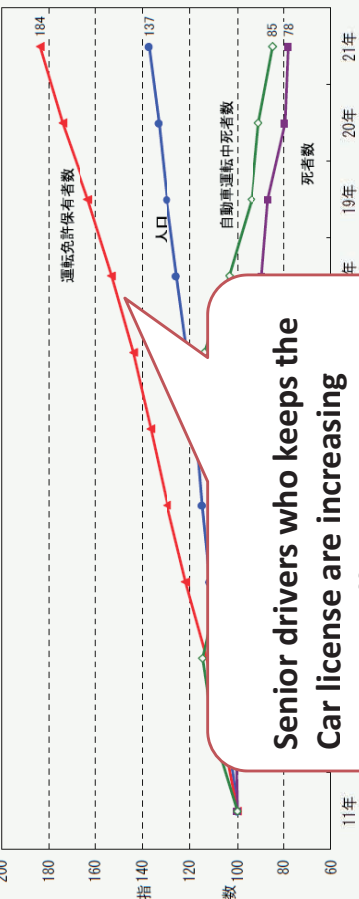
引用:www.e-stat.go.jp平成21年交通事故発生状況



# What's the problem

(2) 運転免許

高齢者（65歳以上）の人口、運転免許保有者数及び死者数の推移（各年12月末）



Senior drivers who keeps the Car license are increasing every year!!



EYE-VISION

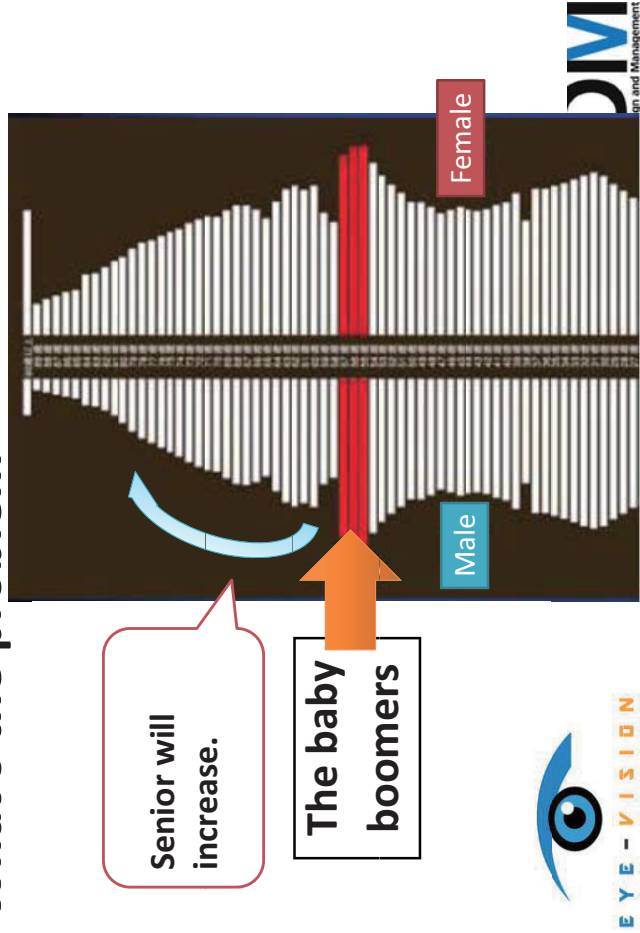


SDIM System Design and Management

## What's the problem

Senior will increase.

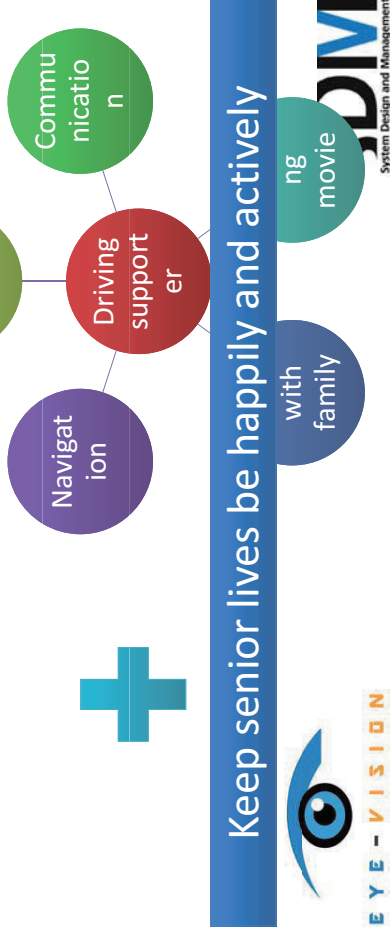
The baby boomers



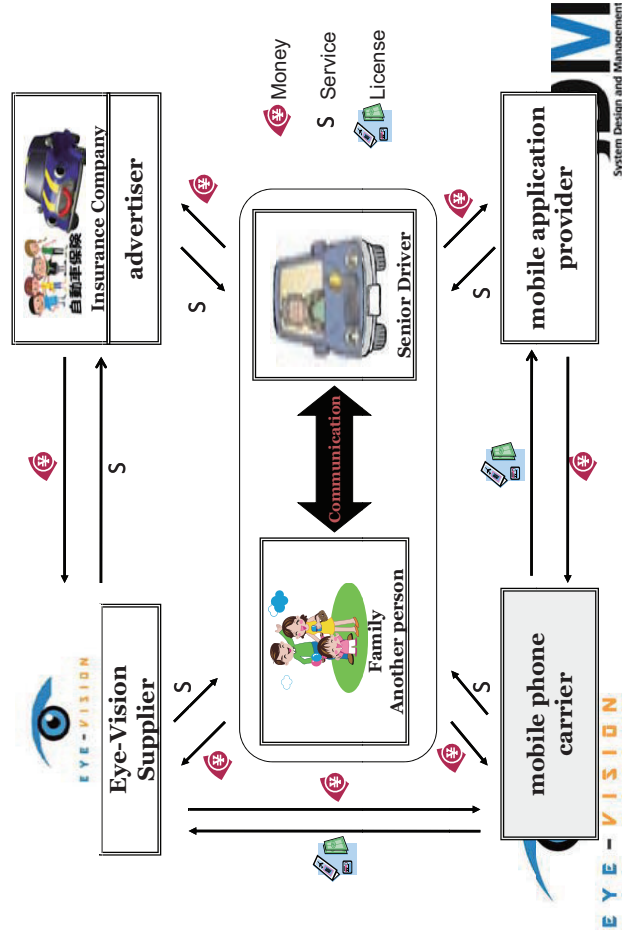
## Project Concept

- Focus target: 40-60 years old=the baby boomers
- Object:

To Maintain the Driving Skill  
Using DS=Driving supporter



## CVCA&Business Model



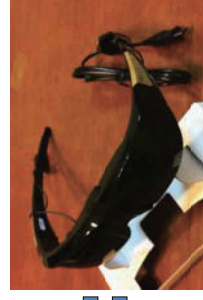
Driving simulator



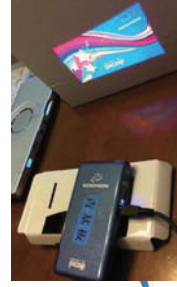
Motion sensor



Cellular phone



Eye Vision



Micro projector