



MOBILE TRAFFIC ASSISTANT





Graduation Project

İbrahimBİLGİN
Filip Veli GÜLTEKİN

ISTANBUL TECHNICAL UNIVERSITY
Computer Engineering Department

Supervisor : Assitant Prof. Feza BUZLUCA
May 2004



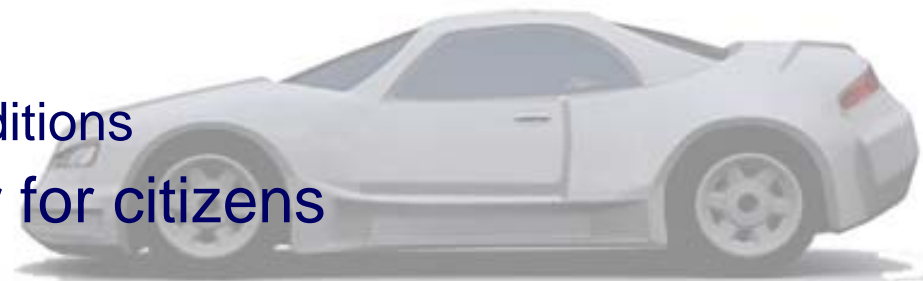


TA

Web

Project Definition

- **Problem :**
 - Traffic is a major problem of big cities
 - It's state is
 - unstable
 - But **not completely unpredictable**
 - It is effected by
 - Specific properties of roads
 - Weather conditions
 - Day of week
 - Time of day
 - Special events and conditions
 - It makes city life harder for citizens





TA

Web

Project Definition

- **Solution :**
 - Try to predict traffic state by means of
 - Specific properties of roads
 - Weather conditions
 - Day of week
 - Time of day
 - Special events and conditions
 - Make suggestions for best travel routes
 - Inform people



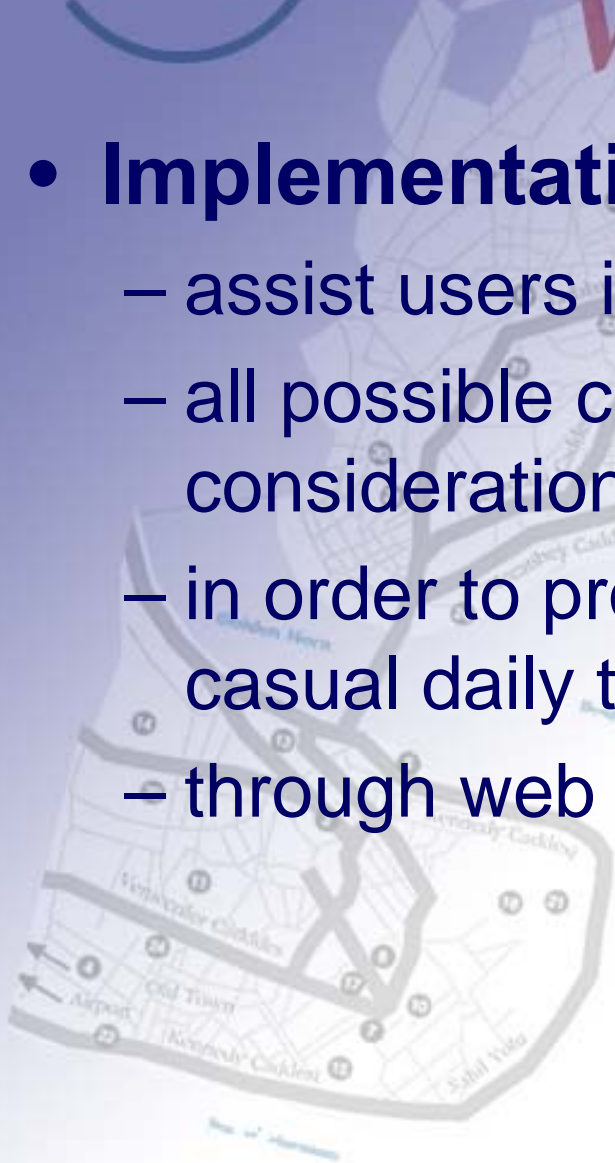


MTA

Web

Project Definition

- **Implementation : MTA Project**
 - assist users in heavy urban traffic
 - all possible conditions taken into consideration
 - in order to provide best (fastest) route for casual daily trips
 - through web & mobile devices



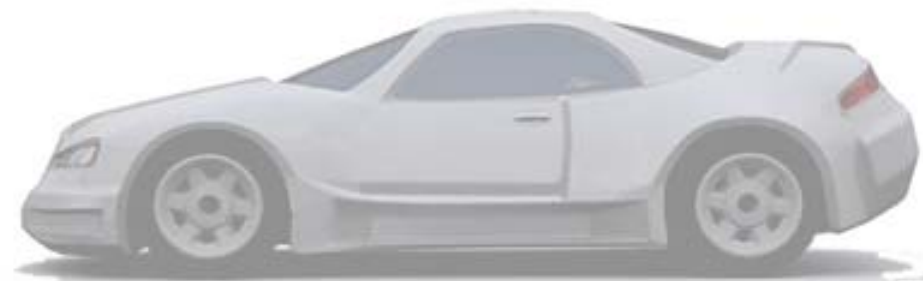
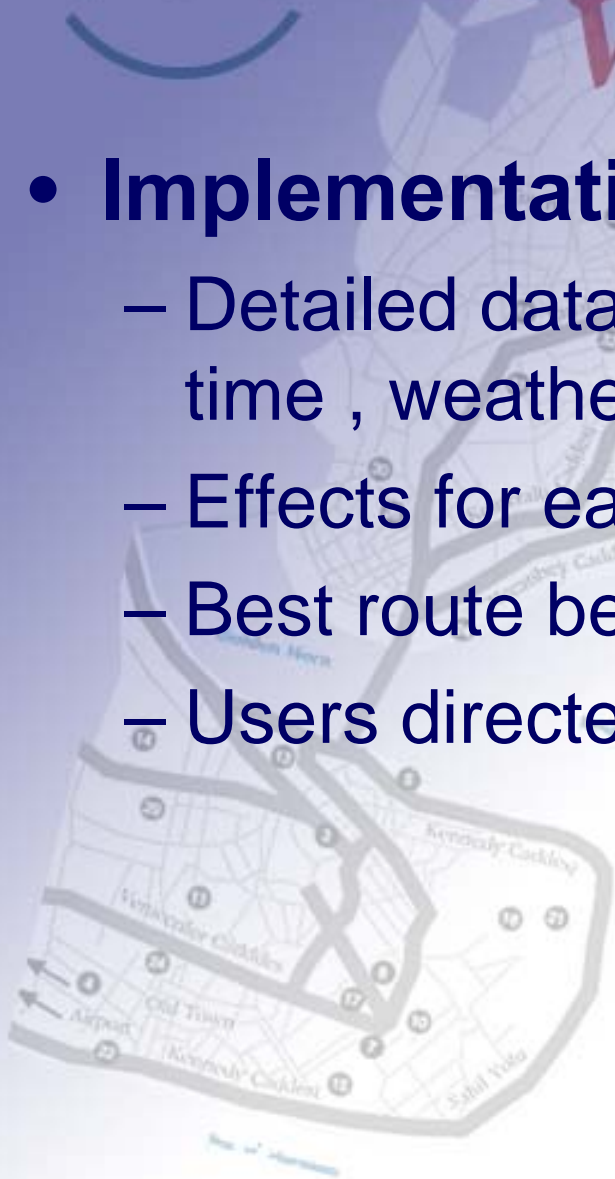


MTA

Web

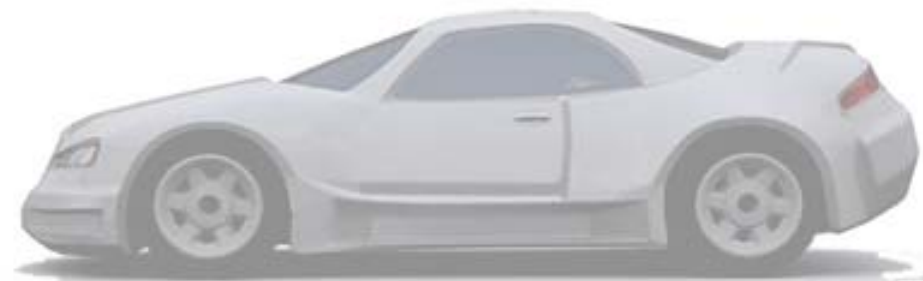
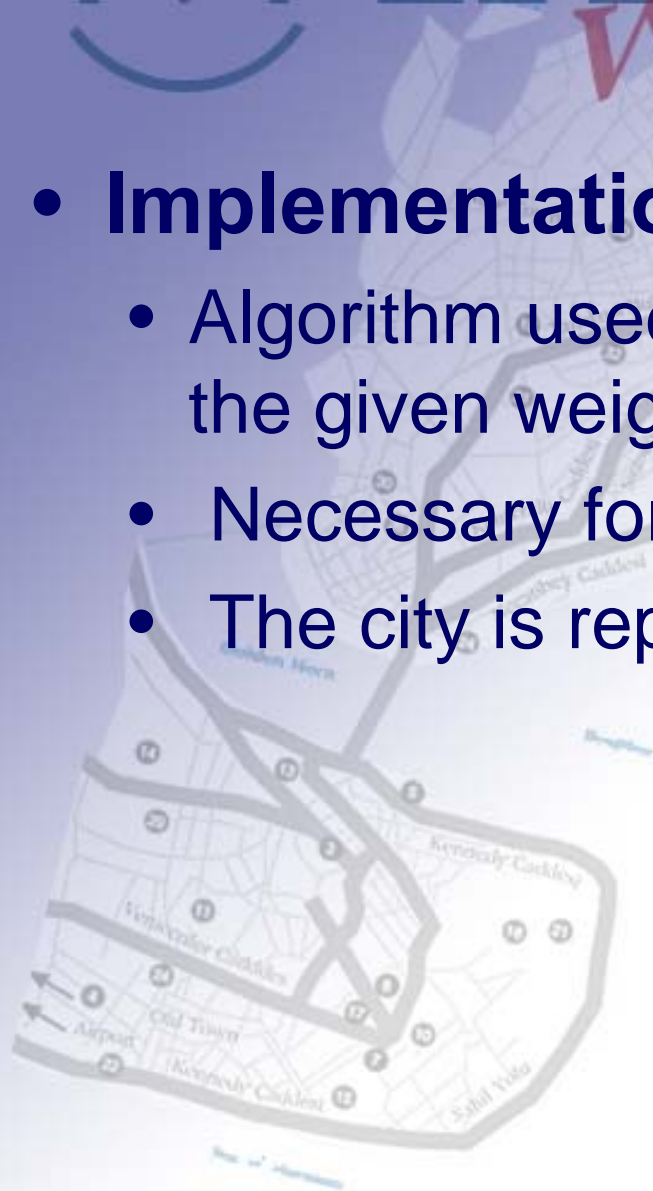
Project Definition

- **Implementation : MTA Project**
 - Detailed database search according to date, time , weather & road conditions
 - Effects for each road evaluated
 - Best route between places decided
 - Users directed to the SHORT-CUT



Algorithm

- **Implementation of Dijkstra Algorithm**
 - Algorithm used to find the shortest path for the given weighed graph.
 - Necessary for finding the best route for users
 - The city is represented as a weighed graph



Algorithm

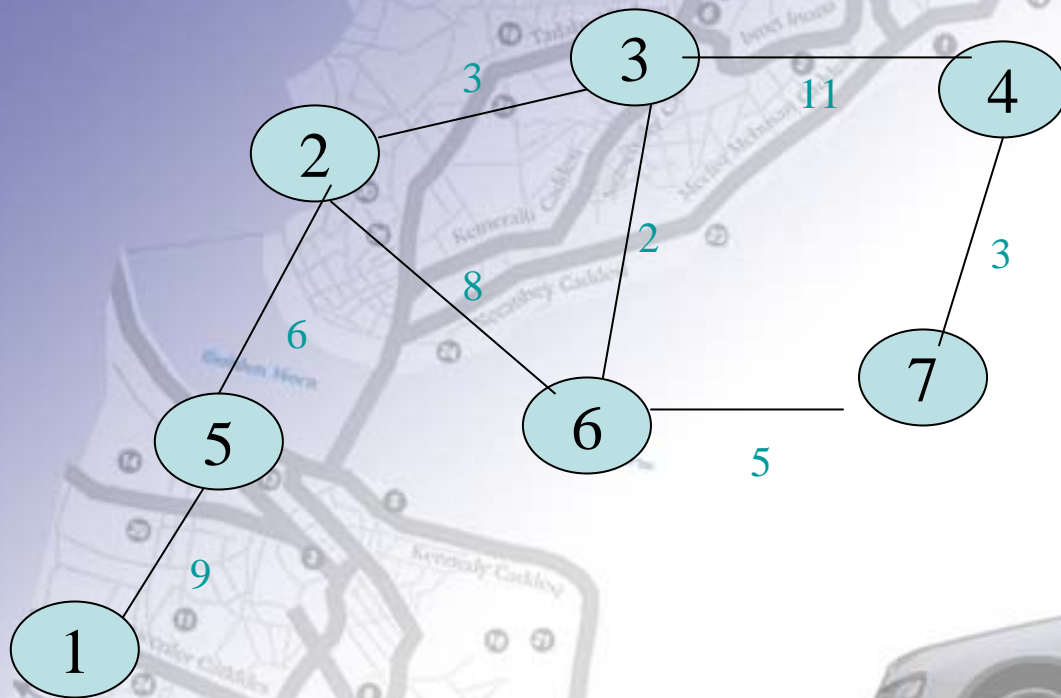
- **Implementation of Dijkstra Algorithm**
 - Graph Class is used for all shortest path algorithms
 - Can be used with various definitions of shortest path
 - Dynamic solution
 - Efficient for all type of areas(Larger/Smaller)
 - Provides Reliability of Project





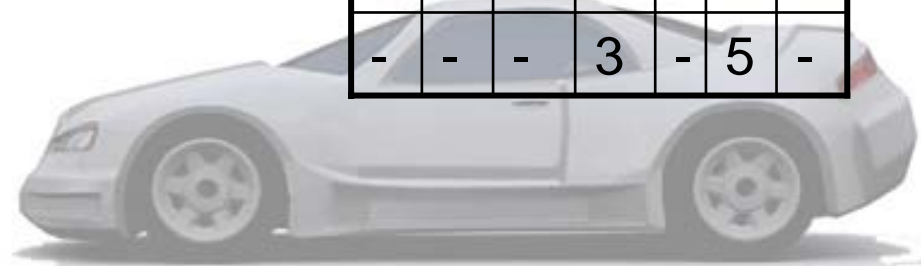
MTA

Dijkstra Algorithm



Connection Table

-	-	-	-	9	-	-
-	-	3	-	6	8	-
-	3	-	11	-	2	-
-	-	11	-	-	-	3
9	6	-	-	-	-	-
-	8	2	-	-	-	5
-	-	-	3	-	5	-



IMPLEMENTATION NODE 6

N	D	R
1	~	-
2	8	2
3	2	3
4	~	-
5	~	-
7	5	7

1	~	-
2	5	3
4	13	3
5	~	-
7	5	7

1	~	-
4	13	3
5	11	3
7	5	7

1	~	-
4	8	7
5	11	3

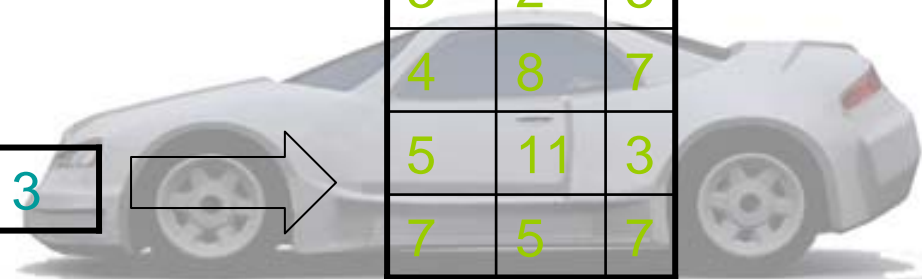
N- Node
D- Distance
R- router

Final Table

1	20	3
2	5	3
3	2	3
4	8	7
5	11	3
7	5	7

1	~	-
5	11	3

1	20	3
---	----	---

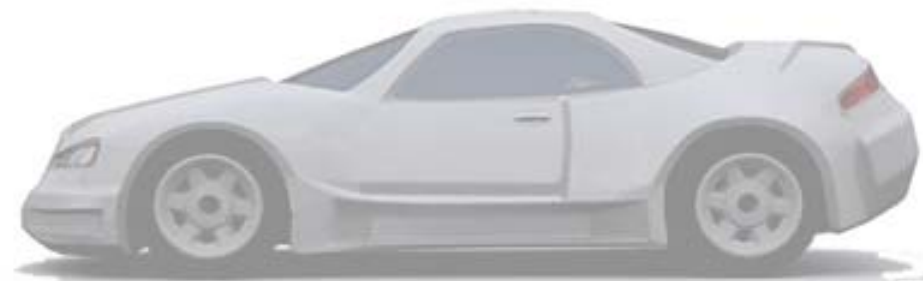
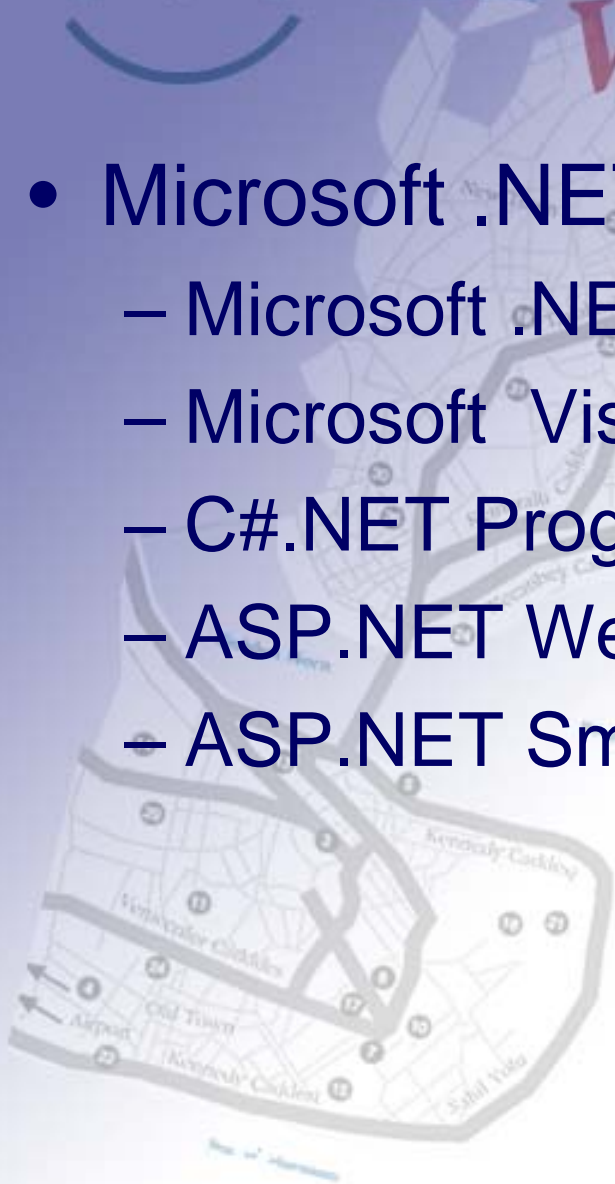




TAweb

Technology Used

- Microsoft .NET technology
 - Microsoft .NET Framework SDK 1.1
 - Microsoft Visual Studio.NET 2003 as IDE
 - C#.NET Programming language
 - ASP.NET Web Controls
 - ASP.NET Smart Device Controls

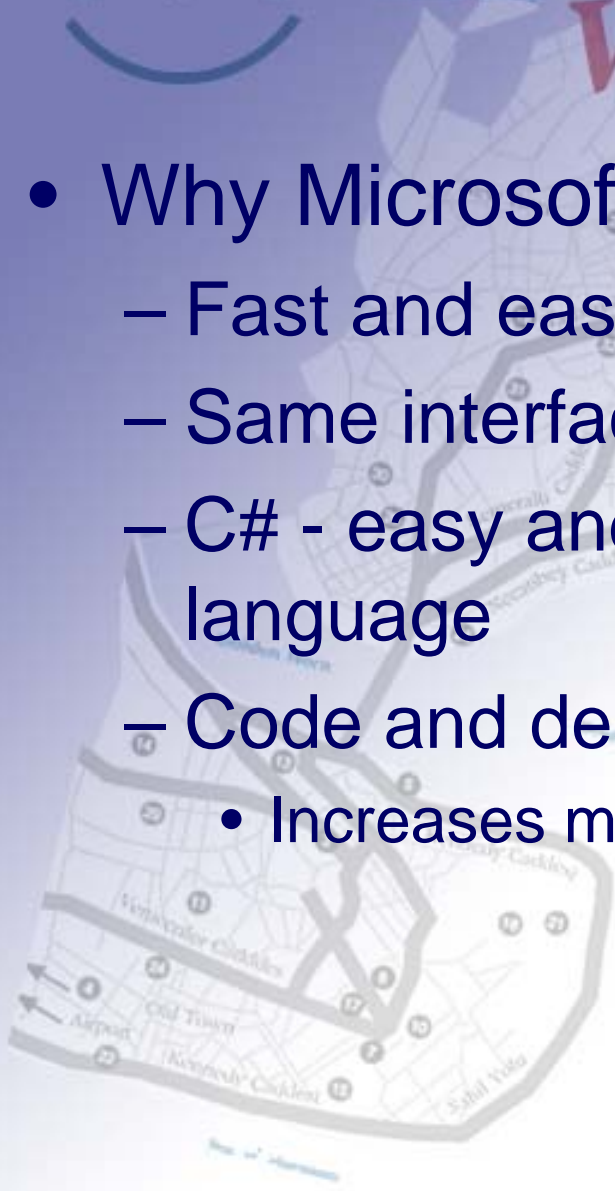




TAweb

Technology Used

- Why Microsoft .NET technology?
 - Fast and easy application development
 - Same interface for all kinds of applications
 - C# - easy and effective object oriented language
 - Code and design in different files
 - Increases maintenance and reusability

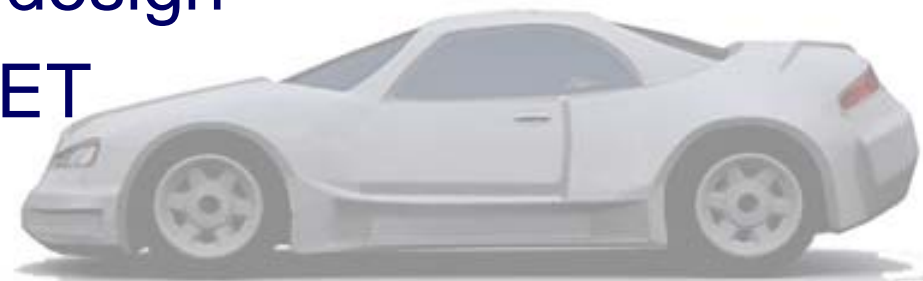




TAweb

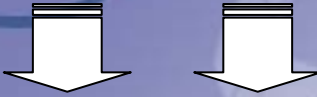
Technology Used

- Why Microsoft Visual Studio.NET?
 - Fast and easy application development
 - Same interface for all kinds of applications
 - Web
 - Smart Device
 - Web Service
 - Easy user interface design
 - Standard IDE for .NET



System Architecture

WEATHER & ROAD
CONDITIONS



ADMIN



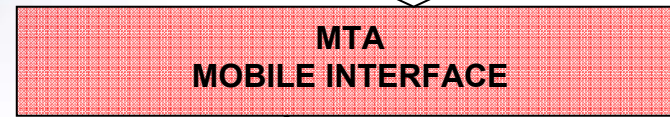
USER



MOBILE USER



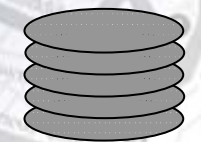
MTA
WEB INTERFACE



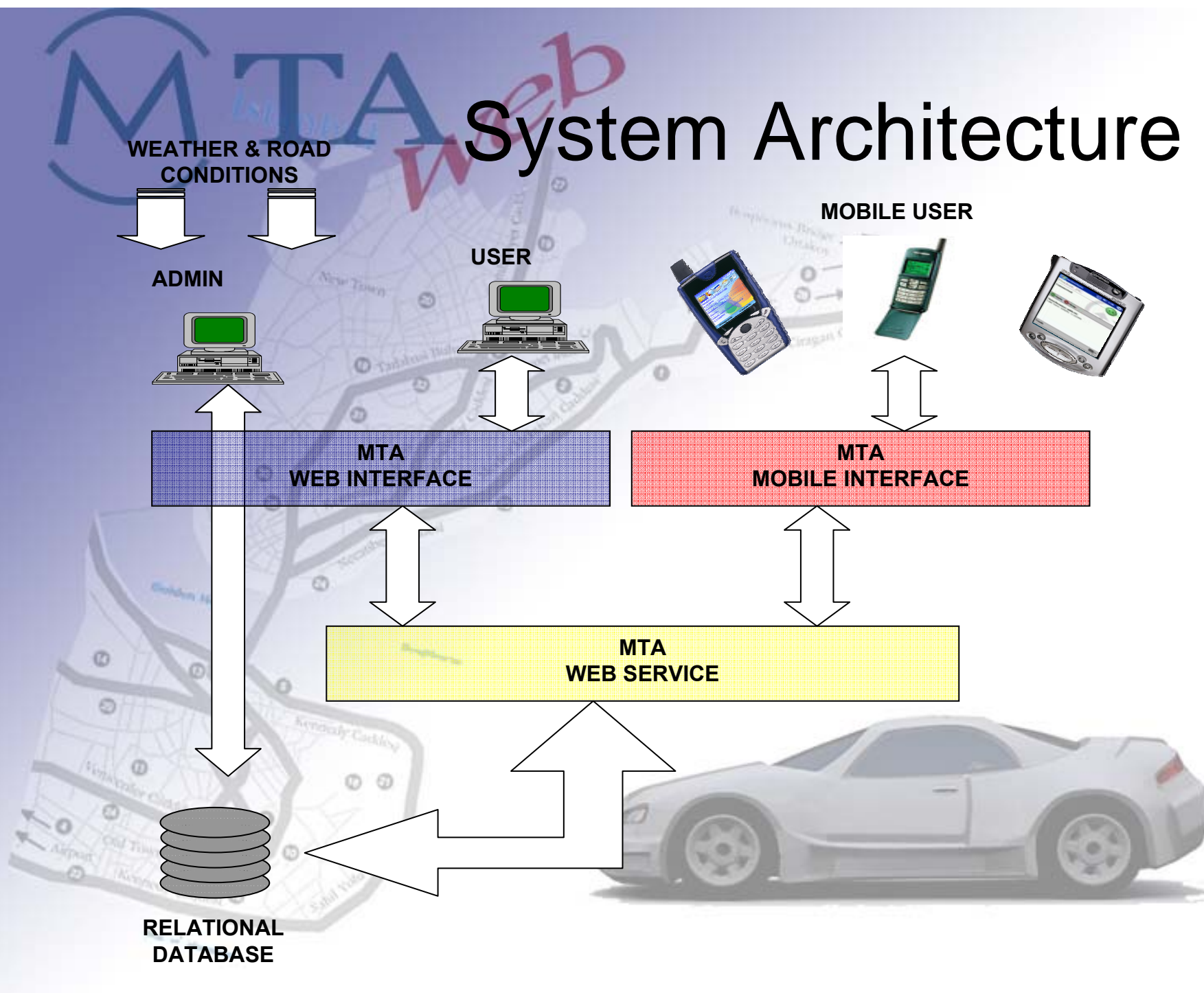
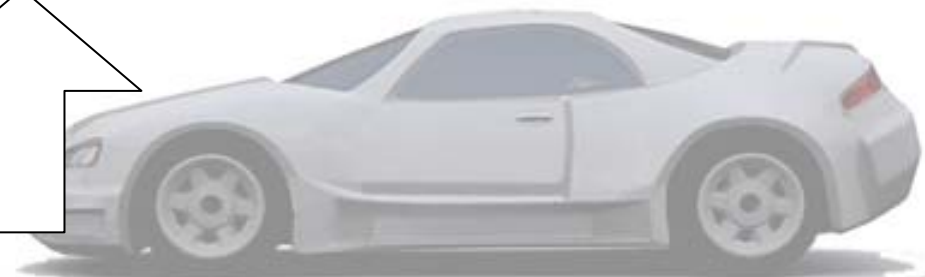
MTA
MOBILE INTERFACE



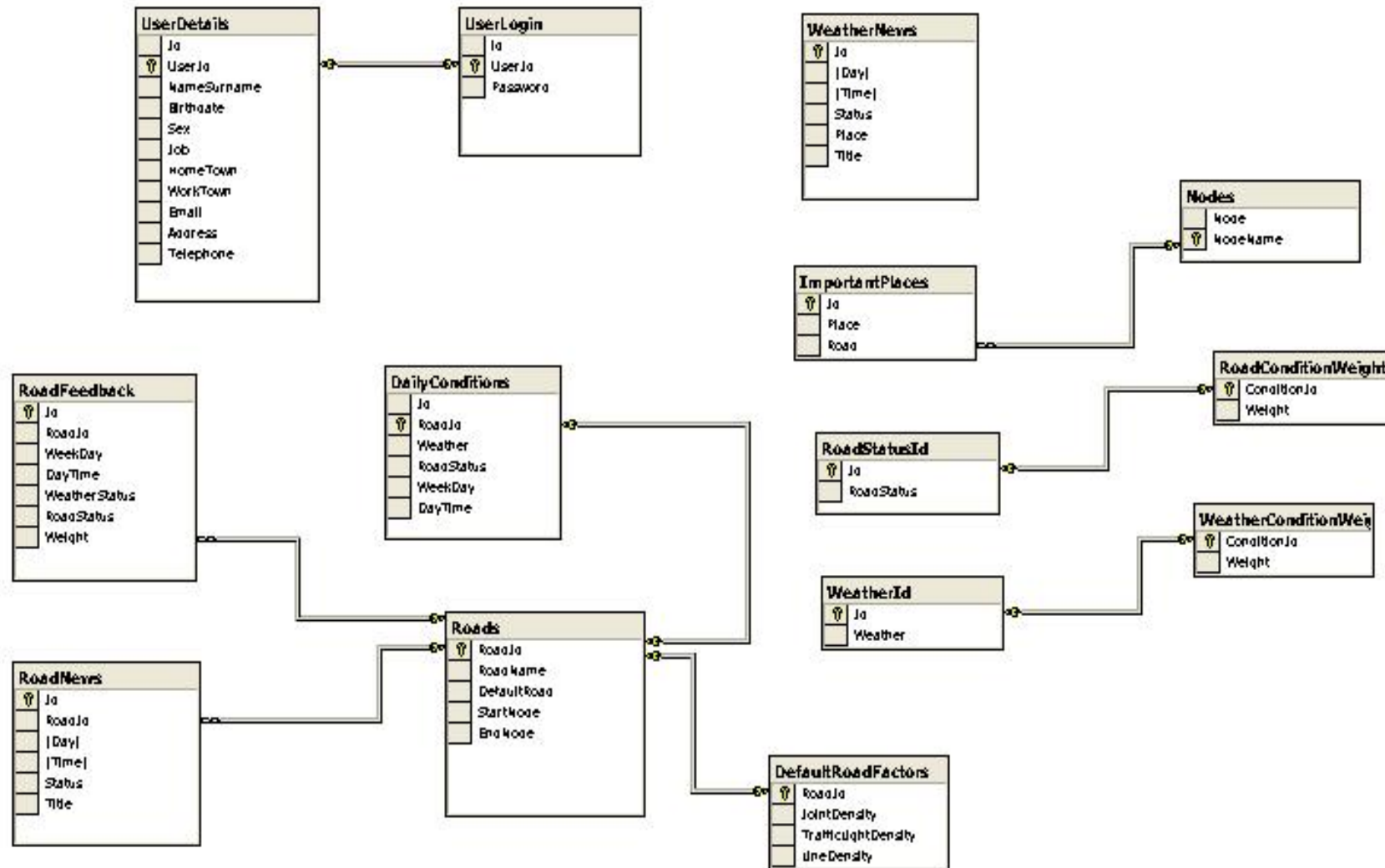
MTA
WEB SERVICE



RELATIONAL
DATABASE



Structure Figure





MTA Web

MTA Web Service

- Why use a Web Service?
 - To distribute all the functionality of the core system to the user interfaces
 - Web
 - Smart Device
 - Mobile Web Interface (future)
 - Java based systems (future)
 - To make improvements easily



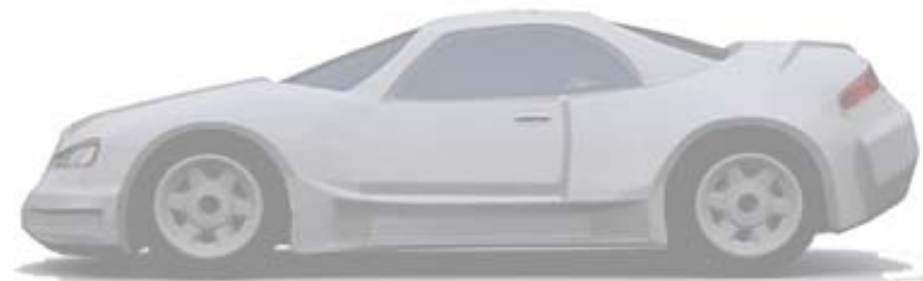
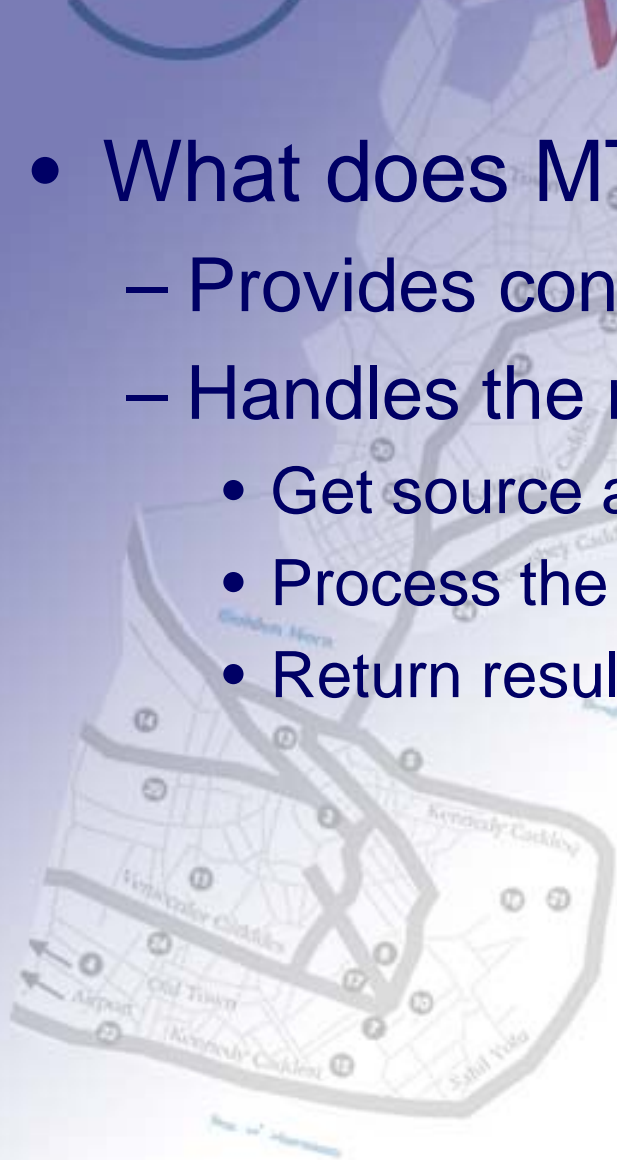


MTA

Web

MTA Web Service

- What does MTA Web Service do?
 - Provides content for user interfaces
 - Handles the main service
 - Get source and destination from UI's
 - Process the core algorithm
 - Return resulting path to UI's



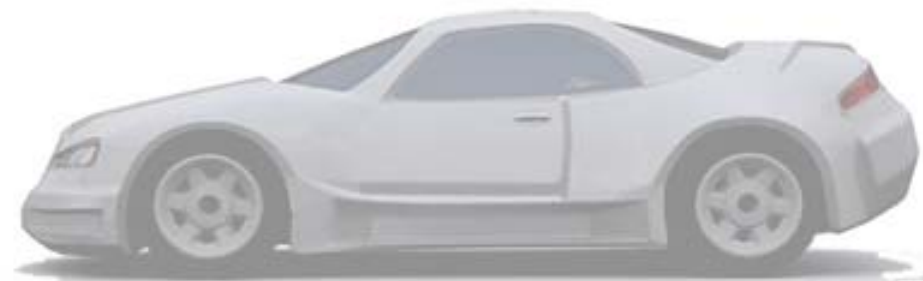
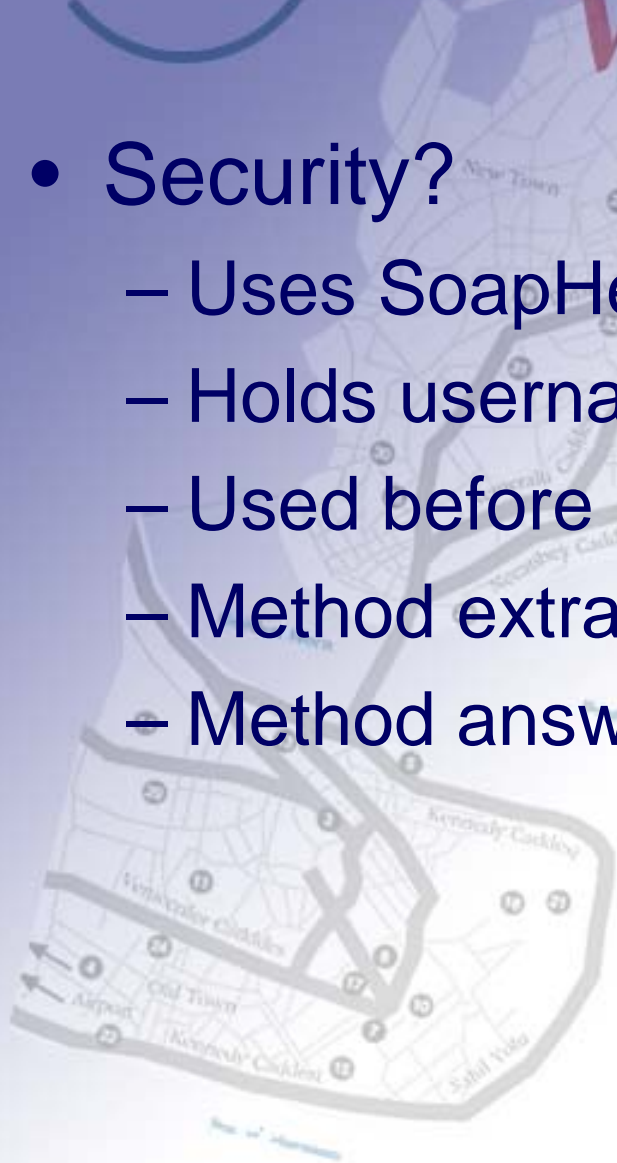


MTA

Web

MTA Web Service

- Security?
 - Uses SoapHeaders for security
 - Holds username and password
 - Used before invoked secure methods
 - Method extracts username and password
 - Method answers only authenticated users





MTA *web*

User Interfaces

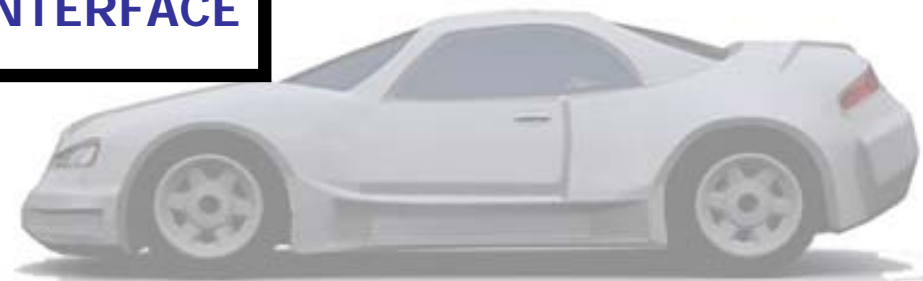
MTA INTERFACES

WEB INTERFACE

MOBILE INTERFACE

ADMIN INTERFACE

USER INTERFACE



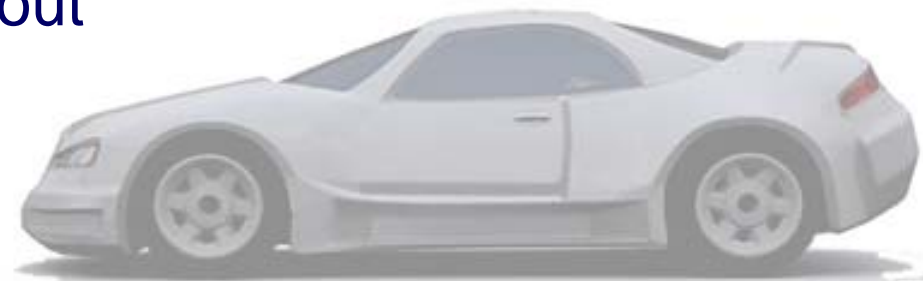


MTA

Web

MTA Web Interface

- User (Member) Interface
 - Login process
 - New user registration
 - Users can preplan their travel
 - Users can search for important places
 - Hospitals
 - Transportation
 - Touristic
 - Users can get news about
 - Roads
 - Weather





MTA Web Demo

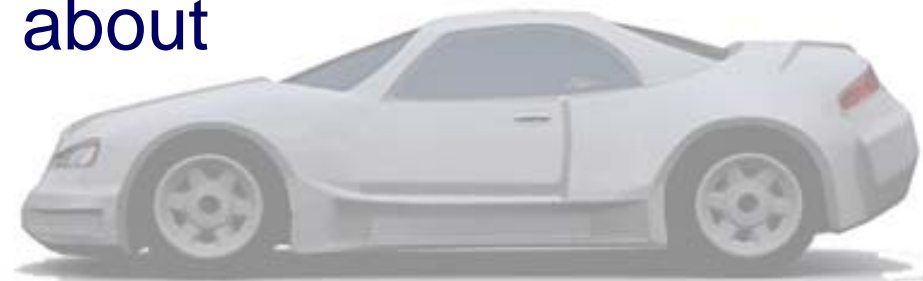




MTA

MTA Mobile Interface

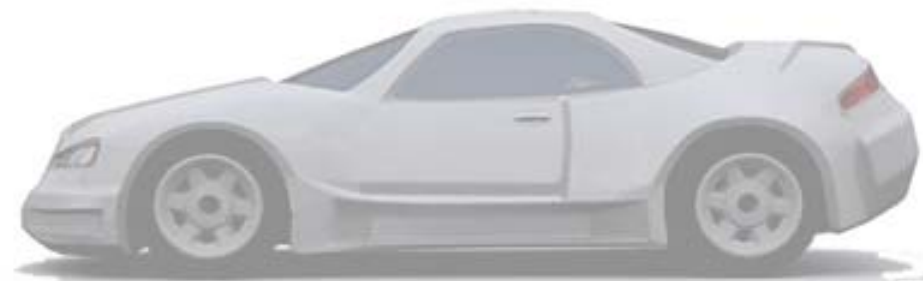
- All the functionalities of web interface:
 - Login process
 - Users can preplan their travel
 - Users can search for important places
 - Hospitals
 - Transportation
 - Touristic
 - Users can get news about
 - Roads
 - Weather





MTA Mobile Interface

- Dynamic/mobile:
 - Accessed anywhere
 - With GPS, will recognize user motion and provide easier instructions
 - “Move left” – instead of road name





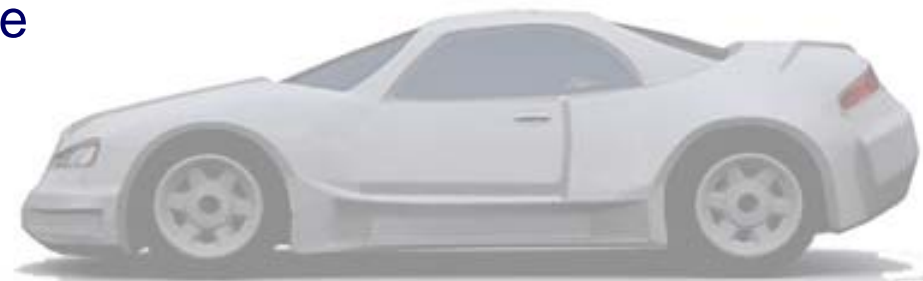
MTA Mobile Demo





References

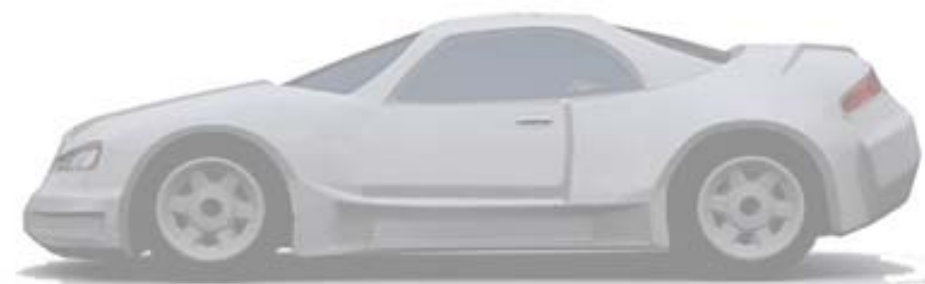
- [1] <http://www.msdn.microsoft.com/netframework> Microsoft .NET Framework
- [2] <http://www.msdn.microsoft.com>. Microsoft SQL Server 2000
- [3] <http://www.msdn.microsoft.com>. Store Procedures
- [4] <http://www.msdn.microsoft.com> XML Web Services
- [5] <http://www.msdn.microsoft.com> Visual Studio .NET
- [6] <http://www.msdn.microsoft.com> C#.NET
- [7] <http://www.asp.net> ASP.NET
- [8] Comer, D.E [Computer Networks and Internets](#) Upper Saddle River, N.J. , Prentice
- Hall, c1999





Comments

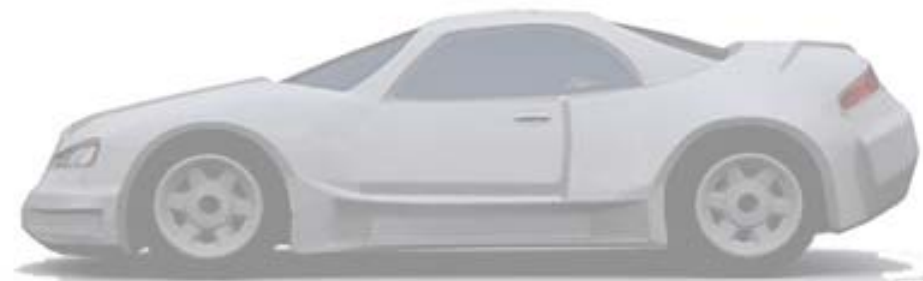
- ✓ Extensible in the future
- ✓ Easy New feature adaptation
- ✓ Adaptable to different places
- ✓ Public transportation features can be included
- ✓ Increased efficiency with usage of 3. generation mobile devices





Conclusion

- ✓ New technologies learned
- ✓ Software development practiced
- ✓ Project Management & Teamwork





QUESTIONS

