CENG 491
COMPUTER ENGINEERING DESIGN
PROJECT PROPOSAL

BUG BUSTERS

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1. PROJECT TITLE

RAILWAY INFORMATION SYSTEM (DEMİRYOLLARI BİLGİ SİSTEMİ)

2. COMPANY NAME

BUG BUSTERS

3. MEMBERS

- *ATEŞ Halim Çağrı*
  - 1502103
  - 05437409878
  - hcagri@gmail.com

- *ÇAKMAK Caner*
  - 1448521
  - 05057400232
  - canercakmak@gmail.com

- *PEKEL Işıl Özge*
  - 1502608
  - 05057935999
  - isilopekel@gmail.com

- *SUCU Burkay*
  - 1502665
  - 05353627094
  - burkays@hotmail.com

4. MOTIVATION & PURPOSE

Railway tracking and information systems are not a new topic in the world but not very common in our country. Turkish State Railways (TCDD) recently introduced some ***high speed trains***, namely ***"Yüksek Hızlı Tren (YHT)"***. Perhaps TCDD does not use the most modern railway systems but tries to improve the on-use train systems and while doing this some other kind of improvements on trains become desired. Introducing YHT is a big step and our team wants to contribute the development process. Of course this contribution is not designing or making new trains; but as mentioned earlier, improving the service quality on currently used trains for passengers and TCDD employees (especially locomotive drivers).

It is very clear that traffic jam and accidents are widely faced problems in Turkey. Considering this fact, getting the interest of people to public transportation can be regarded as one of the most important steps paving the way for an effective solution. Among all, railway has a special place because:

- It is safe because there is only one train on a certain proportion of a railway at a time
- It is cheaper than buses and airplanes
- It is fast (at least the arrival time is fixed) because there is no unforeseen traffic jams
- It is environment friendly

Therefore making the railways more attractive for passengers seems an arising need. This is the point we want to interfere. Some intelligent, user friendly, visually impressive software will be one of the main keys to achieve this goal.

5. PROJECT DESCRIPTION

Our project is mainly about enhancing the service quality of TCDD for both passengers and relevant TCDD employees.

- There is wireless internet connection in trains or Turkey has met with 3g technology. Many people have laptop computers or 3g mobile phones, which means that they are able to connect to internet during the railway travel. So when the project is completed, people may use the system even when they are on train. Supplying some useful information (on demand) about travel to them may be used for advertisements of railways and get people's attention. The features passengers will be able to benefit over internet (from their personal devices) includes:
    - Current train positions on the railway map we model
    - Some simulated information about moving trains, such as the expected arrival time etc
    - Statistical data about punctuality of selected trains
    - Trains schedule, announcements of cancelled departures or constructions on railways
    - Optimum way / Optimum cost calculations in respect of user preferences such as maximum number of train changes

- Machinists do not have to spend their all time watching the railway because the way is not subject to frequent changes. So constructing a mesh network seems more suitable for trains than for buses. Some features we want to implement are:
    - The first four items above with some more detailed information
    - Optimum speed suggestion due to position on railway (slower on curves etc.), weather conditions (fetched from a forecast server or using temperature sensors) and arrival time on schedule

- Some sensors and perhaps an accelerometer to track whether the train goes safely or it is in an emergency situation. If so, mark its position on map and inform relevant help centers.

These features require two different user interfaces. Not all the features are new, but we will design better user interfaces and always keep in mind to be user friendly. In addition to these, some large screen TV monitors may be placed on stations to make passenger without internet connection use and enjoy the system. Also admin panel implementation is another requirement.

If the project is going to be successful, it may be extended with some kiosk-like devices to improve the usability for passengers. We believe such a project will gain people's attention on trains and make them pleased during and after the journey.

6. MARKET SEARCH & LITERATURE SURVEY

Actually there is a similar system on TCDD trains running at the moment: "Tren Bilgi Sistemi" (http://www.trenbilgisistemi.com/). Unless the user is from one of the three certain companies, access to system is denied. This means that public access is not allowed to current system, so has nothing to do with attracting people to use trains, which is our primary goal to work on such a project. On the other hand as much as we could get information about it, this project only determines the train positions and gives alarm in case of emergency which is only some partition of our project.

Some features we mentioned earlier are already in use abroad, but we do not think it would be useless to produce the same product again, because importing software and hardware of this project might increase our dependency to foreign countries. So we believe producing such a project inside our home country is very valuable and it is worth to work on that project. This is a high potential project which may become much needed in a few years and may cost too much for TCDD to import it. But for sure we will take advantage of some known issues such as software libraries or documentations of commonly used hardware, but try to do a better high quality product which will also meet the Turkey-specific and Turkish people-specific requirements. We intend to not only make it very stable and high quality, but also make it very easy to understand and use even by our grandmas.

We will need some papers about construction of *train / station* databases, some 3d modeling papers to model railways, papers on GUI designing, documentations of GPS devices and some sensors we may use, papers about algorithms to find *optimum cost / optimum time* ways.