ABOUT AGNIK

Agnik is a data analytics company for distributed, mobile, and embedded environments. Agnik’s mission is to provide software products and offer services in this area. Agnik’s products are powered by a collection of powerful patent-protected technologies in the areas of distributed data mining, privacy-protected secure multi-party data mining, and mobile/embedded data stream management and mining.

MINEFLEET - REAL-TIME VEHICLE PREDICTIVE ANALYTICS

MineFleet software is designed for commercial fleet owners and fleet management companies who want the power of advanced predictive vehicle data mining for dramatically reducing the operating costs. MineFleet offers a powerful onboard data stream mining software for modeling, benchmarking, and monitoring of vehicle health, driver behavior, fuel-consumption, and fleet characteristics.
**FLEET ANALYTICS**
- Compare and benchmark vehicles in the fleet.
- Compare drivers across the entire fleet.
- Identify all vehicles showing specific problems.
- Identify drivers with specific driving characteristics.
- Comprehensive report for the entire fleet.

**FUEL CONSUMPTION ANALYTICS**
- Impacts of vehicle health on fuel consumption.
- Influence of driver behavior on fuel economy.
- Optimize factors influencing fuel economy.
- Quantify the predicted savings using calculators.
- Generate comprehensive reports.

**DRIVER MONITORING ANALYTICS**
- Speeding, idling, braking, and acceleration violations.
- Manage driver history and driving pattern data.
- Monitoring dependency between fuel consumption and speed, acceleration, and other factors.
- Evaluate drivers on safety, schedule, conformance, fuel consumption & vehicle care.
- Optimize driving effect on fuel consumption.
- Generate various driver monitoring reports.

**WHY USE MINEFLEET?**

**ADVANCED PREDICTIVE ANALYTICS**
- Find out reasons behind poor gas mileage.
- Benchmark vehicles and identify bad ones.
- Identify bad driving practices.
- Find anomalous vehicle behavior and avoid expensive breakdowns.
- Onboard analytics minimizes wireless transmission.
- Find optimal operating condition to get the best performance of your vehicles and more.

**REAL-TIME**
- Onboard data stream mining and alert generation. Analyzes data onboard and sends alerts/analytics over wireless Wide Area Networks. Real-time data can be transmitted either using 802.11 based connection or a Wide-Area Network (data plan subscription is required) to the MineFleet server.

**HARDWARE OPTIONS**
- MineFleet vehicle data bus adapter comes in serial, USB, and Bluetooth. You can also use your own data bus adapter. MineFleet onboard analytics runs on most embedded devices, PDAs, and Laptops. MineFleet Server runs on a PC.

**VEHICLE TYPES**
- MineFleet supports a wide range of light, medium, and heavy-duty vehicles.

**PREDICTIVE VEHICLE HEALTH ANALYTICS**
- Fault codes and manufacturer-enhanced parameters.
- Detect vehicle problems causing poor fuel economy.
- Determine problems before fault codes appear.
- Predictive modeling of vehicle sub-systems.

**MINEFLEET WEB SERVICES**
- View summary of all alerts for your entire fleet.
- View MineFleet generated vehicle and driver analytics alerts anytime using the web.
- The alerts are updated real-time as they are being generated by the MineFleet server.
Agnik’s MineFleet® Onboard (MF-DMP101) can be used in the plug-and-play mode without any integration.

The DMP device hosts Agnik’s vehicle Data Mining Agent software. It is powered by the patent-protected MineFleet® Onboard data stream mining technology. It can be used either as a stand-alone device or as an add-on to your own device using USB, serial, or Ethernet ports. It can also support optional Bluetooth and 802.11 interfaces. You can also connect a GPS device and a GPRS modem to MF-DMP101. This allows you to empower your solution with Agnik’s patented vehicle data stream mining technology without any integration effort.

**How Does MF-DMP101 Work?**

The DMP connects to your vehicle data port (for example, OBD-II, J1708), analyzes the data streams (manufacturer enhanced parameters, generic parameters, and fault-codes), and generates the predictive models, reports, and alerts. The generated analytics can be sent over to your on-board device using a wide range of standard interfaces such as USB, serial, Ethernet (with options for Bluetooth and 802.11). You can then view these analytics in your on-board device or send these over the wireless network to MineFleet® Server/Client/Web-Services software for further analysis.
MineFleet: An Analysis of the Return of Investment
1. Keeping Your Fleet in Shape

Keeping your vehicles in shape and making sure that they are driven properly are important for optimal performance and low operating cost. MineFleet offers a tool to do that. This document discusses the return of investment (ROI) on MineFleet. First let us look at some important facts that we will use for the analysis of the ROI. These observations are made based on reports from the US Department of Energy\(^1\) and a project\(^2\) co-financed by the European Commission Directorate-General Transport and Energy for studying driving behavior.

1. **Faulty Oxygen Sensors:** Fixing a faulty oxygen sensor, can improve your fuel economy by as much as 40%. (Savings of $0.9/gallon)
2. **Basic Maintenance:** Fixing a car that is out of tune or has failed an emissions test can improve its gas mileage by an average of 4 percent. (Savings of $0.09/gallon)
3. **Rapid Acceleration and Braking:** Aggressive driving (speeding, rapid acceleration and hard braking) wastes gas. It can lower your gas mileage by 33 percent at highway speeds and by 5 percent around town. You may save in between 5 to 33 percent in fuel economy by minimizing aggressive driving. (Savings of $0.12-$0.76/gallon)
4. **Speeding:** Just by observing the speed limit you may save in between 7 to 23 percent in fuel economy. (Savings of $0.16-$0.53/gallon)
5. **Excess Weight:** Removing excess weight may have considerable impact on the fuel economy. An extra 100 pounds in your vehicle could reduce your fuel economy by up to 2%. (Savings of $0.02-$0.05/gallon per 100 lbs)
6. **Air Filter:** Checking and replacing air filters regularly may improve the fuel economy by as much as 10% (Savings of $0.23/gallon)
7. **Idling:** Idling reduces the overall gas mileage; so minimize idling.
8. **Accident Risk:** Based on work by Nilsson [3, 4] in Sweden, a change in average speed of 1 mile/hr will result in a change in accident numbers ranging between 3.2% for a 75 miles/hr road and 6.4% for a 30 miles/hr road.

Cost savings are based on an assumed fuel price of $2.31/gallon.

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\(^1\) http://www.fueleconomy.gov/feg/maintain.shtml

\(^2\) http://www.erso.eu/knowledge/content/20_speed/speed_and_accident_risk.htm
2. Analysis of ROI: An Illustration

2.1. Assumptions

1. Ford E-150 Commercial Cargo Van
2. Market Price $21,321
3. Depreciation rate 10% per year
4. Gas mileage (miles/gallon)
5. Distance traveled on average 200 miles/day
6. Gas Price $2.31/gallon
7. Assumes existing onboard computing platform such as a GPS receiver box

2.2. Particulars of MineFleet

1. Fuel Consumption Monitor (FC): Monitors the impact of driver behavior and vehicle health on fuel consumption.
3. Driver Behavior Monitor (DB): Monitors speed, idling, acceleration and braking and how they affect fuel economy.
5. Fleet Monitor (FM): Performs comparative analysis of all the vehicles and drivers across the entire fleet. Identifies anomalous behavior.

2.3. Analysis

Please see the table in the following page for the analysis. A soft copy of the ROI Calculator is available upon request from Agnik.

References

1. Estimates for fuel savings from sensible driving are based on studies and literature reviews performed by Energy and Environmental Analysis, Inc, Washington, DC.