

# MOBILITY & ANALYTICS SERVICES

### INTRODUCTION

At HCL's Digital & Analytics division, we help design and build key platform components of customers' Digital-Technology-Footprint to power their Digital transformation journey. Our team of design-thinkers & industry-process experts help our customers break down barriers by combining deep knowledge of business processes with user-centered design principles – to truly visualize the potential of digital technology.

HCL's Digital & Analytics services brings its entire gamut of expertise – from consulting to implementation – to ensure that digital journeys can enable an end-to-end IT its transformation.

We believe that every enterprise has a unique DNA. We help amplify this uniqueness, through the power of digital technologies and analytics.



### MOBILITY SERVICES





## MOBILITY SERVICES – TECHNOLOGY LANDSCAPE

NSULTING	DEVELOPMENT
Consulting Framework App Development approach selection tool IT and Technology Landscape Reference Architecture Best Practices and Guidelines	<ul> <li>Phonegap</li> <li>Titanium Appcelerator</li> <li>Angular IS Xamarin</li> <li>Objective C</li> <li>Apache Wicket</li> </ul>
Application & Technology Roadmap	<ul> <li>Swift, Android SDK</li> <li>Jquery Mobile</li> <li>Sencha Touch</li> </ul>
New Technologies Training Swift Training Automation Tools Training	<ul> <li>TESTING &amp; CERTIFICATION</li> <li>UI Automation</li> <li>See Test, Robotium</li> </ul>
IKM Assessment	<ul> <li>Selenium</li> <li>Crashlytics</li> <li>Ruby, Calabash</li> <li>Cucumber</li> </ul>
	<ul> <li>ENABLERS</li> <li>Test Automation Framework</li> <li>MMA</li> <li>Factory Model for Mobile Dev and Sustenance</li> </ul>

### **BUSINESS BENEFITS**

### **QUANTITATIVE BENEFITS**



## CASE STUDY : MOBILE INTEGRATED PARKING STATION SYSTEM DEVELOPMENT

### SCOPE

Mobile Integrated Parking Station development with third party cash recycler system.

### CLIENT

Parking Station Manufacturer

#### HCL APPROACH

- End to End development of the system
- Leveraged the Linux Customization Expertise @ HCL
- HCL UxD CoE to design UI for Mobile/Tablet
- Team Leader with experience in J/XFS
- Firmware team comprises of Device Service experience

### **TECHNOLOGY/TOOLS HIGHLIGHT**

- ARM Cortex-A8
- Linux, Android, C++/C, JNI, Java
- RabbitMQ, Tomcat, Client 's RDC
- J/XFS
- Third Party Cash Recycler

### HCL SOLUTION

- Mobile Interface to Parking station
- E-Receipt to mobile
- Cash Deposit functionality
- Balance Dispense functionality
- Admin Functionality
- Diagnostic module
- Display Driver
- Service Utility



# ANALYTICS SERVICES



### **ANALYTICS COE**

CREDENTIALS		SERVICES
Investment in Cognitive Analytics CoE dedicated to Machine Learning, Deep Learning, Statistical Techniques, & other Advanced Analytical Methodologies	Con	<ul> <li>Business Use Case Definition</li> <li>Data Quality and Integration Assessment</li> <li>Ecosystem Monetization</li> <li>Information Management System Design</li> <li>Technology and Tools Stack Evaluation/ Recommendation</li> </ul>
Expertise in implementation steps of Analytical Solution: Architecture & Design, Data Governance, Data Warehousing, Business Intelligence, Agile Analytics Solutions, Data Science	Eng	<ul> <li>Agile Analytics Integration with Legacy/ Upcoming Applications</li> <li>Enterprise Data/Data Science Platform Solution</li> <li>Digital Engineering</li> <li>Information Management Platform</li> <li>Benchmarking and Tuning</li> </ul>
Accelerators like Data Science Lab & Re-useable Components	Оре	<ul> <li>Data Management Platform Management</li> <li>DevOps Integration (Data Sc/Application)</li> <li>Shared Services and CoE</li> <li>Change and Configuration Management</li> <li>Streamlining Business Process</li> <li>Data Standardization</li> </ul>

#### **UNIVERSITY PARTNERS**





## CASE STUDY : SUPPLY CHAIN MANAGEMENT – INVENTORY FORECASTING

#### **BUSINESS CASE**

An U.S based ERP software development company wants to incorporate analytical solution to

- Improve operational efficiency
- Optimize resource planning



#### **Techniques used for Analysis**

Time Series Methods

- ARIMA for forecasting Demand,
- VAR for Inventory forecast and
- ARIMAX for sales return quantity forecasting



Forecasted results leading to

- Optimal inventory management
- Efficient order fulfillment
- Improved resource allocation

#### **Key observations:**

- Forecasting for Optimal Planning
- Improved Operational Efficiency
- Effective Cost Management
- Enhanced Reporting

#### SOME OF THE REPORTS GENERATED RESULTING INTO INSIGHTS:



Forecasted Weekly Numbers

Weekly Forecast - Product wise





### CASE STUDY : PROGNOSTICS OF MACHINE HEALTH

#### **BUSINESS CASE**

A Engine manufacturing company wants

- Condition-Based-Monitoring for its products
- Integrate analytics to the system where sensor data is used to predict hazardous status



#### Methodologies used for Analysis & Modeling

- Data Pre-processing with Normalization for creating usable features
- Identification of extensive Multicollinearity
- Non-Linearity in data
- Ensemble methods like Random Forest did not return sufficient accuracy

### Techniques leading to key observations:



#### Fuzzy Forest used to select important features

• Extreme Gradient Boosting used for classification

### • Thr ere derived related to the not

The Following insights were derived related to the issues:

- Model to compute and continuously update residual life distributions of partially degraded components
- This forms basis for alert notification to service engineer
- Predicting the risky zone beyond which it is not preferable to operate the engine

### Techniques leading to key observations:

- Threshold beyond which it is not preferable to operate the engine
- Patterns that alert for realtime condition monitoring information



### PERIOD WISE MONITORING OF ENGINES





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