EDITORIAL
A Word from the Managing Director
Nikhil Barshikar

OPINION
Productization of Analytics
Pritam Kanti Paul
CTO and Co-Founder, BRIDGEi2i

TRENDING
Customizing Recommendation System
Techniques for Next Best Offers
R. Raghavendra
Senior Director, HP Analytics Data Labs

WHAT’S BREWING?
Imarticus Goes Online
Management Development Programmes
Operational Risk MDP: Sneak Peek

UNWIND
Imarticus Good Reads
Dear Reader,

As business owners see the incremental value that analytics provides, demand for analytics continues its upward trajectory. A fundamental shift is clearly underway in how business users like to consume analytics: on-demand and more personalized. Analytics for the Masses means that analytics needs to be democratized, simplified and easily consumable.

One such path-breaking approach is ‘Productizing’ analytics services, or in other words, creating products based on consistent and repeatable services. Many businesses have shown an inclination to switch from project-based consulting to these product offerings as they typify the ‘Decisions first’ approach and offer several advantages, including accelerated delivery of solutions at a significantly cheaper cost. On the supply side, technology and analytics vendors are embracing these challenges rather well. We are delighted to have Pritam Kanti Paul, CTO and Co-Founder at BRIDGEi2i, put forth his views on the productization of analytics. In this interesting read, he makes the case that neither a pure product based nor a pure services based approach will meet the requirements of most businesses, which is where a hybrid offering comes in.

When organizations discuss how to drive value from big data, they often focus on improving the customer experience through big data analytics. We are already enjoying the benefits of the so-called collective intelligence, which is embedded in a lot of applications we use on a daily basis. Of course you are used to Facebook, Twitter or LinkedIn suggesting people you might also know, or to Amazon recommending products that you might like. All of them have one thing in common: the use of recommendation techniques to filter what statistically is most relevant for a particular user. What started off as a novelty has turned into a serious business tool. These systems can be designed using various approaches such as content-based or collaborative filtering. In this issue, R. Raghavendra, Senior Director at HP Analytics Data Labs, makes a case for recommender systems that are based on collaborative filtering.

Analytics for the Masses also means we relook at the way our youth is trained on analytical tools and process. Imarticus offers many online programmes on analytics that are self-paced, instructor-led and are geared towards upskilling working professionals within a short span of time, while still ensuring quality, consistency and repeatability in training results. Check out a brief summary of the online programmes that we believe are relevant to you on Page 11.

Diwali is also the time for new beginnings and ventures. Imarticus is proud to announce the launch of our Management Development Programmes (MDP) to cater to your senior managers and high potential employees. Buoyed by the overwhelming response to our Risk Management Round Table in August earlier this year, we have chosen Operational Risk as the topic for our very first MDP on 21-22 January, 2016. Please refer Pages 12 & 13 for more details. We have many more analytics-focused MDPs in the works – watch this space. We look forward to your whole-hearted participation and suggestions for future workshops.

We are very excited about what 2016 will bring and, as always, we invite you to come visit us at our offices in Mumbai, Bangalore and Chennai. We have also recently revamped our website to cater to your requirements. Please visit imarticus.org/corporate to learn more about our corporate solutions. Please do get in touch with us at corporaterelations@imarticus.com for any requirements or suggestions to serve you better.

Best Wishes Always
Nikhil Barshikar
Founder & Managing Director
OPINION

PRODUCTIZATION OF ANALYTICS

Pritam Kanti Paul
CTO and Co-Founder - BRIDGEi2i

INTRODUCTION
The concept of using business data to improve an organization’s decision-making is not new. Modern day businesses need a solution with the following characteristics to solve their business problems:

QUALITY OF INSIGHTS
On demand, real time, granular, actionable insights with predictive and prescriptive analytics

IMPLEMENTATION TIME
Short, without much disruption to current processes

COST
Somewhere between the licensing cost for off the shelf products and one time analytics services implementation

ROI
Faster ROI, measurable impact, sustainable advantage

WORLD OF PRODUCTS
A school of thought that says some analytics problems could be solved with the help of IT software and products alone.

ADVANTAGES
- Faster deployment at a cheaper cost
- Access to user community
- Trial usage for a limited period of time
- Easy upgrades at lower cost

DISADVANTAGES
- Difficult to integrate due to inherent differences in business processes between companies
- Needs longer time for customization
- Sometimes too specific, niche and ‘small’ in the overall scheme
- Sometimes regarded as black box and generic

By design, an off the shelf product can satisfy only a few basic requirements that are consistent across many businesses and cannot offer a tailor-made solution. A product’s effectiveness, acceptability and ease of usage would get diluted if the product tried to be everything for everyone! Remember Google Wave? The failure of Google Wave is one such example. In retrospect, among other things, the failure was attributed to its complicated user interface, resulting in a product that was a bit like email, a bit like an instant messenger and a bit like a wiki, but ultimately couldn’t do any of the things any better than the existing solutions.

continued...
OPINION

WORLD OF SERVICES
A school of thought that says custom built services are the perfect solution to address business problems.

ADVANTAGES
- Granular and accurate recommendations that completely fulfil the needs of your business
- Measurable impact
- Can easily support future needs of the business

DISADVANTAGES
- High cost of designing the solution
- Longer implementation time
- The cost of incremental services to meet business needs are equally high
- Apprehension to invest as the final outcome is not clear

Neither an entirely off the shelf productized solution, nor a pure service offerings can, in isolation, cater to the growing and complex needs of today’s organizations. This creates a need for a hybrid offering.

HYBRID ANALYTICS SOLUTION
A business solution whose core analytics algorithms and frameworks are readily available and are flexible for customization to suit business needs.

ADVANTAGES
- Granular and accurate recommendations that completely fulfil the needs of your business
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So, what are the key ingredients of a hybrid offering?

1. EASY-TO-INTEGRATE PRESENTATION LAYER
   - Actionable Dashboards
   - User Interface for real time, easy to consume insights

2. CONSUMPTION LAYER
   - Industry Trends
   - Business Scenarios
   - Business Rules
   - Hybrid Algorithms

3. CUSTOMIZABLE ALGORITHMS
   - Industry Trends
   - Business Scenarios
   - Business Rules
   - Hybrid Algorithms

4. REUSABLE FRAMEWORKS
   - Data Augmentation (Multiple Data Sources - Internal)
   - Data Management (Integrate, Clean, Create Attributes, Transform)
   - Hardware, Software Architecture

Now this is easier said than done. Let us illustrate this with a use case.

BRIDGE2I FORECASTING ENGINE
Forecasting Engine is a cloud-enabled, one-stop forecasting platform that automatically identifies the best suited models for a series of data and generates accurate forecasts.

The application uses advanced forecasting models along with more traditional models, and has proprietary algorithms to choose best models, and enable ‘what if’ simulations and back testing models.

“IT IS TIME TO START THINKING ABOUT EMBEDDING ANALYTICS IN BUSINESS PROCESSES FOR DECISION MAKING. PRODUCTIZATION OF ANALYTICS IS THE HOLY GRAIL THAT WILL HELP US REACH THE LAST MILE!”

continued...
We are at a juncture where the hardware maturity can support the aspirations of algorithms and frameworks. With companies such as Google open sourcing their machine learning systems, it is certainly the right time to start thinking about embedding analytics in business processes for decision making. Productization of Analytics is the Holy Grail that will help us reach the last mile!

CLIENT USE CASES
- Commodity price forecasts for a Hi-Tech company
- Fraud loss forecasting for a major financial services company
- Demand forecasting for a niche manufacturing company
- Sales pipeline forecasting for a Hi-Tech company

The use cases stated above have commonalities in terms of frameworks and algorithms to choose the best methods. However, the key differentiating factor in each of these use cases is a business rule engine, data management and pre-processing that optimizes forecasts to provide higher forecasting accuracy for a longer period of time. On similar lines, BRIDGEi2i is focusing on building such platforms that we call “Technology Accelerators.” We have developed platforms around:

- Model risk governance for financial services
- SKU recommendation engines for sales reps
- Customer experience tracking as well as lead management for marketing and sales

CHEAT SHEET
Let me leave you with one quick cheat sheet that can help you identify and design hybrid solutions. Some questions you need to ask yourself are:

- Can the solution bring sustainable advantage to the business?
- Is the analytics solution easy to adopt without making much change to the existing processes?
- Does the solution have core components that cover the critical intelligence part of the solution?
- Does the architecture allow customization based on business processes?
- Is it future ready in terms of infrastructure and changes in data etc?
- Can the solution be embedded at the point of decision making?
- Is the solution affordable?
- Is there a scope for volume game?
INTRODUCTION
CEOs are serious about customer engagement. They want their companies to be customer-obsessed, knowing what customers want before they want it. It’s not just lip service. It’s a matter of dollars and cents: converting browsers into buyers. Companies are increasingly getting serious about customer engagement to provide better experiences as well as proactively recommending customized products based on customer’s purchasing patterns, demographic information and interaction response etc. to nurture loyalty and increase sales.

NEXT BEST OFFERS
Customer engagement can happen at multiple touch points, offering opportunities for next best offers and building brand loyalty with a steady stream of revenue. A key strategy to improve customer engagement is to prescribe the right product to the right customer at the right time. This results not only in higher customer engagement but also ensures a better experience. This marketing strategy of next best offer is a widely sought after problem and there are many analytics solutions currently available. Data analytics play a key role in identifying and deploying these opportunities.

Next best offer strategies can be deployed in multiple ways:

- Business rules that can suggest new products based on customer data of transaction and relationship history. For example, someone who has taken a student loan should be sold a vehicle loan in five years, based on event based business rules.

- Predictive analytics based approach which analyzes historical transaction data. For example, market basket analysis where if most customers buy fries with burgers, it is highly likely that the customer who will buy a burger will also buy fries.

RECOMMENDER SYSTEMS
Another set of techniques is to understand the customer’s likes, dislikes and preferences using a recommendation system. Recommender systems are being used by an ever-increasing number of e-commerce sites to help consumers find products to purchase. What started off as a novelty has turned into a serious business tool. Recommender systems use product knowledge—either hand-coded knowledge provided by experts or “mined” knowledge learned from the behavior of consumers—to assist customers through the often-overwhelming task of locating products they would gravitate towards. They represent a powerful method of enabling users to filter through loads of information and large product spaces, and thereby convert random browsers into loyal buyers.

COLLABORATIVE FILTERING
One approach to the design of recommender systems is collaborative filtering, which has been highly successfully in e-commerce. It is a popular recommendation algorithm that bases its predictions and recommendations on the ratings or behavior of other users in the system. A distinct advantage of the collaborative filtering approach is that it does not rely on machine analyzable content and therefore it is able to accurately recommend complex items such as movies without requiring an “understanding” of the item itself.
This article focuses on highlighting the applicability of collaborative filtering across multiple industries by customizing it according to the needs and constraints of specific industries.

**COLLABORATIVE FILTERING-BASED RECOMMENDATION SYSTEMS FOR NEXT BEST OFFER**

Collaborative filtering works on a basic assumption that users with similar preferences will respond in a similar manner to items available where:

- Users are existing customers for a business
- Items are products or services offered like online groceries items, online subscription based content, Direct-To-Home (DTH) entertainment packages, voice and non-voice based telecommunication services
- Preference or attitude of users towards items is captured in different ways like purchase history, rating history, subscription history etc.

Collaborative filtering techniques use these available user-item response points to predict missing user-item responses. So, in any collaborative filtering model, the two most critical components are:

- Preference function \(f_1\) which acts as input for machine learning
- Similarity function \(f_2\) which is used to predict responses for missing combinations

**APPLICATION AND PREFERENCE**

Collaborative filtering is a preferred approach over standard business rule based approaches and classification techniques under the following circumstances:

- Customer demographic information which indicates taste and preferences is not readily available or accuracy of captured information is not certain for the majority of the customer base
- Information is available for user (customer) and item (products or services) preferences
- Business need for analytical insight is beyond standard apriori based deliverables
- Handling of customer life cycle behavioral attributes like disconnection, downgrade etc. for better ROI from next best recommendation

Hence, even though the use of collaborative filtering for next best offer started with e-commerce and online businesses, due to the above points, it has found its relevance in multiple industries by customizing the response function and similarity function as per their business needs. Some industries where standard collaborative filtering algorithm have been successfully customized and implemented include media, entertainment and the telecommunication industry.

**APPROACH AND METHODOLOGY CONSIDERATIONS**

There are multiple approaches to collaborative filtering which primarily include user-based collaborative filtering and item-based collaborative filtering. Some key considerations while building a collaborative filtering based analytical next best recommendation solution include:

**MODEL SELECTION:** Applicability of specific collaborative filtering technique depends on multiple factors including user-item data richness, ease of deployment, accuracy, scalability and computation performance. Due diligence should be done while selecting the appropriate model based on the factors mentioned as per business need and preferences.

**PREFERENCE FUNCTION GENERATION:** The generation of preference function is dependent on the dynamic of customer lifecycle analysis in a specific business environment. A customer response may be:

- Time-independent static preference or
- Time dependent dynamic preference

For example, in a sales based e-commerce model, a product purchase is an absolute preference for a user-item combination, where once a product is purchased, it is purchased forever.

*continued...*
However, in a subscription driven business model, a subscription which is purchased at a specific month can be discarded next month and can again be purchased in subsequent months. Hence, customer preference is a time dependent dynamic function. It is also important to identify the preference mechanism which will predict customer propensity—that is, whether it is a probabilistic function highlighting probability of purchase or a hold score function highlighting product subscription interest as holding period or something else.

**SIMILARITY FUNCTION CONSIDERATIONS:** Similarity function should ensure that all the relevant and critical dimensions of user similarity have been considered. For example, in a telecommunication business, three customers may have an inclination to buy the same product or service. However, the first customer may be a loyal customer without any frequent product or service downgrades, whereas the second customer may have a tendency to frequently downgrade offered products, while the third customer may have a frequent disconnection behavior. So, in such a scenario, the similarity function should be good enough to take care of not only product type consumption similarity but also disconnection, reconnection, product upgrade and downgrade behavior similarities.

**COMPUTATION COMPLEXITY:** Computational complexity is a key factor in terms of overall approach since collaborative filtering algorithms can be computationally exhaustive based on the user and product base.

This becomes more relevant for real time business deployment versus an offline deployment with periodic updates. There are multiple approaches to deal with computation complexity. Some of them include:

- Selection of lesser computationally intensive collaborative filtering techniques
- Improvement of computational performance through accuracy trade-off
- Improvement of computational power through additional hardware resources
- Use of domain knowledge and business rules to simplify computational complexity

**OPERATIONALIZING ANALYTICS OUTPUT INTO ACTIONABLE INSIGHTS**

There are two ways in which collaborative filtering based analytical output can be deployed. Based on industry and product offerings, deployments can be either customer based or product based.

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“**RECOMMENDER SYSTEMS REPRESENT A POWERFUL METHOD FOR ENABLING USERS TO FILTER THROUGH LARGE INFORMATION AND PRODUCT SPACES, AND THEREBY CONVERT BROWSERS INTO BUYERS.**”

In a customer based deployment, a top-n recommendation methodology is followed where each customer is offered 1st best or 2nd best or nth best product for consumption.

*continued...*
However, irrespective of marketing deployment methodology, a collaborative filtering based analytical output can be deployed for operationalizing analytics.

CONCLUSION
We are at a juncture where the hardware maturity can support the aspirations of algorithms and frameworks. With companies such as Google open sourcing their machine learning systems, it is certainly the right time to start thinking about embedding analytics in business processes for decision making. Productization of Analytics is the Holy Grail that will help us reach the last mile!

"BUSINESSES BENEFIT FROM REVENUE UPLIFT, REDUCTION IN MARKETING COST THROUGH TARGETED CAMPAIGNS AND OPTIMUM UTILIZATION OF RESOURCES LEADING TO HIGHER ROI"
ONLINE AT IMARTICUS

Imarticus Learning offers short-term, online programmes that provide your employees with a thorough understanding of products, processes and operations as applicable to the Analytics industry.

These programmes provide you with valuable training options to add to your calendar for diverse training requirements, such as supplementing your classroom trainings, onboarding new employees or as periodic ready refreshers.

KEY FEATURES

- **INDUSTRY RELEVANT CURRICULUM**
- **INSTRUCTOR LED DELIVERY**
- **EXPERIENTIAL LEARNING**
- **FLEXIBLE AND MODULAR**
- **INTEGRATED LEARNING MANAGEMENT SYSTEM (LMS)**

HIGHLIGHTS

- **COMPLEMENTARY OFFERINGS**
  - Free webinars by imminent industry experts on topics of current interest
  - Free introductory modules of our online programmes

- **DELIVERY**
  - Self paced videos
  - Live instructor-led virtual classes
  - Case study methodology
  - Accessible on multiple platforms

CERTIFICATION PREPARATION

Prepare your employees to clear prestigious national and international certifications by SAS Institute, etc.

PROGRAM OFFERINGS

<table>
<thead>
<tr>
<th>Certification</th>
<th>Duration</th>
<th>Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Programming (CISP)</td>
<td>50 Hours</td>
<td>SAS Programs and Functions, Macros, SQL Tables, Views, Joins, Program Efficiency and Optimization</td>
</tr>
<tr>
<td>R Programming (CIRP)</td>
<td>46 Hours</td>
<td>Writing Functions, Data Manipulation, Statistical Concepts, Predictive, Text and Multivariate Analytics</td>
</tr>
<tr>
<td>Python (CIP)</td>
<td>40 Hours</td>
<td>Statistics using Python, Predictive, Text and Multivariate Analytics, Optimization, Forecasting</td>
</tr>
<tr>
<td>Data Visualization (CIDV)</td>
<td>40 Hours</td>
<td>Need for Data Visualization, Data Visualization Best Practices, Types of Visual Tools, Visual Storytelling with Data</td>
</tr>
</tbody>
</table>
The sweeping changes in the corporate world consequent to liberalization, privatization and globalization, the convergence of technologies and the growth of the Internet have unleashed competition both in the domestic and international markets.

With an ever-changing, increasingly connected and competitive world, business managers need to constantly update their knowledge and professional capabilities in all areas affecting their business and career.

Our Management Development Programmes prepare your employees to become better leaders as well as more valuable contributors to your broader institutional goals. They act as catalysts for fresh thinking, re-training, knowledge enhancement and strategic development.

WHO ARE THEY FOR?
These workshops are ideal stepping stones for Mid to Senior Level Management and your high potential employees.

OUR OFFERINGS

CORPORATE WORKSHOPS
- Bespoke programmes that are customized to your requirements
- Open only to members of a particular organization
- Duration: 1-5 Days

OPEN WORKSHOPS
- Expert faculties identify topics of contemporary interest
- Open to participation across different industries
- Duration: 2 Days

LEARNING METHODOLOGY
The workshops focus on the practical realities of the market, rather than taking an excessively academic or theoretical approach, and will blend discussions with case studies and assignments.

AREAS OF EXPERTISE
- Big Data
- Customer Engagement Using Analytics
- Analytics in Financial Services
- Fraud Analytics
- HR Analytics
- Social Media Analytics
- Supply Chain Management
This 2-day workshop is designed to deliver a deep, practical understanding of operational risk management frameworks and measurement methodologies in financial institutions.

Participants will be better prepared to implement meaningful risk assessment initiatives, produce useful risk management information and understand basic modeling techniques for operational risk measurement.

LEARNING OUTCOMES

- Design and implement an effective operational risk management platform
- Execute an operational risk assessment and measurement program
- Understand how to capture, report and investigate operational risk events, how to produce meaningful Risk MI including KRI data and trend analysis, and how to implement operational risk appetite
- Apply the best practice models and methodologies for operational risk management

WHO SHOULD ATTEND?

Senior Managers in organizations, in particular Operational Risk, Financial Control, Operations, Technology, Compliance, Audit and Legal Officers

EXPERT PROFILE

DR. RANJAN CHAKRAVARTY

- 22 years of global experience in risk management
- Ex–Managing Director at Hypovereinsbank, DBS Bank, Singapore, and Head of Risk, Research and Products for MCX-SX
- A specialist in risk management at Bankers Trust New York (now Deutsche Bank), BankBoston (now Bank of America Merrill Lynch) and GE Capital in the US
- Pioneer in Basel II and III implementation
- An alumni of Columbia Business School

LOGISTICS

WHEN: 21st and 22nd January, 2016; 9 AM to 6 PM
WHERE: JW Marriott Sahar, Andheri East, Mumbai
EMAIL: mdp@imarticus.com
Disrupt Yourself: Putting the Power of Disruptive Innovation to Work - Whitney Johnson

Johnson, a Merrill Lynch equity analyst turned entrepreneur, shows how and why to upend a career in this practical, concise book. Savvy and often counter-intuitive, this book offers the tools, mind-set guidance, and rationale for avoiding complacency and embracing a new career path. Consider this your playbook for personal and professional innovation. Are you ready to jump?

Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization - Olivier Blanchard

The social media code has officially been cracked! In Social Media ROI, Blanchard reveals how companies can apply the massive power of social media to achieve equally massive results. Incredibly practical, yet very enjoyable, this book offers a clear roadmap to growing your revenue in the dizzying world of tweets and retweets, likes and shares, connections and comments by measuring your FRY (Frequency, Reach, and Yield).

Big Data Revolution: What Farmers, Doctors And Insurance Agents Teach Us About Discovering Big Data Patterns - Rob Thomas and Patrick McSharry

In this collaborative work by IBM Vice President of Big Data Products and an Oxford Research Fellow, this book describes the major trends emerging in the field, the pitfalls and triumphs being experienced, and the many considerations surrounding Big Data, all while guiding readers toward better decision making from the perspective of a data scientist.

Good to Great: Why Some Companies Make the Leap... And Others Don't - Jim Collins

Good to Great introduces readers to the concept of an enduring great company, one that sustains tremendous growth for at least 15 years from the so called “turning point”. Published in 2001, the book offers a well-reasoned road map to excellence for any organization and gives a great opportunity to analyze how much endurance there is in a great enduring company.

The Book of Awakening: Having the Life You Want By Being Present in the Life You Have - Mark Nepo

A daily guide for authentic living in hard times, The Book of Awakening is a beautiful and poetic book to keep your head high, your heart open and your feet on the ground. A year’s supply of wise and shining thoughts to be taken, one a day, like vitamins for the soul. Highly recommended by Oprah Winfrey and one of her Ultimate Favourite Things.
Imarticus Learning is formed to bridge the gap between Academia and the industry. The firm provides a range of Corporate Solutions designed to assist firms in meeting their skillset requirements.

Headquartered in Mumbai, Imarticus has delivery capabilities across India with dedicated centres at Mumbai, Bangalore, Chennai, and satellite centres at Pune and Jaipur.

**HIGHLIGHTS**

- Training and content delivery capability, across the areas of Investment Banking, Finance & Treasury, Capital Markets Operations, Business Analytics, Technology and Consulting.
- Preferred sourcing and corporate training delivery partner for leading Global Banks, Consulting, KPO, Technology and Analytics firms.
- Range of customized delivery methods such as instructor led training, e-learning, workshops and seminars for optimal training effectiveness.

**CONTACT US**

We have recently revamped our website to cater better to your requirements.
Please visit us at: [www.imarticus.org/corporate](http://www.imarticus.org/corporate)

**AGILE HIRING**

Ready Placements at No Cost

**SOURCING TO PLACEMENT**

2-3 month programs targeted towards onboarding

**TEMPING**

6-9 month resource staffing in Investment Banking Operations

**CORPORATE TRAINING**

2-10 day programs targeted towards employee skill development

EMAIL US: corporaterelations@imarticus.com
Every morning in Africa, a Gazelle wakes up. It knows it must run faster than the fastest Lion or it will get killed.

Every morning, a Lion wakes up. It knows it must outrun the slowest Gazelle or it will starve to death.

“ When the sun comes up, You’d better be running. ”