Lean A.I as automation.

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Abstract
Lean A.I is a data mining algorithm that implements the Referendum Algorithms for polls and blog data lakes, to implement the Lean process in an organization. This paper discusses the Referendum Algorithms and its application to the automated implementation of Lean methodology.

Keywords: Lean Methodology, Lean in Agile, Lean Automation, Referendum Algorithm, Data Mining.

Introduction.

Lean Thinking.

(Contributors to Wikimedia projects 2005) Lean thinking is a business methodology that aims to provide a new way to think about how to organize human activities to deliver more benefits to society and value to individuals while eliminating waste.

The aim of lean thinking is to create a lean enterprise, one that sustains growth by aligning customer satisfaction with employee satisfaction, and that offers innovative products or services profitably while minimizing unnecessary over-costs to customers, suppliers and the environment.

The basic insight of lean thinking is that if you train every person to identify wasted time and effort in their own job and to better work together to improve processes by eliminating such waste, the resulting enterprise will deliver more value at less expense while developing every employee's confidence, competence and ability to work with others.

Lean thinking as such is a movement of practitioners and writers who experiment and learn in different industries and conditions, to lean think any new activity.

Pull is the basic technique to "Lean" the company and, by and large, without pull there is no lean thinking.

Seeking perfection through kaizen:(50MINUTES.COM 2015; Topolsky, n.d., n.d., [b] 2017, [a] 2017; “Continuous Improvement with Kaizen Teams” 2010; Topolsky, n.d.; Hakutsuru and Ueda 2017; Maurer 2012) The old time sensei used to teach that the aim of lean thinking was not to apply lean tools to every process, but to develop the kaizen spirit in every employee.

The lean community is now a generation strong and has many great examples to offer to any lean learner, whether beginner or experienced.

Lean thinking is thinking together and no employee should be left alone with a problem.

On teaches lean thinking in highlighting the immediate barriers to the lean goal of zero defect at every step of the process at all time.

Standardized Work: Lean thinking is about seeking the smoothest flow in anywork, in order to see problems one by one and resolve them one by one, thus improving both the flow of work and the autonomy of the person.

Standardized work teaches lean thinking by visualizing every obstacle to smooth work each person encounters and highlighting topics for kaizen.

Visualization teaches lean thinking by getting people to work together on their own problems and develop their responsibility to reaching objectives without overburden.

There are two controversies surrounding the word "Lean," one concerning the image of lean with the general public and the other within the lean movement itself.

Lean thinking very clearly states that it seeks cost reductions - finding the policy origins of unnecessary costs and eliminating at the cause - and not costcutting - forcing people to work within reduced budgets and degraded conditions in order to achieve line by line cost advantage.

A second ongoing controversy, within the lean community itself, concerns how closely lean thinkers should follow Toyota practices.

This debate is thus vital for the lean movement as confronting Toyota practices, such as they are here and there, to other environments is the starting point of lean thinking.

In this respect, "How much like Toyota thinking should lean thinking be?" is a question without an answer that merits constant, case by case consideration.

Individual customers rather than market segments: Without denying the need to think in terms of segments, lean thinking is about taking seriously every single customer complaint and opinion of the product or service, as a fact.

By contrast, lean thinking is taught to managers so that they help their own direct reports to think lean and reduce overburden, unneeded variation and activity waste by working more closely with their teams and across functional boundaries.

Lean thinking at senior level creates leaner enterprises because sales increase through customer satisfaction with higher quality products or services, because cash improve as flexibility reduces the need for inventories or backlogs, because costs reduce through identifying costly policies that create waste at value-adding level, and because capital expenditure is less needed as people themselves invent smarter, leaner processes to flow work continuously at takt time without waste.

Lean and green.

(Contributors to Wikimedia projects 2005)
The import of lean thinking goes way beyond improving business profitability.

In their seminal book Natural Capitalism(Hawken 2013; Lovins and Hunter Lovins, n.d.; Hunter Lovins, Lovins, and Hawken 2007; Hawken et al. 1999), authors Paul Hawken, Amory Lovins and L. Hunter Lovins explicitly reference lean thinking as a way to sustain growth without so much collateral damage for the environment.

Lean thinking's approach to seek to eliminate waste in the form of muri, mura and muda is a proven practical way to attack complex problems piece by piece through concrete action.

Toyota industrial sites are well known for their sustainability efforts and wellahead of the "Zero landfill" goal - all waste recycled within the site.

Practicing lean thinking offers a radically new way to look at traditional goods and service production to learn how to sustain the same benefits at a much lower cost, financially and environmentally.

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The Referendum Algorithm
The referendum algorithm is a basket of data mining tools operating on a data lake of poll data and blog data. These tools can consist of both statistical and deterministic text mining tools[2](“Website” n.d.). These form the basis for a decision support system.
The philosophy is of the involvement of the local community in decision making on development in their neighbourhood, by the collection of data of polls and blogs creating a data lake to be mined for e-governance. Considerable efficiency and simpler solutions can be mined, which leads to better profits, lean implementations and more sustainable solutions.
Koteshwara et. al discuss a text mining DSS for e-governance using clustering and association mining algorithms from a data lake[2].

Lean A.I
Lean A.I is the application of text mining and artificial intelligence to automatic decision making using a data lake of feedback from the workforce on Muda, Muri and Mara. Value

addition, pull processes and just in time concepts.

Various algorithms for text mining can be applied analogous to the referendum data mining system for the automation of decision processes.

The application of the Lean process, as a modification of the TPS to the administration of a non profit organisation The Mother Divine is discussed. So is the application to Software Development Management and the Agile SDLC.

This is also the inspiration for the “Vahi Ka Vahi” model of model of ecommerce(Bheemaiah 2019 in publication).

TMbDSS is used for Change Management of any part of the BPM KM.
A polling system is used for the change authorization, using text extraction techniques[] and the Occam’s Razor HDL to mine the simplest solution.
Usually Natural Law solutions for improvement of the BPM KM are given preference over technological solutions.

Mura.

Mura is a Japanese word meaning "Unevenness; irregularity; lack of uniformity; nonuniformity; inequality", and is a key concept in the Toyota Production System as one of the three types of waste.

Mura, in terms of business/process improvement, is avoided through Just-In-Time systems which are based on keeping little or no inventory.

These systems supply the production process with the right part, at the righttime, In the right amount, using first-in, first-out component flow.

Just-In-Time systems create a "Pull system" in which each sub-process withdraws its needs from the preceding sub-processes, and ultimately from an outside supplier.

This type of system is designed to maximize productivity by minimizing storage overhead.

Muri.

Muri (無理) is a Japanese word meaning "unreasonableness; impossible; beyond one's power; too difficult; by force; perforce; forcibly; compulsorily; excessiveness; immoderation",and is a key concept in the Toyota Production System (TPS) as one of the three types of waste (muda, mura, muri).
The same concept of Muri can be generalized to the SDLC or the BPM KM, TMbDSS can be used for the text extraction of feedback, in a tree data structure, for the automated analysis of Muri(McGovern 2018b; Lin and Hunter 2015; Eswaramoorthi et al. 2010), the propagation of this to BPM KM, can be controlled through change management and a poll, similar to the Mura technology.(Harrington and James Harrington 2017; “The Lean Six Sigma Guide to Doing More with Less” 2012; Davis 2009; Jackson and Woeste 2008; George and Tamilio 2015)

Muda.

Muda is a Japanese word meaning "Futility; uselessness; wastefulness", and is a key concept in lean process thinking, like the Toyota Production System as one of the three types of deviation from optimal allocation of resources.

One of the key steps in lean process and TPS is to identify which activities addvalue and which do not, then to progressively work to improve or eliminate them.(McGovern 2018a; Traeger 1994; "Lean Thinking, Muda, and the Four Ls" 2010; Chahal and Fayza 2016)

The longer a product sits in one of these states, the more it contributes to waste.

The smooth, continuous flow of work through each process ensures excess amounts of inventory are minimized.

In contrast to transportation, which refers to damage and transaction costs associated with moving the product, motion refers to the damage and costs inflicted on what creates the product.

Whenever the product is not in transportation or being processed, it is waiting.

Making more of a product than is required results in several forms of waste, typically caused by production in large batches.

Having to discard or rework a product due to earlier defective work or components results in additional cost and delays.

Henry Ford probably said it best when he noted, "You can think you can achieve something or you can think you can't and you will be right. Shigeo Shingo divides process related activity into Process and Operation. He distinguishes"Process", the course of material that is transformed into product, from "Operation" which are the actions performed on the material by workers and machines.

The plan is therefore to build a fast, flexible process where the immediate impact is to reduce waste and therefore costs.
Similar TMbDSS with change management by poll, can be used for waste reduction.
For the wastes in :

Transportation

"Every time a product is touched or moved unnecessarily there is a risk that it could be damaged, lost, delayed, etc. as well as being a cost for no added value. Transportation does not add value to the product, i.e. is not a transformation for which the consumer is willing to pay".(Achahchah, n.d., 2018; Pries and Quigley 2012; Myerson 2016; Vieira et al. 2012)

This is automated in BPM KM by optimization of the operating system controlling the SDLC processes in case of an SDLC implementation or in case of an organization's, BPM KM, change management by polling with text mining and operational optimization for DSS is recommended.(*The Promotion of BPM and Lean in the Health Sector: Main Results* 2018; Kemsley 2015; Komus 2011; Wiesler 2018; Höver and Mühlhäuser 2014; Anderson, Boulanger, and Johnson 2008; Kale 2016; Nanopoulos and Schmidt 2014)

Inventory[edit]

Whether in the form of raw materials, work-in-progress (WIP), or finished goods, represents a capital outlay that cannot yet produce an income. The longer a product sits in one of these states, the more it contributes to waste. The smooth, continuous flow of work through each process ensures excess amounts of inventory are minimized.

The operational optimization and contributions to change management for reduction of wastage by reducing inventory is as previously described.

Motion[edit]

In contrast to transportation, which refers to damage and transaction costs associated with moving the product, motion refers to the damage and costs inflicted on what creates the product. This can include wear and tear for equipment, repetitive strain injuries for workers, or unnecessary downtime.

This process involves the explicit feedback on the transition from solutions with moving parts, to static technology solutions with the same TMbDSS solutions as discussed previously. Downtime is also decreased by the transition to static technologies

Risk management solutions to lower risk are also managed similarly.

Waiting[edit]

Whenever the product is not in transportation or being processed, it is waiting (typically in a queue). In traditional processes, a large part of an individual product's life is spent waiting to be worked on.

Similar to the processes previously described.

Over-production[edit]

Making more of a product than is required results in several forms of waste, typically caused by production in large batches. The customer's needs often change over the time it takes to produce a larger batch. Over-production has been described as the worst kind of waste.[8]

This waste has been completely eliminated by on demand 3D printing.

Over-processing[edit]

Doing more to a product than is required by the end-customer results in it taking longer and costing more to produce. This also includes using components that are more precise, complex, expensive or higher quality than absolutely required.[*citation needed*]

Also eliminated by 3D printing.

Defects[edit]

Having to discard or rework a product due to earlier defective work or components results in additional cost and delays.

Improve SDLC efficiency, 3D printing process and BPM KM by processes similar to processes described previously.

Unused Resources.

Confusion[edit]

Main article: Confusion

General uncertainty about the right thing to do, or absence of documented procedures and operating statements.

TMbDSS to add(Holmemo, -Q. Holmemo, and Ingvaldsen 2018)

Self-doubt[edit]

Writer Jim Womack described "thinking you can't" as the worst form of waste, quoting Henry Ford's aphorism:

> ***Henry Ford probably said it best when he noted, "You can think you can achieve something or you can think you can't and you will be right.***[10]

Conclusion:

We have thus described data mining algorithms with decision trees for data lake mining and decision support in Lean A.I to implement the Vahi Ka Vahi model, in future work we explore other decision tree models and extensions of data mining from text centric mining to a plethora of code, legacy code, ontologies, scientific paper, mathematics and media.

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