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Implementation of Intelligent System for reducing the time and stress of a potential organization using a collaborated wireless intelligent system

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***Abstract*— The world is movingvery fast! The technology landscape is evolving in line with the demand and fast track lifestyle of people thinking comfortable solution which saves time to generate value in life. Business wants solution which can generate result – Intelligent system is the latest technology in the block which organization is opting to implement. This effective technology is widely used in the developed world with many features. Most of the organizations using IS to analyze, understand and react – using the multiple source of large data. Usage of IS potentially saves a lot of resources for an organization and can free up cost. Intelligence system is a double-edged sword. Although there are some who believes IS will improve problems and ultimately create a better society for human beings to live in, many still fear that IS might take over. As a result, some of the current jobs will vanish from earth due to widespread use of IS. Effective utilization of algorithm and creative mindset is concentrating the world in a center point. At the same time, world is progressing to a stage where IS will run the show in near future. Organization is heavily researching the how to make better use of IS – to take competitive advantage and grab the potential future enablers to sustain growth and prosperity.**

***Index Terms*—Intelligent System, IS, POS, IT.**

I. INTRODUCTION

An intelligent system is a machine with an embedded, Internet-connected computer that has the capacity to gather and analyze data and communicate with other systems. Other criteria for intelligent systems include the capacity to learn from experience, security, connectivity, the ability to adapt according to current data and the capacity for remote monitoring and management.

In IT, a system is classified as a collection of connected elements or components that are organized for a common purpose. As such, although they are naturally spoken of in terms of devices, intelligent systems include not just intelligent devices but also interconnected collections of such devices, including networks and other types of larger systems. Similarly, intelligent systems can also include sophisticated AI-based software systems, such as chatbots, expert systems and other types of software.

Essentially, an intelligent device is anything that contains a functional, although not usually general-purpose, computer with Internet connectivity. An embedded system may be powerful and capable of complex processing and data analysis, but it is usually specialized for tasks relevant to the host machine.

Intelligent systems exist all around us in point-of-sale (POS) terminals, digital televisions, traffic lights, smart meters, automobiles, digital signage and airplane controls, among a great number of other possibilities. Built-in intelligence is an integral component of the developing internet of things (IoT), in which almost everything imaginable can be provided with unique identifiers and the ability to automatically transfer data over a network without requiring human-to-human or human-to-computer interaction.

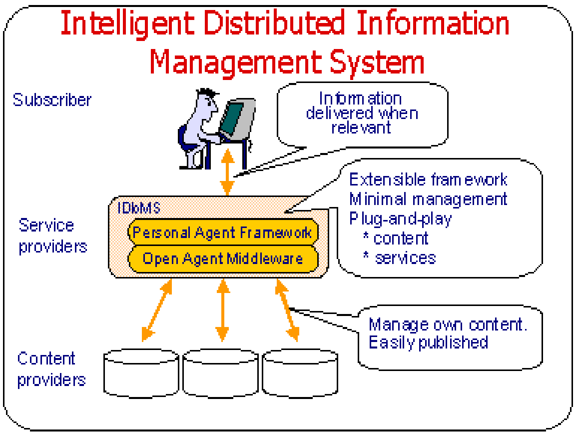

Figure 1: Intelligent Distributed Information Management System

II. ORGANIZATION MODELING

The purpose of organization modeling is to provide the information base upon which intelligent processes rely. We can say that an "Intelligent Management System" will require at least as much information as humans need. The quality and variety of this information cannot be found in the databases of current management information systems. Nor is the form of the organization model related to current notions of database structures. For example, a simulation system requires knowledge of existing processes including process times, resource requirements, and its structural (routing) relation to other processes. It must also know when routings for products are static, or are determined by a decision process such as a scheduler. In the latter case, it also should know when and where to integrate the scheduler into the simulation. If IMS wants to generate the sequence of events to produce a new product, it must have knowledge of processes (e.g., machines) which includes the type of processing it can do, its operating

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constraints, the resources it consumes, and its operating tolerances. If data is to be changed in an interactive, possibly natural language mode, IMS must have knowledge of generic processes such as machines, tasks, and departments if it is to understand the interaction. It must also know the importance of information and how it relates to other information in order to detect missing information and inconsistencies. Hence, the organizational model must be able to represent object and process descriptions and functional, communication and authority interactions and dependencies. It must represent individual machines, tools, materials, and people.

III. ORGANIZATIONAL INTELLIGENCE

Organizational Intelligence (OI) is the capability of an organization to understand and conclude knowledge relevant to its business purpose. In other words, it is the intellectual capacity of the entire organization. With relevant organizational intelligence comes great potential value for companies and therefore organizations find study where their strengths and weaknesses lie in responding to change and complexity. Organizational Intelligence embraces both knowledge management and organizational learning, as it is the application of knowledge management concepts to a business environment, additionally including learning mechanisms, knowledge models and business value network models, such as the balanced scorecard concept. Organizational Intelligence consists of the ability to understand complex situations and act effectively, to understand and act upon relevant events and signals in the environment. It also includes the ability to develop, share and use knowledge relevant to its business purpose as well as the ability to reflect and learn from experience.

While organizations in the past have been viewed as collations of tasks, products, employees, profit centers and processes, today they are intelligent systems that are designed to manage knowledge. Scholars have shown that organizations engage in learning processes using tacit forms of in-built knowledge, hard data stored in computer networks and information gleaned from the environment, all of which are used to make practical decisions. Because this complex process involves large numbers of people relating with diverse information systems, organizational intelligence is more than the aggregate intelligence of organizational members; it is the intelligence of the organization itself as a larger system.

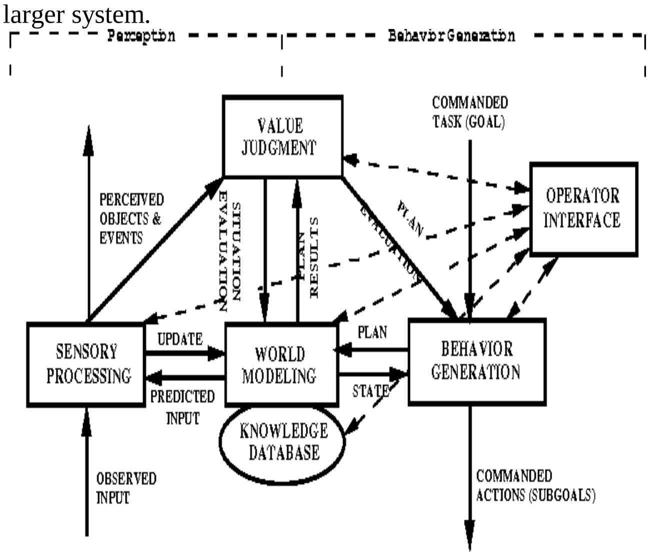

Figure 2: Organizational Intelligence

IV. INTERACTION WITH THE EMBEDDED SYSTEM:

An embedded system is a computer systemdesigned to perform a dedicated or narrow range of functions with a minimaluser intervention. An intelligent system is a system that is able to react appropriatelyto changing situations without user input. Main challenges for intelligent solutions in embedded systems drive from reliability and real-time requirements and fromconstraints on cost, size, and power consumption.Possible intelligent methods for embedded systems are biologically inspired, such asneural networks and genetic algorithms. Multi-agent systems are also prospectivefor an application for non-time critical services of embedded systems. Another fieldis soft computing which allows a sophisticated modeling of inexact (sensory) data.Finally, since embedded systems often provide critical services, there is need forintelligent validation techniques that assist the developer in evaluating if the systemis fit for its purpose.

Designing embedded systems is quite different from desktop programming. Desktop programmers are able to use standard environments with almost unlimited (virtual) memory
as well as a good monitoring and debugging interface. In contrast, an embedded programmer
has to reject such comfort. Embedded systems should run on spare resources, thusshould require low power, little program and working memory, be small in size, and oftenshould guarantee real-time behavior or be resistant against failures. Many embedded applicationshave been implemented as "dumb" programs, consisting only of a few lines ofcode. However, the embedded market calls for more extensive and smarter applications,for example, an electronic braking system of a car should be able to provide its service invarious extreme situations, e. g., the breakdown of a braking element of one wheel[1].Therefore, a new generation of intelligent embedded systems is necessary. Most algorithmsfor intelligent embedded systems already exist in the computer science communityHowever, a major problem for many intelligent solutions is that they come in the formof a complex system, which cannot be easily evaluated analytically – it is often difficultto check whether a system is fit for its purpose or not. This problem calls for intelligentvalidation methods like model checking.

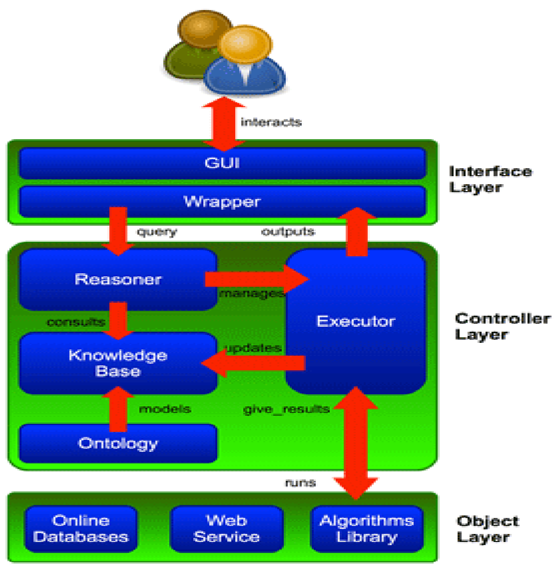

Figure 3: Information Hierarchy

V. CORPORATION WITH THE SENSOR DEVICES:

Current interest in smart sensor networks, development in technologies such as microelectronics, nanotechnology, communication networks and distributed computing, they have all contributed to the development of sensor systems. The purpose of a sensor system is to sense and measure certain quantities, and to use the information and knowledge obtained from the measured data, and any prior knowledge, to make intelligent, forward-looking decisions and start taking actions. Even the definition of what constitutes an intelligent sensor starts from a fundamental desire to get the best quality measurement data that forms the basis of any complex health monitoring and/or management system. If the sensors, i.e. the elements closest to the measure are unreliable then the whole system works with a tremendous handicap. Hence, there is a real need to distribute intelligence to the sensor level, and give it the ability to assess its own health thereby improving the confidence in the quality of the measured data.

Sensing is a significant component of complex and sophisticated systems of today's technology. Work in industry concentrated on sensors with built in expert systems and look-up tables. These sensors, called smart sensors, were described as simple sensing devices with built in intelligence. This intelligence included decision making capabilities, data processing, conflict resolution, communications or distribution of information.

The main challenge lies in the creation of a standard format of intelligent sensors such that they can provide the measurement as well as the measurement quality for all types of sensors. The key requirements of an advanced health monitoring system are that it should be able to detect damaging events, characterize the nature, extent and seriousness of the damage, and respond intelligently on whatever timescale is required, either to mitigate the effects of the damage or to effect its repair. Requirements serves to sub-divide the problem as follows: detection of damaging events, classification of the damage, prioritization of the seriousness of the damage, identification of the cause of the damage, formulation of the response and execution of the response. [2]

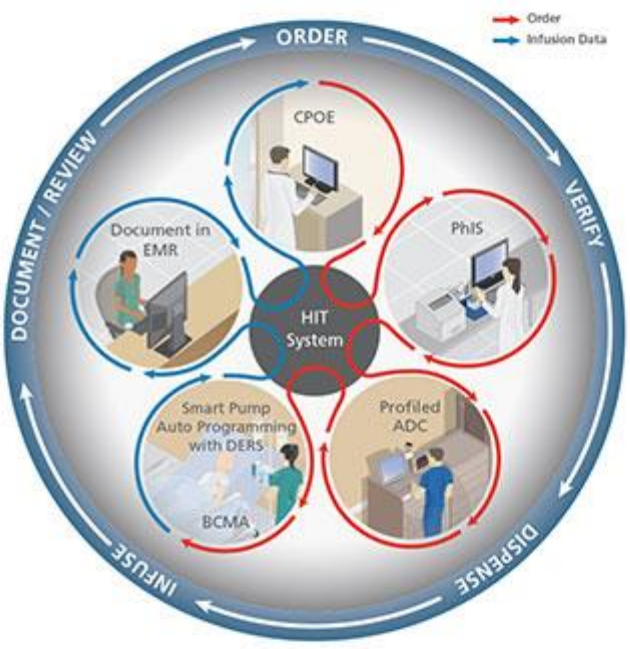

Figure 4: HCI Concept

VI. HUMAN COMPUTER INTERACTION COLLABORATION:

Human-computer interaction (HCI) is relatively young and broad research related section in Information Technology (IT) area, and currently has no finally settled definition. It includes the study of design, evaluation andimplementation of interactive computer systems intended for human use, as well as related aspects. TheEngineering processes in HCI is accompanied with the efforts to improve the quality of interaction with acomputer system, and first of all, improve the quality parameters of the user interface. According to the recommendations of experts at least 10% of total budget of software development project must be allocated to development of the usable interfaces with enough level of usability. The average improvement ofkey business indicators belongs to the market of webapplications which occupies about 83% of the softwaredevelopment market. This fact gives us evidence ofsignificant economic efficiency of interactive softwaresystems based on web-applications development.However, not all projects related to software developmentare implemented by using the practical and effectiveinteraction design methods. As a result, the value of thebenchmark as the percentage of successful completedtasks for web applications is no more than 81% andfor certain categories of users it is 1.5-2 times lower.Use of such type of intelligent system may reduce the requirements for qualification of engineers, for time andbudget spending, decrease number of errors and improve the quality of interaction for all users[4].

VII. DISTRIBUTE THE INTELLIGENT SENSOR TO AN ORGANIZATION:

Intelligent sensors and intelligent transducers in the existing systems, intelligence is still centralized, but the more the systems become decentralized the more the intelligence will be distributed, and as a result the more efficient and effective the systems will become. This will need what is called an intelligent sensor. A modern microprocessor- based intelligent sensor could be composed of a sensing element, a signal-processing part, and a microprocessor. If we combine a sensing elementwith a signal processor on a single chip then what we get is an intelligent sensor. Soon it will be possible to put an intelligent sensor on a microprocessor, but much local signal conditioning can be taken over via a microprocessor used in a system. Intelligent transducers are a result of recent developments in large scale integration (LSI) and very large-scale integration (VLSI) technology. Transducers can be integrated with signal-processing circuits on the same chip to perform active functions.

VIII. METHODOLOGY OF IS:

The four steps comprising methodology are shown in Figure 1. First, we createredundancy in the sensor readings. Next we use a time-series state prediction model topredict the expected value for each variable. The sensor readings and the redundantestimates are compared to the values predicted by the state prediction model. We thenfuse the validated readings into a fused estimate and detect sensor failures by generatingresidue signals (i.e., differences between the sensor readings and the fused estimates) andmonitoring them for changes in their statistical properties.

A sensor reading validation cycle (i.e., steps carried out between two sampling points)consists of predicting the value of the variable being estimated, measuring, creatingredundanttimes, validating, fusing multiple estimates, and updating the value of thevariable being estimated. Abrupt sensor failures are detected through the validation gate (a region based on the expected distribution); incipient sensor failures are detected bymonitoring the sensor residues. The basis of this methodology is systematic use of thedirect measurements provided by the sensors, the redundant measurements, and theestimated predicted value from the prediction process. The simultaneous checking ofvalues of each variable with the cross-checking of estimates obtained from values fromsensors measuring dissimilar process variables (through redundancy creation as detailedin the following section) and with an adaptive prediction process combined through aKalman filter [8] (i.e., combining distributions) enables the method to detect multiple sensorfailures and detect and estimate bias and calibration errors. Changes in the statisticalproperties of the sensor residue are used to detect faults in the sensor. Since each sensorhas its own residue signal, simultaneous, multiple sensor failures can be detected. Themodular methodology is well suited to be integrated into probabilistic equipmentmonitoring and diagnostic systems particularly those using probabilistic belief networks[5].

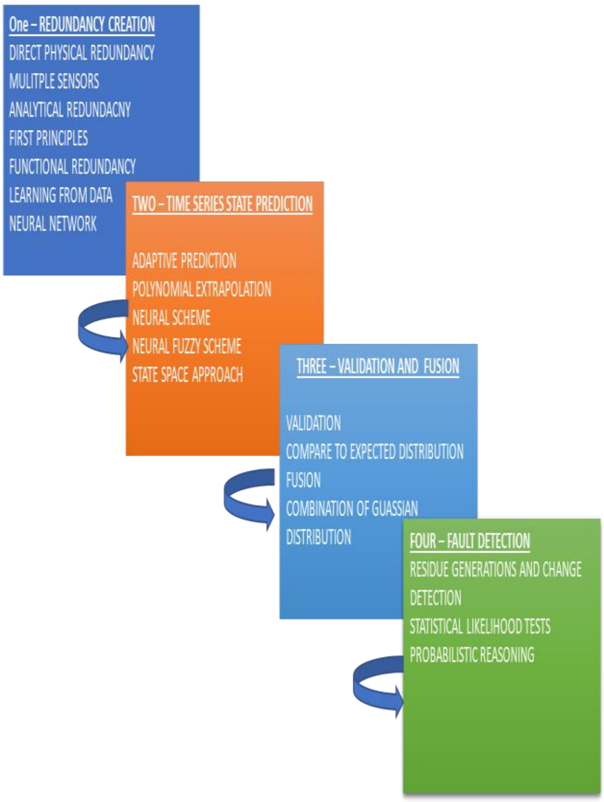

Figure 5: Flow chart representation of the four steps of the methodology along with tools

IX. COST EFFECTIVE OF ISS:

To elaborate cost effectiveness, we can talk about building management systemExplicit domain knowledge plays the key role for software units to execute relevant tasks autonomously, which in turn can ease the increasing complexity embedded in the like contemporary building management process. In many cases, the cost of multi-functional sensor networks is still high,and the sensor system deployment still requires special expertise, which hinders their wider adoption for the existing or new buildings. Together with a supporting multiagent software framework, the application described herein can provide real time and smart building monitoring through querying the modelled domain knowledge. The contribution of the developed sensor network lies in its compact assembly, easy deployment, and the intelligence provided by elaborating the explicit building domain knowledge through the use of autonomous software agents. The ongoing testing shows a promising building monitoring network with the original intentions to identify wasted energy consumption in buildings, and further suggest better usage of building spaces.

Buildings play a key role in supporting daily human activities, and in order to make buildings better for their purposes while still behaving in an environmentally friendly way, effective mechanisms are needed to better monitor buildings, understand building operations, and further make timely decisions. Contemporary buildings are becoming much more complex than ever before in terms of their involved components and functionalities, which normally include environmental concerns, such as lighting, heating, power, water and drainage, together with security and communication technologies. To cope with that level of complexity, deploying various types of sensors into buildings is a very effective way to collect real time environmental data in the first place. Conventional sensor networks for building monitoring lack smart means to exploit collected data to support relevant knowledge generationEffective management of a deployed sensor network to inform and assist in the decision-making process remains an important issue[3]. The underlying software system plays the keyrole in the process to achieve an efficient and intelligent sensor system. Overall all these IS initiatives generates savings and benefit for the organization.

X. IMPLEMENTATION OF IA:

Implementing intelligent automation (IA) is the logical next step for firms that are looking to make their automated processes "smarter."

XI. THE STEPS TO SUCCESS:

The first step in adopting IA is identifying those business cases that are most ripe for automation. As you look at your firm's business activities, ask the following questions about each of them to determine whether or not IA is the right choice:

- *What amount of time is spent on the activity?* If very little time is spent, automation might not be worth the investment.
- *How many steps or people are involved?* Firms should seek out the greatest opportunity for return on investment in terms of human and technical resources.
- *What systems already exist to perform some of these steps?* Are other efficiency-creating options that could yield a better return being overlooked?

For a system to be valued to any enterprise it must understand unique business needs. Therefore, once a good IS candidate has been identified, weneed to "teach" the system about specific business requirements.

For example, RPA virtual workers handle multiple data feeds from multiple sources and can schedule tasks to be performed in a certain order to improve particular processes. Advanced NLG systems leverage domain-specific ontologies to perform business-relevant analysis and express the output in language that is contextual to your firm and its audience. These criteria will be specific to your enterprise.

Finally—much like human workers—intelligent systems must be accountable for the results they produce. Systems should be able to "explain themselves" through transparent, traceable decision-making, which can track information all the way back to the original source. Firms will want to accurately assess:

- How much time is being saved
- The amount by which operational costs are being reduced
- How IA is leading to better outcomes
- What the organization is able to accomplish that wasn't possible before IA

XII. COMBINING HUMANS WITH MACHINES—THE IS CULTURE SHIFT

No one will dispute that automation is helping organizations save time and money. Increasingly firms and their employees are becoming more comfortable with automation in the workplace. But ISis a little different from previous automated solution repetitions.

IA systems work in partnership with humans. Humans must provide the machines with the reasoning steps necessary for transforming raw data into valuable and actionable insights. Therefore, effectively implementing IA depends in large part on how well humans and machines are able to work together at a higher level than they do through less sophisticated automation. That requires a bit of a culture shift. In this respect, the problem is largely on the humans in terms of embracing IA.

When the partnership works, there are numerous possibilities for applying IA to strengthen performance, increase revenue, and please customers.

XIII. SMOOTHING THE PATH TO IA BUSINESS PROCESS TRANSFORMATION

Three Suggestions for helping smooth the path to creating successful partnerships between humans and machines, and incorporating IA as a valuable part of your firm's operations:

1. Start with a use case that the business views as a clear winner to establish an immediate success, then build on that success.
2. Make sure to assemble the right team, composed of both business subject matter specialists and technologists. The improvement to the business process must occur. Don't make the mistake of simply further automating an existing process without improving it.
3. Begin the design process with the end state in mind by creating a reverse timeline. Make the starting point achieving the desired business value, then work your way backward to implementation [6].

XIV. DRAWBACKS AND FUTURE TARGET:

Intelligence system is a double-edged sword. Although there are some who believe IS will improve problems and ultimately create a better society for human beings to live in, many still fear that IS might take over. Some experts predict that AI will rapidly evolve to the extent that humans will no longer have control over it

Nowadays, people fear that machines will eventually replace them, leaving them with only a few choices in the job market, and thus leading to high unemployment rates. Whether or not machines will completely replace human beings still remains a mystery, but recent technological improvements have already shown that it is not something that we can simply disregard. The nature of work is changing. IS has become smarter and faster enough to calculate at the speed of light.

The rapid advancement in IS is causing a significant degree of anxiety. Many worry that IS will further exacerbate inequality and increase rates of poverty since automation is constantly reducing the general demand for labor and decreasing employment in various sectors.

In addition to triggering a significant change in the job market, IS systems utilizing big data analysis (ex. a smart navigation system to avoid traffic jams) are infringing upon the rights to privacy of individuals. With or without one's knowledge, large amounts of personal data are being collected. Advanced technology is providing big corporations the capacity to get hold of mass data that can be exploited for their own benefits. Some argue that the development of these weapons is a severe breach of international humanitarian law, threatening the right to life as well as the principle of human dignity.

The real concern here is the algorithmic bias embedded into machines. This is especially critical for those utilized in the field of medicine and law that require high levels of objectivity. Bias within systems regarding artificial intelligence can reinforce discrimination, such as displaying a tendency to advertise higher paying jobs to men, ultimately exacerbating gender inequality[7].

REFERENCES:

[1] WilfriedElmenreich: Intelligent Methods for Embedded Systems.
[2] Ajay Mahajan1, Christopher Oesch2, Haricharan Padmanaban2, Lucas Utterback2, Sanjeevi Chitikeshi2, Fernando Figueroa. Physical and Virtual Intelligent Sensors for Integrated Health Management Systems.
[3] Michael Dibley, Haijiang Li, YacineRezgui and John Miles. COST EFFECTIVE AND SCALABLE SENSOR NETWORK FOR INTELLIGENT BUILDING MONITORING, ICIC International c 2012 ISSN 1349-4198.
[4]M. N. Sheriyev , B. Atymtayeva, I. K. Beissembetov and B. K. Kenzhaliyev. Intelligence System for Supporting Human-Computer Interaction Engineering Processes.
[5] SatnamAlag . A Methodology for Intelligent Sensor Measurement, Validation, Fusion, and Fault Detection for Equipment Monitoring and Diagnostics.
[6]Tommy Marshall in Accenture: Taking the leap: identifying, implementing, and measuring intelligent automation performance, Posted on 9 January 2018.
[7] YeonSeoKoh: The Drawbacks of Artificial Intelligence.*https://yonseiuicscribe.com/the-drawbacks-of-artificial-intelligence.*
[8]Tony Lacey.Tutorial: The Kalman Filter.

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