AUTOPIA: DELTA OR DELUSION?

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THE STRUCTURE OF MY PRESENTATION

1) THE CONFLICT WE ARE NOW IN

2) HOW WELL DO HUMANS DRIVE ANYWAY?

3) FROM AUTOMATION TO AUTONOMY

4) A GLIMPSE OF OUR FUTURE
THE CONFLICT WE ARE NOW IN
WITH APOLOGIES TO AN EX-PRESIDENT

FIVE SCORE AND SEVEN YEARS AGO, OUR FOREFATHERS BROUGHT FORTH UPON THIS CONTINENT, A NEW CREATION, CONCEIVED IN DETROIT, AND DEDICATED TO THE PROPOSITION THAT ALL MEN ARE CREATED MOBILE. NOW WE ARE ENGAGED IN A GREAT WAR, TO TEST WHETHER THAT VEHICLE, OR ANY VEHICLE SO CONCEIVED CAN LONG ENDURE. AND SO TODAY, WE HERE HIGHLY RESOLVE THAT THESE DRIVERS SHALL NOT HAVE TRAVELLED IN VAIN — THAT THESE CARS, UNDER THEIR CONTROL, SHALL HAVE A NEW BIRTH OF FREEDOM — AND THAT CONTROL OF THE VEHICLE, BY THE DRIVER, FOR THE PEOPLE, SHALL NOT PERISH FROM THIS EARTH.
Are Today’s Vehicles - Computers on Wheels?

Or, Car’s Driven by Super-Computers?
WHAT THEN IS AUTOPIA?

IT’S THE INTRINSIC PROMISE OF AN AUTOMATED UTOPIA

It Offers the Prospect of a Collision-Free Transport System.

But is Such a World Possible?

And are “Driverless” Cars the Way to Achieve It?
Let’s Grasp the Essence of the Problem

The Escape of the “Kinetic” Tiger


How well do Humans Drive Now?
As of today, human-controlled driving remains critical because it is:

i) A ‘Social’ Amenity of More than 100 Years in Duration.

ii) Perhaps the Most Daily Practiced of all Adult Skills.

iii) The Most Litigated of All Forms of Human Activity?

iv) The Last Great Bastion of “Apparent” Analog Control.

It is also the arena where most individuals will first interact directly with sophisticated robots.
And, Make no Mistake ...

Modern-Day Cars are Robots

Built by Robots
PRIMUM NON NOCERE

*(FIRST – DO NO HARM)*

To do no (Further) Harm ...

We have to index present Harm.

So, How well are people avoiding accidents?

How Many Non-Accidents Happen Per day?

The Psychological Problem of ‘Non-Events.’

No Distraction Problem Here then ...
CURRENT COLLISION RATES

Fatality Rates per 100 Million Annual VMTs

A Surge in Fatalities
Change in U.S. vehicle deaths over successive two-year periods.

Deaths decline with recessions (such as 2007-9) because driving declines.
Source: National Safety Council
To Comprehend Non-Collisions, We Might Use Physics

We might be able to use Boyle’s Law (and Maxwell’s Demon) to the question of Non-Collisions.

But in their essence, Collisions are a Human Problem

And Humans are Far from Perfect

Distracting “Thieves” of Attention Driving

Internal
- IVIS, GPS, & Maps
- Related Cognitive tasks

External
- Weather & Environment
- Roadway Design
- Roadway Lighting
- Other Drivers & Traffic

Related
- HandsFree Phone
- Driver Impairment
- Unrelated Cognitive Tasks
- HandHeld Phone
- Passengers
- Text Messaging
- Music
- Manipulating Objects
- Food and Beverage

Percentage of Studies

Vehicle
- Teenager
- Young
- Middle
- Older

Unrelated
- Work Zones & Roadside
- Billboards & Signs
FROM AUTOMATION TO AUTONOMY
“It should also actually introduce a lot more hours onto the machines, ... You don’t need lunch breaks, you don't need crib times or shift changes.” Tim Day (BHP)

“Now we see no plan to off-shoring anything to do with the Integrated Remote Operations Centre, ... we see it as a WA-led initiative.” Tony Ottaviano (BHP).
AUTOMATION AND ITS INSIDIOUS PENETRATION:
FIRST – AN ‘APPARENTLY’ NON-THREATENING EXAMPLE.
AN INVIDIAUS PENETRATION?

“Cows (either grazing in fields or housed in large sheds) decide for themselves when they want to be milked and form an orderly queue outside ... Some dairy parlours are now milking 24/7 without any human present.” (Private Eye).

Saki – :The Mappined Life.”

“Put that Light Out”
NHTSA Levels

A Description AND an Evolutionary Map

If you Build Vehicles where Drivers are Rarely Required to Respond …

They will Rarely Respond When Required.
NHTSA’s Hierarchy is Founded on …
The MABA-MABA List

**Machines Surpass Humans in the:**
- Speed
- Power
- Computation
- Replication
- Simultaneous operations
- Short term memory

- Ability to respond quickly to control signals, and to apply great force smoothly and precisely
- Ability to perform repetitive, routine tasks
- Ability to store information briefly and then to erase it completely
- Ability to reason deductively, including computational ability
- Ability to handle highly complex operations, i.e., to do many different things at once.

**Humans Surpass Machines in the:**
- Detection
- Perception
- Judgment
- Induction
- Improvisation
- Long term memory

- Ability to detect small amounts of visual or acoustic energy
- Ability to perceive patterns of light or sound
- Ability to improvise and use flexible procedures
- Ability to store very large amounts of information for long periods and to recall relevant facts at the appropriate time
- Ability to reason inductively
- Ability to exercise judgment

And Sheridan’s Description is founded on ...
Let's have a look... here.
<table>
<thead>
<tr>
<th>SAE level</th>
<th>Name</th>
<th>Narrative Definition</th>
<th>Execution of Steering and Acceleration/Deceleration</th>
<th>Monitoring of Driving Environment</th>
<th>Fallback Performance of Dynamic Driving Task</th>
<th>System Capability (Driving Modes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>the full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Human driver</td>
<td>n/a</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance</td>
<td>the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task</td>
<td>Human driver and system</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>2</td>
<td>Automation</td>
<td>the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task</td>
<td>System</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>3</td>
<td>Automated system (“system”) monitors the driving environment</td>
<td>the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene</td>
<td>System</td>
<td>System</td>
<td>Human driver</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>4</td>
<td>High Automation</td>
<td>the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene</td>
<td>System</td>
<td>System</td>
<td>System</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation</td>
<td>the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver</td>
<td>System</td>
<td>System</td>
<td>System</td>
<td>All driving modes</td>
</tr>
</tbody>
</table>
THE HANCOCK LIST

Driver Remains in Charge of Their Vehicle
Underlying Systemic Forms of Automation are Non-Polemic

Driver Remains Responsible
Outward Appearance Shows Some Degree of ‘Sharing’

Driver Relegated to Drudge
Constrained to Hours of ‘Vigilant’ Boredom

Driver Becomes the Servant
Automation Instructs the Human. Automation Often Gets Frustrated

Driver Becomes the Slave
Automation Punishes Dis-Obedience.

Disappearing Drivers
Automation Questions Need for Any Human Presence

What Driver?
Visions of Untrammelled Autopia Abound

Autopia Achieved
Transport of the Robots by the Robots for the Robots.

Humans Excluded

Current Automation
Vehicle Begins to Usurp Momentary Control

Human Forced to Watch and Worry

Automation Has all the Fun

L1 L2 L3 L4 L5 L6 L7
Let’s Glimpse our Future
UPON INTRODUCING NEW TECHNOLOGIES

Source: Airbus, 2015, With Thanks to: Michael Feary.
ARE THERE THINGS WE DON’T WANT TO AUTOMATE?

- FAMILY
- RELATIONSHIPS
- LEISURE
- OTHERS?
“Cows (either grazing in fields or housed in large sheds) decide for themselves when they want to be milked and form an orderly queue outside ... Some dairy parlours are now milking 24/7 without any human present.”

“STUDENTS (either grazing in fields or housed in large sheds) decide for themselves when they want to be EDUCATED and form an orderly queue outside ... Some UNIVERSITIES are now INSTRUCTING 24/7 without any TEACHER present.”
Consider the comparable evolution of the aircraft pilot

Military

Hero

Civilian

Authority

Drudge

Pilots – Are They Are Becoming Extinct?

Or Simply Managers/Observers of Ever More Autonomous Systems.
Let's consider another "Skilled" profession.
THE ‘APPARENTLY’ INEVITABLE PROBLEM OF VIGILANCE


So it May not be as Much About HOW we Automate but Whether ...

We SHOULD Autonomize?

The Last Day of Operation of the World’s Busiest Telegraph Office
Automated systems are designed to accomplish a specific set of largely deterministic steps (often in a repeating pattern) in order to achieve one of a finite set of pre-defined goals.

Autonomous systems, in contrast, are generative; they learn and evolve through the input of operational and contextual information and thus their actions necessarily become more indeterminate across time.

What LIMITS do We set on AUTONOMY?

Precisely HOW and WHEN Do We Set Such Limits?

AUTOMATION: WHAT WE (HUMANS) USED TO DO OURSELVES

Elevator Operator

Doorman

We are not just taking away work here. We are taking away TELETIC activity. These guys actually ENJOY their Job!!

Don’t Some, or Even Many, Drivers ENJOY Driving?
Will There Be Persistent Problems of “Mixed Equipage?”

Always a Last Bastion for Petrol-Heads to Practice their Arcane Rites?
Driving has Often Been the first full expression of personal “Freedom” (Driving Solo) and its Last expression (Removing Keys from an Aging Parent).
The development needs to be a human-centered, not a techno-centered evolution.

Currently we are being driven by what is possible, not what is advisable.
In very early 1900's in Germany, George Edward Stanhope Molyneux Herbert had a near fatal car accident.

Today's Absurdity:
Are there benefits of motor-vehicle accidents?
WHAT THEN IS DELTA?

THE DESIGNED ELIMINATION OF TRAFFIC ACCIDENTS

DELTA: Makes a Difference
ALL Patterns we experience are ONLY Sensory-Cognitive APOPHENIA

"Life’s a jest and all things show it, I thought so once and now I know it."
(John Gay’s Epitaph).

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Thank You
“Can You Trust Your Robot?”

Domination is a Human NIGHTMARE, not a Machine DREAM

(A Part of our Flawed Propensity to Attribute ‘Agency’)

SURELY WE HAVE BOTH A MORAL AND A PRAGMATIC IMPERATIVE TO CONSIDER PURPOSE BEFORE PROCESS

Automation: how much is too much?

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The headlong rush to automate continues apace. The dominant question still remains whether we can automate, not whether we should automate. However, it is this latter question that is featured and considered explicitly here. The suggestion offered is that unlimited automation of all technical functions will eventually prove anathema to the fundamental quality of human life. Examples of tasks, pursuits and past-times that should potentially be excused from the automation imperative are discussed. This deliberation leads us back to the question of balance in the cooperation, coordination and potential conflict between humans and the machines they create.

Practitioner Summary: The reason for this work is to examine how much automation is too much. The investigational form is synthetic in nature. The major finding is – it depends? Each design decision of practitioners as to what to automate and when is, therefore, critical and fateful.

complications arising from interactions between human drivers and driverless cars cannot be solved with current representational models for decision-making and coordination. We analyzed an example of human driving in roundabouts through the ecological dynamics framework, which considers that drivers' exploratory activities rely on the utilization of affordances, rather than on the internal processing of information, which is currently the default assumption guiding driverless-car design. Driverless-cars present a remarkable opportunity for developing new technology to improve human interaction with the world. Ecological approach could be used to investigate how digital driving landscapes may be closely tailored to the drivers' needs through their own driving activities.
The Evolution from ‘Automatic’ to ‘Autonomous’ we will witness an increasing attribution of ‘Agency.’ Experimentally, we are (and will be) stuck between the

**SCYLLA of SIMPLICITY**

and the

**CHARYBDIS of COMPLEXITY**

Automation TO Autonomy IS suspended between Reductionistic “Controlled” Experimentation and Indeterminate Holistic “Systems-Based” Inquiries.
The Eye of the Tiger

ARE HYBRID CONTROL ARCHITECTURES NECESSARILY A STEP ALONG THE ROAD TO UNTRAMMELED AUTONOMY?

Driver-Centered vs Machine-Centered?
But

Are we actually short of people?
Lots of human activities are characterized by hours of boredom: moments of terror.

Hours, days, weeks, months even years of preparation for hours, minutes, even mere seconds of performance.
THE HEDONOMIC DIMENSION
Some People LOVE Driving ... Others LOVE Their Car!
How Much Fun is NASCAR in AUTOMATED Vehicles?

But Then Again How Much Fun is NASCAR Anyway?
The Issue of Attributed “Agency” – And How Easily Love Can Turn to Hate
Vehicle Control Expresses the “Will to Power” (Literally Sometimes). Automatic Vehicles place Restrictions on that Freedom. How Long Before ‘System-Wide’ Control Sub-Optimizes Individual Aspirations? How Can we then ever Optimize the “Commons” of Driving?
An Orthotic Recovery of Your Mother

• Which Isolates you from the ‘Outside’ World.
• It Keeps you ‘Warm and Dry.’ (Gordon Sumner)
• It Moves You almost Effortlessly from A to B.
• It is Your Own Personal (Private) Space.
• It’s One of the Most Valuable Things you Possess

People Love Their Cars

Nihil Sub Sole Novum – With Thanks to Neil Lerner
When we look to change the vehicle, we are also changing society...

On what principle are we making such change. Or is it all on principal alone.
The Role of Advanced Automotive Technology in Defeating Evil – The Standard Narrative
MIMETIC PRINCIPLES

1) Physical Replication (Mimesis)

2) Biological Principles (Biomimesis)

“Nature tends to copy solutions that work, and if aeons ago the ancestors of our visual system (for example) managed to solve the Many Properties problem, it would not be entirely surprising to find that the later linguistic systems simply copied their solution. If this were so, then the distinction between reference and predication reflects an even deeper and older architectural feature of the neural organization of our sensory systems.”


3) Technological Orthotics (Technobiomimesis)
Are They Each Equipped with Volvo’s Collision-Avoidance?
Biomimetic Principles

Intentionally Forming ‘A Predator’ Shape – or is this a Case of Cognitive ‘Apophenia’?

Non-Collisions on the Basis of Adiabatic Principles?
Also Happen On the Road
ARE SUCH PREDATOR’S … PATHOGEN’S IN THE TRAFFIC STREAM?

Whose Symptomatology Include … “Road Rage” “Tailgating” etc.
The Sheepdog and the Japanese Garden

Metaphor for Interaction with Nascent Autonomous Systems (e.g., Robots).

Metaphor for Context-Shaping of our Environment (e.g., sustainable design).

Technobioimetic Principles

There will be more vehicles and forms of swarm failure.
TECHNOBIOMIMETIC PRINCIPLES

ARE THEY:

i) Purely metaphorical?

ii) Conveniently Analogue?

iii) Direct Replications?

Such Principles Allow us a Degree of Precedence and Prescience in an ever-more complex world.

The Continuing Issue of Optimality and Change.
The Hancock Car Crash, April 14th, 2010 [98th Anniversary of the Titanic’s Sinking: To the Exact Hour!]. This coincidence Caused me to Think. So, in the Emergency Room I set a Goal ...
Yet my conclusion is that: All time is delusion and all change is illusion!
The Humans Are Dead
WHAT DREAMS MAY COME?

WE are NOW engaged in a Great ‘Civil’ War. Do You WORK for TECHNOLOGY, or, Does TECHNOLOGY WORK for YOU?

Transportation (Cars) are perhaps the Critical Battleground of this War.

Not CAN we Automate but SHOULD WE automate? However, That Train Has (Already) Left the Station.

If so, is HOW We automate Now the Best-Worst Option?

Technobiomimetic Principles appear to Hold the Best Promise.

Distracted Driver Runs Into Canterbury Cathedral