

Flows: Manifesting CO₂ Emissions

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ABSTRACT

'Flows' explores Manuel Castells theory of the Space of Flows, which relates to network society and technologies role in a new type of space. Flows bring things and people into synchronous, real-time interrelationships made up purposeful, repetitive, programmable sequences of exchange and interaction. Therefore we can define flows as consisting of three elements – the medium through which things flow, the things that flow, and the nodes among which the flows circulate. 'Flows' is a mixed media artwork that interprets these three elements through vehicles, CO₂ emission ratings data and ANPR (Automatic Number Plate Recognition) cameras, by treating the car as a data packet, whose registration plate is a portal to the Internet in the same way that QR codes or RFID are beginning to offer.

Keywords: Internet of Things, Space of Flows, Design Informatics, Big Data, Arduino, 3D Printing, Lighting & Furniture Design.

Index Terms: H.3.4 [Systems and Software]: Information Networks; H.3.5 [Online Information Services]: Web-based Services; H.5.m [Information Interfaces and Presentation]: Miscellaneous.

1 INTRODUCTION

Informatics is about structure, behaviour and interactions. It's about natural and engineered information processors. Design is about the generation, development and testing of concepts. It's about the creation of physical objects, capabilities or services. 'Flows' is an artwork by two different practitioners, a software developer and a product designer, from the new field of Design Informatics, which is the intersection of conceptual thinking, design and data. By understanding that objects are as much representations of an immaterial system that begin and end as data (Sterling 2005), as they are material form, we can harness massive connectivity, analytic power and industrial-strength simulation to design tangible products and intangible services to support the augmented society; just as virtual reality is blending into augmented reality, the digital economy and the information society will evolve into the augmented society.

2 THEORETICAL CONTEXT

'Flows' is situated in the context of the Internet of Cars. Proposed by Speed & Shingleton in their paper, Manifesting Flow: An Internet of Cars, the vision of an Internet of Cars is located within the emerging technical and cultural phenomenon known as 'The Internet of Things (IoT)', Attributed to the Auto-ID research group at MIT in 1999 (Ashton), it refers to the technical and cultural shift anticipated as society moves towards a ubiquitous form of computing that facilitates the connection of everyday

objects and devices to all kinds of networks. The analog bar code that has for so long been a dumb, encrypted reference to a shop's inventory system will be superseded by an open platform in which every object manufactured will be traceable from producer to distributor, and potentially every single person who comes into contact with it following its purchase. Further still, every object that comes close to another object, and is within range of a reader, could also be logged on a database and used to find correlations between owners, environmental conditions and applications.

Speed & Shingleton suggested that a technically determinist vision of tags and codes appeared to be obscuring an opportunity to fold existing 'things' into an Internet for traffic. Cars are the single most visual form of actual moving data that we know and yet they are wholly overlooked as packets of data that interface with humans, businesses and the environment. Car registration plates can be used as unique identifiers in the same way as barcodes and offer a platform for people to store data on to them, use them as interfaces to social networks, pass messages between people, and connect to data.



Figure 1: IoT: Barcodes, QR Codes, RFID and Registration Plates.

Dynamic, fluid and representing individual packets of information within a UK wide network, cars could be critical components within the emerging phenomenon known as the Internet of Things. Each one tagged with a unique identifier that is scannable with smart phones, as well as the highly sophisticated roadside cameras, cars with their number plates have been the equivalent of barcodes on supermarkets products for many years. In this way cars are turned into networked artefacts that provide the missing link in connecting the flow of things to people, artefacts environments and businesses. The ability to tag a vehicle's registration plate with information to allow others to read at various points in the future offers a potentially new way of disseminating not only traffic information (journey times, congestion/incident hotspots), but data on weather/road conditions, special events, and user relevant offers.

'Flows' explores the experimental use of cars as a manifestation of flow across social networks. Manuel Castells first proposed the theory of the Space of Flows, in *The Rise of the Network Society* (1996), and it relates to network society and technologies role in a new type of space. Flows bring things and people into synchronous, real-time interrelationships made up purposeful, repetitive, programmable sequences of exchange and interaction. Therefore we can define flows as consisting of three elements – the medium through which things flow, the things that flow, and the nodes among which the flows circulate. 'Flows' interprets these three elements through vehicles, CO₂ emission ratings data and the A354's ANPR cameras.

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3 ARTWORK

Approximately 40000 cars are recorded everyday on the A354 between Dorchester and Weymouth. Through the use of a vehicle lookup enquiry, a service you might use when purchasing a car, one can ascertain detailed information about the vehicle including make, model, fuel type, engine size, and CO₂ output.

Plate	Make	Model	Fuel Type	Engine Size	CO2 Output
W123 ABC	Ford	Fiesta	Petrol	1.6	140
W456 DEF	Vauxhall	Corsa	Petrol	1.4	120
W789 GHI	BMW	1 Series	Petrol	1.6	140
W012 JKL	Mercedes	Smart	Electric	0	0
W345 MNO	Volvo	V40	Petrol	1.6	140
W678 PQR	Peugeot	208	Petrol	1.6	140
W901 STU	Renault	Clio	Petrol	1.6	140
W234 VWX	Seat	Ibiza	Petrol	1.6	140
W567 YZA	Skoda	Fabia	Petrol	1.6	140
W890 BCD	Toyota	Aygo	Petrol	1.6	140
W123 EFG	Nissan	Leaf	Electric	0	0
W456 HIJ	Hyundai	Ioniq	Electric	0	0
W789 KLM	Kia	Niro	Electric	0	0
W012 NOP	Jeep	Renegade	Petrol	1.6	140
W345 QRS	Land Rover	Discovery	Petrol	2.0	180
W678 TUV	Range Rover	Range Rover	Petrol	2.0	180
W901 WXY	Mercedes	GLC	Petrol	2.0	180
W234 ZAB	BMW	X1	Petrol	2.0	180
W567 CDE	Vauxhall	Trailblazer	Petrol	2.0	180
W890 FGH	Peugeot	5008	Petrol	2.0	180
W123 IJK	Renault	Scenic	Petrol	2.0	180
W456 LMN	Seat	Alcazar	Petrol	2.0	180
W789 OPQ	Skoda	Katana	Petrol	2.0	180
W012 RST	Toyota	Proace	Petrol	2.0	180
W345 UVW	Nissan	Navara	Petrol	2.0	180
W678 XYZ	Hyundai	Starter	Petrol	2.0	180
W901 ABC	Kia	Stout	Petrol	2.0	180
W234 DEF	Jeep	Compass	Petrol	2.0	180
W567 GHI	Land Rover	Discovery Sport	Petrol	2.0	180
W890 JKL	Range Rover	Range Rover Evoque	Petrol	2.0	180
W123 MNO	Mercedes	GLA	Petrol	2.0	180
W456 PQR	BMW	X2	Petrol	2.0	180
W789 STU	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W012 VWX	Peugeot	5008	Petrol	2.0	180
W345 YZA	Renault	Scenic	Petrol	2.0	180
W678 BCD	Seat	Alcazar	Petrol	2.0	180
W901 EFG	Skoda	Katana	Petrol	2.0	180
W234 HIJ	Toyota	Proace	Petrol	2.0	180
W567 KLM	Nissan	Navara	Petrol	2.0	180
W890 NOP	Hyundai	Starter	Petrol	2.0	180
W123 QRS	Kia	Stout	Petrol	2.0	180
W456 TUV	Jeep	Compass	Petrol	2.0	180
W789 WXY	Land Rover	Discovery Sport	Petrol	2.0	180
W012 ZAB	Range Rover	Range Rover Evoque	Petrol	2.0	180
W345 CDE	Mercedes	GLA	Petrol	2.0	180
W678 FGH	BMW	X2	Petrol	2.0	180
W901 IJK	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W234 LMN	Peugeot	5008	Petrol	2.0	180
W567 OPQ	Renault	Scenic	Petrol	2.0	180
W890 RST	Seat	Alcazar	Petrol	2.0	180
W123 UVW	Skoda	Katana	Petrol	2.0	180
W456 XYZ	Toyota	Proace	Petrol	2.0	180
W789 ABC	Nissan	Navara	Petrol	2.0	180
W012 DEF	Hyundai	Starter	Petrol	2.0	180
W345 GHI	Kia	Stout	Petrol	2.0	180
W678 JKL	Jeep	Compass	Petrol	2.0	180
W901 MNO	Land Rover	Discovery Sport	Petrol	2.0	180
W234 PQR	Range Rover	Range Rover Evoque	Petrol	2.0	180
W567 STU	Mercedes	GLA	Petrol	2.0	180
W890 VWX	BMW	X2	Petrol	2.0	180
W123 YZA	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W456 BCD	Peugeot	5008	Petrol	2.0	180
W789 EFG	Renault	Scenic	Petrol	2.0	180
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W345 KLM	Skoda	Katana	Petrol	2.0	180
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W789 IJK	Mercedes	GLA	Petrol	2.0	180
W012 LMN	BMW	X2	Petrol	2.0	180
W345 OPQ	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W678 RST	Peugeot	5008	Petrol	2.0	180
W901 UVW	Renault	Scenic	Petrol	2.0	180
W234 XYZ	Seat	Alcazar	Petrol	2.0	180
W567 ABC	Skoda	Katana	Petrol	2.0	180
W890 DEF	Toyota	Proace	Petrol	2.0	180
W123 GHI	Nissan	Navara	Petrol	2.0	180
W456 JKL	Hyundai	Starter	Petrol	2.0	180
W789 MNO	Kia	Stout	Petrol	2.0	180
W012 PQR	Jeep	Compass	Petrol	2.0	180
W345 STU	Land Rover	Discovery Sport	Petrol	2.0	180
W678 VWX	Range Rover	Range Rover Evoque	Petrol	2.0	180
W901 YZA	Mercedes	GLA	Petrol	2.0	180
W234 ABC	BMW	X2	Petrol	2.0	180
W567 DEF	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W890 GHI	Peugeot	5008	Petrol	2.0	180
W123 JKL	Renault	Scenic	Petrol	2.0	180
W456 MNO	Seat	Alcazar	Petrol	2.0	180
W789 PQR	Skoda	Katana	Petrol	2.0	180
W012 STU	Toyota	Proace	Petrol	2.0	180
W345 VWX	Nissan	Navara	Petrol	2.0	180
W678 YZA	Hyundai	Starter	Petrol	2.0	180
W901 ABC	Kia	Stout	Petrol	2.0	180
W234 DEF	Jeep	Compass	Petrol	2.0	180
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W890 JKL	Range Rover	Range Rover Evoque	Petrol	2.0	180
W123 MNO	Mercedes	GLA	Petrol	2.0	180
W456 PQR	BMW	X2	Petrol	2.0	180
W789 STU	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W012 VWX	Peugeot	5008	Petrol	2.0	180
W345 YZA	Renault	Scenic	Petrol	2.0	180
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W901 DEF	Skoda	Katana	Petrol	2.0	180
W234 GHI	Toyota	Proace	Petrol	2.0	180
W567 JKL	Nissan	Navara	Petrol	2.0	180
W890 MNO	Hyundai	Starter	Petrol	2.0	180
W123 PQR	Kia	Stout	Petrol	2.0	180
W456 STU	Jeep	Compass	Petrol	2.0	180
W789 VWX	Land Rover	Discovery Sport	Petrol	2.0	180
W012 YZA	Range Rover	Range Rover Evoque	Petrol	2.0	180
W345 ABC	Mercedes	GLA	Petrol	2.0	180
W678 DEF	BMW	X2	Petrol	2.0	180
W901 GHI	Vauxhall	Land Rover Discovery Sport	Petrol	2.0	180
W234 JKL	Peugeot	5008	Petrol	2.0	180
W567 MNO	Renault	Scenic	Petrol	2.0	180
W890 PQR	Seat	Alcazar	Petrol	2.0	180
W123 STU	Skoda	Katana	Petrol	2.0	180
W456 VWX	Toyota	Proace	Petrol	2.0	180
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W234 MNO	Range Rover	Range Rover Evoque	Petrol	2.0	180
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