

PLANET SCALE INFORMATION INTEGRATION

Humankind has stumbled almost accidentally on a way to globally integrate all knowledge into one interlinked network and thereby made it accessible everywhere to everyone. In the next 10 years we must safeguard, extend and build on this achievement. We should also use it as an example to tackle similarly challenging integration problems - creating integrated and interlinked models of entire enterprises, the state of the art in scientific communities and all the laws governing our societies.

INTRODUCTION

Every book ever written; every song ever sung; every movie ever made - available to everyone, everywhere. Universal access to the entirety of humankind's knowledge from every home, every valley, all mountains and even the middle of the ocean.

This is not some delirious vision by some drunken lunatic - this is our world! The Internet has enabled humankind to integrate its collective knowledge and brought the complete realization of this vision firmly within humankind's grasp.

This universal access to humankind's knowledge has been an age long dream and its implementation is a splendid achievement indeed. It is a cultural treasure and something our time will be remembered for. It is an achievement that was made possible by the Internet - an information system encompassing the planet that integrates all codified knowledge as well as enables instant contact to all experts worldwide.

"My" EU of 2020 will have recognized universal access enabled by the internet as a cultural treasure and it will use laws to foster - not to endanger - it. This EU will take strength from seeing this global information integration to start to tackle other information integration problems that - at first glance - seem similarly (and falsely) impossible; three examples are detailed below.

In the following I will first shortly touch on how states (and the EU) are currently endangering universal access to humankind's knowledge and how they could use laws to foster it. I will then sketch three cases of other information integration problems that the EU should find the courage to tackle: All laws of the EU, entire scientific fields as executable models and entire enterprises as integrated models.

SAFEGUARDING AND FOSTERING UNIVERSAL ACCESS TO HUMANKIND'S KNOWLEDGE

Universal access emerged with little state involvement, lead by volunteers and commercial interest. But it is the state that is now endangering it - ill advised copyright legislations, censorship and arbitrary imposition of local laws onto a global information space risk this cultural treasure in the name of outdated business models and antiquated laws. As an example consider the HADOPI law, whose first version (later ruled unconstitutional) would have cut of entire households from the access to global knowledge purely based on unproven accusations of copyright infringement against a single member of that household.

In my vision the EU of 2020:

- Has realized that universal access to humankinds knowledge (as mediated by the internet) is a human right on equal footing with (and possibly superseding) the right to education.
- Has revamped the outdated, pre-digital 'copyright' laws into modern 'distribution rights' laws that put society first and that take special care to ensure that citizens can talk back, can interact, adapt, mashup and build on cultural artifacts. Laws that have been made after the realization that our rigid copyright laws risk fossilizing our culture.
- Is using 'data fluidity' laws to ensure long term data preservation and competition in the digital age. These laws stipulate that every application and every service that holds user created data (e.g. mails in Google Mail, documents in Office Live, bookmarks in Yahoo's del.icio.us) must offer documented, royalty free and complete interfaces and data format descriptions that allow complete access and quick export of all user created data. These laws ensure that each user can manipulate his or her data with whichever tool he/she fancies and that he/she can take all of it to a different service or application on a moment's notice. In addition to being an important consumer right, these data fluidity laws can (to some extend) play the role of anti-trust laws that are often to slow in their application.

CASE 1: ALL THE LAWS OF A STATE! AND THE EU!

When faced with a fine perceived as unfair, a citizen of the European Union will usually not be able to find relevant judgments from comparable cases in court. Sadly he or she will not be able to voice frustration to the people responsible for the law he/she has gotten into conflict with. Shamefully this citizen will usually not even be able to find and read the relevant law and the relevant implementation guidelines. Shamefully and utterly unnecessary: there isn't a reason in the world that not every ticket includes a link to a page with the relevant laws that are interlinked with relevant provision, judgments and parliamentary deliberations.

Hence, in my vision the EU of 2020:

- Has taken the bold step to add "computisch" (or RDF) as official language of the European language and all laws, provisions and parliamentary deliberations are annotated with the machine understandable markup that enables to tackle the problems sketched above. This will not be more expensive than other official languages
- Has passed laws stipulating that all laws and provision must be freely and easily available on the internet on sites that enable citizens to 'talk back' and be heard.

CASE 2: AN ENTIRE SCIENTIFIC FIELD! EXECUTABLE!

It is now possible to build models of such size and complexity that they can (and do) reflect the state of the knowledge of an entire scientific community. In some cases these models can be so elaborated that computers can 'execute' them – e.g. enabling a drug researcher to see the effects a particular chemical component on a simulation of the heart reflecting the aggregated knowledge from thousands of scientists. Or enabling school children to walk through a virtual representation of Rome - build jointly by hundreds of scientists and enthusiasts, interlinked with provenance information, scientific articles and petabytes of scientific data.

Such integrated model of scientific fields offer tremendous value in a world where the scientific community grows ever more specialized and many solutions rely on applying knowledge from many domains (which is much simpler if the knowledge from these domains has been integrated into executable models).

In my view the EU of 2020:

- Has created a special research funding program for this kind of large scale integration of scientific knowledge. This is a multi stage program where projects run much longer than usual but where funding must be reapplied for periodically (and where there's a guarantee that some projects will lose their funding).
- Has changed laws to remove obstacles to scientific information integration. Mostly this means the introduction of Open Access rules that force the public availability of publicly funded research.

CASE 3: AN ENTIRE ENTERPRISE! IN REALTIME! THAT CAN PREDICT ITS FUTURE!

In the world of business software systems we are currently witnessing the integration of the formerly separate fields of business rule management systems (systems managing the rules governing the decisions a business makes) and business process management systems. At the same time business intelligence system

integrate ever more information sources to give an ever completer picture of the knowledge needed for high level business decisions.

However - taking a long view - these are but timid steps in the direction of the natural endpoint of integrated business planning supported by the Holistic Digital Enterprise. This Holistic Digital Enterprise will not stop at purely mirroring the state of an enterprise, but it will be backed by AI systems that use novel machine learning algorithms to permanently predict the future development of all the businesses parameters, continuously learning from their actual development; informing decisions with these predictions and alerting people to sudden deviations of values from expectations.

This is a vision that is now starting to become realistic. Hence, in my view the EU of 2020:

- Has made the Holistic Digital Enterprise and supporting machine learning techniques into core areas of research funding.

CONCLUSION

Humankind has stumbled almost accidentally on a way to globally integrate all knowledge into one interlinked network and thereby made it accessible everywhere to everyone. In the next 10 years we must safeguard, extend and build on this achievement. We should also use it as an example to tackle similarly challenging integration problems - creating integrated and interlinked models of entire enterprises, the state of the art in scientific communities and all the laws governing our societies.