Collective Intelligence in Architecture: The Collaborative Knowledge-based design of buildings

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1. INTRODUCTION

This paper describes current “work in preparation” that is based on a career of research about the advancing information technology applied to the creation of buildings and the collective knowledge/intelligence required on the part of the numerous Building team members, for a successful building project.

In light of current academic and societal events, it is timely to be reconsidering the content and context of Architectural Intelligence in research, education, and practice. The locating, financing, planning, design, reviews and approvals, construction, use of buildings, and the role of buildings in the environment, represent a significant portion of the use of energy and in the quality of life for all, globally. To teach and practice Architecture as an integrated portion of the building process, rather than an isolated silo of academic and then professional practice, is to reflect the reality of the profession.

The value of this collective information serves students, professionals, home owners and other building type owners, developers, builders, and facility managers alike. The concept of “building types” is the beginning of sorting information into application to specific buildings, as each building type is different and has its own world of knowledge associated with that particular type of building.

As the developing Internet of Things begins to further evolve, opportunities are developing to contribute to and benefit from the collective intelligence approach in each of the areas connected to buildings, including automotive, smart phone, wearables, etc.

The combination of how to develop a computer-based ecosystem of connected objects within a building with appropriate human/computer interface to successfully connect and manage such ecosystems is magnitudes beyond the smart house / smart buildings systems in current use.

1.1. The Approach for Architecture Intelligence

While there have been attempts to unite the Building industry into an AEC conglomerate (Architecture Engineering Construction) as a way to address the need for collaboration, none of these attempts have resulted in a structure adequately prepared to meet the challenges of current circumstances and opportunities, either in the academic setting or in professional organizations.

Knowledge of the history and existing momentum of the Building Industry teams members, the technological advances of NASA, automotive, and Silicon Valley will be merged with the current activity in the Internet of Things, with buildings featured as the biggest things in the internet of things. Engaging research efforts, educational efforts, and professionals (including agency professionals). This effort will be knowledge driven. An Architectural Intelligence instance of
1.2. Implementation

At the base of this effort will be a system of infinite data (beyond big data). Infinite data is an ongoing continuous flow of updating information based on the IBM Watson-model, so that new information is added by users of the system whose views include the ability to input, so that an expert system is built as the system is being used. Categories of users will include students, professionals, home owners, building owners, developers, builders and many more. On top of that layer of data will be building type filters, so that each building type — house, hotel, museum, office building, can filter information for the specific application to each particular building type.

Working closely with Service Science concepts, as this system develops, new concepts in how to collect, store and view this growing body of knowledge will be accommodated in ways to allow for the open, non-proprietary system of knowledge to support the wide base of users. Alternate revenue models with be fully explored and tested as the adoption of this knowledge system develops.

Engaging the Silicon Valley center of the U.S. Space Agency, NASA-Ames Research Center and their technology transfer program, advanced modeling and simulation, and their mission of assisting with better life quality on earth. Already involved with Facebook, Google (including Search), and Apple technologies, relationships will be further developed and well as more new companies.

Bay Area Universities, k-12 educational activities, and continuing education will play a significant role in engaging education at all levels — in what is a key factor in the introduction and continuing of STEAM (Science, Technology, Engineering, Architecture, Math). Architecture is the perfect combining of these elements in an interesting activity that can benefit all communities.

Further development of this proposal will be available prior to the May - June 2015 Collective Intelligence conference.

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REFERENCES


