

DANA M. PAVEL

13 Granite Apartments
30 River Gardens Walk
London, SE10 0GA
Mobile: 07766052090
Email: da16pa@gmail.com

Research Statement

SUMMARY

My main expertise and research interests lie in areas related to context-aware computing, affective computing, software agents, smart environments, constraint-based programming, Semantic Web, and knowledge modeling and management. I have been working in these topics since 1998. My main strengths are creativity, determination, technical leadership, system thinking, passion, curiosity, and foresight.

I like to interact with people from various areas, from research to business and I very successfully did so within Nokia Research creating collaborations both with academia as well as Nokia-internal and external business entities.

I like to create systems for supporting as well as bettering humans, and look at ways to capture, interpret and visualize user context in a fun, engaging and evolving manner. I love to work in an environment where inter-disciplinary work is encouraged and where I can create and develop technologies aimed to have a positive impact on people's lives.

CURRENT AND FUTURE RESEARCH

Since 2008, my main research focus was on designing and developing a lifestyle management system aimed towards collecting, interpreting and presenting information to an end user within a self-reflective and interactive environment. My aim has been to capture various aspects of one's lifestyle, by capturing information able to define various context aspects such as: activity, availability, emotional, environmental, physical, social and temporal.

The system I've been developing includes various design choices such as: (1) integrating end users in the process of gathering and interpreting data; (2) providing them with both abstract and detailed access to information; (3) creating a story-inspired model and visualisation paradigm for representing and correlating collected data; (4) allowing end users various levels of system customisation; (5) and giving users full control over collected data. The work on designing and building the [MyRoR](#) system also included performing various user experiments (via an online questionnaire as well as based on exploratory hands-on study) in order to better understand what people would like to see in their stories and how they would like to interact with them.

The story-inspired framework I created, including the model, automatic process and multimedia visualisations, provides a novel way of representing and correlating information within a lifestyle management system. The process of creating stories as a sequence of meaningful events contains multiple challenges as people's needs and interests change within time and context. Interesting aspects derived from this work include: (1) creating the stories within a mobile-based environment; (2) improving the algorithms for determining what "meaningful" events should be included within a story; (3) providing better means for end users to customize their stories; (4) improving adaptation of the story model and process to recording context and end user needs; (5) exploring the usage of the platform within certain applications areas, such as stress management; (6) allowing users to share their stories through a customizable process; (7) exploring the creation and usage of stories within various collaborative situations (e.g., co-creation, merging of shared stories, etc.); (8) further

exploring the role of MyRoR and its stories in supporting and enhancing self-reflection and mindfulness.

PAST RESEARCH TOPICS

Lifelogging

During 2006 I was involved in Nokia internal and external research projects related to capturing, visualizing and sharing memories. Smart phones played an essential role in these projects, as they were used to collect and access user information. As part of these activities, I also lead the SharMe project, an external collaboration project funded by TEKES (The Finnish agency for technology and innovation) and including researchers from Nokia, Tampere University of Technology (TUT) and Helsinki University of Technology (TKK). My main focus was on developing new ways of representing and visualizing user-related media. We used Semantic Web technologies for representing as well as reasoning about collected information. We also used and extended visualization tools such as Piccolo/Jazz. In collaboration with TUT we performed user studies related to using mobile technologies (and not only) for creating memories, what information is perceived as useful and how people would like to share digital memories. I also created an external collaboration with Prof. Gregory Abowd's group at Georgia Tech on sharing memories within the context of families living abroad.

Spiritual Computing

In 2006 I became interested in using context awareness for something more than just recommendations and adaptive behaviours and also looking beyond emotion-awareness. My interest was in how technology could support us at a spiritual level, no matter what our spiritual needs are (i.e., religious or otherwise). Some of the interesting issues I looked at were related to stress management, confidence booster, spiritual growth and support (including social networks). I was involved in creating various scenarios and requirements for context-aware systems able to determine and support users' spiritual needs and also looked at how considering such needs would impact companies business-wise. Other activities included discussions with various researchers within Intel Research, Microsoft Research and France Telecom.

Mobile-based sensing platform

In 2004, I started working on designing a mobile event-based sensing platform. The main goal was to use mobile phones for collecting data from various sensors and then send it to a remote server for being used by applications. Important considerations within this work were to study how to allow for both local and remote recording, how to minimize the amount of data sent by subscribing only to particular data and also allowing for data interpretation on the device as well as conditional sending of data (e.g., based on thresholds or aggregation requests). The initial work was also part of the EU FP6 project MIMOSA. The Symbian-based platform (later called NORS) eventually became open source. In 2011, the platform was ported to Android and it played an important role in the PAL project as well as my PhD thesis (see [AIRS](#) in Google Play). I continued to be involved in extending the design and functionalities of the platform, especially based on findings derived from my PhD work.

Distributed context acquisition and delivery middleware

During 2004 and continuing in 2005 I worked and lead a project on developing a context delivery middleware, called CREDO. The CREDO middleware was based on a pub/sub paradigm, specifically the SIP (Session Initiation Protocol) event framework, and it had an entirely ontology-based design and implementation, supporting the definition of a hierarchical structure of context producers and consumers. The main goal of this work was to create a middleware with distributed functioning at various levels: data collection, data storage, data processing and service/application logic as well as looking at various services and domains that could benefit from such middleware. Within the middleware, we used OWL-S for describing context providers as services and mapping functions to systems APIs. The middleware allowed for automated context provide discovery, automated context acquisition and composition.

The role of context in ad-hoc communities

During 2004 I worked in a project looking at how context awareness can play a role within forming and supporting social ad-hoc communities. Context information such as being within the same shared space, or sharing similar interests were considered when forming communities as well as for increasing trust within an ad-hoc community.

Affective and context-aware personal assistant

(2001-2003) Motivated by my wish to create better context and user-aware recommendation systems, I started looking at *affective computing* in 2001, a paradigm that takes into account users' emotions as well as other context information and preferences. In the project I created and lead, mood (or affective state) was used in filtering user's preferences and, together with other context information, determined what suggestions were shown within a recommendation system. The focus was on creating a mobile-based system, where the user could interact with the system through a wireless device (iPaq) and the reasoning was done on a remote server. The project used a CSP (Constraint Satisfaction Problem) representation to build the inference engine. The scenarios were based on a museum experience as well as a multi-visitor within a home environment.

Agent-based Smart Environments

My first activities in Nokia Research (1999-2000) were in building multi-agent-based smart environments as well as experimenting with different control interfaces. Initially, I created a smart environment where X10-based devices could be controlled through a gesture-based interface built by adapting a handwriting recognition algorithm to work with a touchpad. For each device brought into the smart environment an agent was created. Each device had an associated profile, represented in RDF. RFID tags were used to associate entities to their profiles. In creating the environment, I used the JADE agent platform. The multi-agent design was also used in my later work focused on home environments: agents were added for access control, negotiating preferences, learning, and various services.