Making Project Team Recommendations from Online Information Sources

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Abstract

We are developing an Internet platform called MediaTeam that provides a marketplace connecting media content consumers to communities of media content creators. The platform is enabled by our method for automated assembly of virtual project teams. Media creators use the automated team assembler to quickly identify and team with collaborators. The team assembly platform factors in how the skills, work, and communication styles of team members complement each other into its team recommendation process. We are now testing the teaming and collaboration platforms with video creators and seek to launch by the summer.

Virtual Teaming for Media Production

In conducting interviews of film and video professionals, we discovered widespread interest in the ability to form virtual, limited-duration project teams to perform the work associated with specific production projects. This ephemeral teaming is echoed by the nature of video production work, which is becoming increasingly decentralized, enabled by the spectrum of communication technologies available. Independent filmmakers, postproduction companies, and broadcast news organizations are increasingly turning to virtual collaboration and outsourcing to achieve production tasks, but team formation happens through word of mouth and is largely ad hoc. Virtual teaming for film and video is inadequately addressed by current virtual freelance marketplace platforms. To address this need, we are developing a service called MediaTeam that supports virtual collaboration between producers and consumers of digital media.

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Background

While the need to rapidly assemble, activate and manage virtual teams is acute in video production, these capabilities are increasingly important across the complete spectrum of modern work. Literature surveys of virtual teaming (Ebrahim, Ahmed, and Taha 2009) identify the use of virtual teaming across nearly every professional endeavor. The principle challenge is that of *management*: how does one manage roles, project deadlines and conflicts in teams that have minimal (if any) physical interaction? This argues for team selection platforms that factor in team

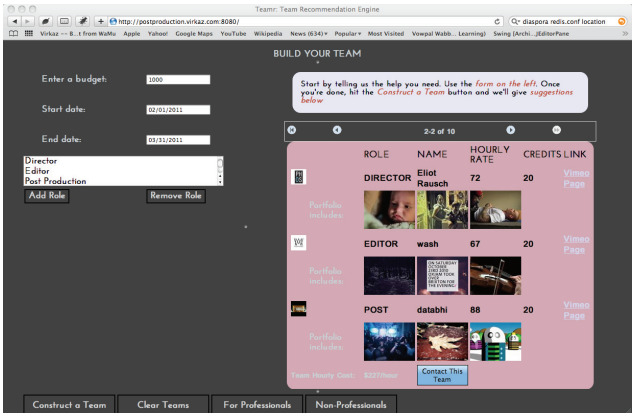


Figure 1:MediaTeam interface. User supplies requirements for the virtual team and is presented with recommendations within budget and schedule constraints.

cohesion. Yet, our analysis of existing platforms reveals little in the way of support team-specific construction, let alone the ability to factor in cohesiveness. Collaborator recommendation (McDonald, Ackerman 2000) and match-making (Diaz, Metzler and Amer-Yahia 2010) systems focus mostly on interest- and skills-based selection and do not consider selection of complementary skills and work styles. Commercial outsourcing platforms (e.g. odesk.com) provide per-skill-set search and recommendation but do

not consider cohesion-supporting factors important in the selection of a team.

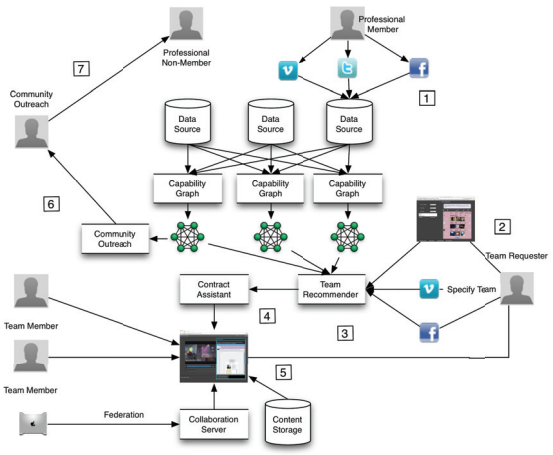
The ideal process of virtual team construction should therefore be one in which an individual wishing to form a team describes the complementary skills required to accomplish the team's goals, provides budget and time constraints and then submits this description to a system which returns one or more suggested team configurations, giving consideration to the skills, communication styles, and professional experiences best aligned with the goals. MediaTeam automates this process by running team construction algorithms upon semantic networks derived from profession-oriented websites and social networks.

How It Works

The core technology of virtual team creation is an engine that creates a semantic network of individuals, their interests, capabilities, and availabilities from social network data. This semantic network is called the Community Capability Graph (CCG), where vertices correspond to individuals, and edges correspond to relations and community attributes relevant to expertise.

A media creator seeking a team provides either a description of the task that they are seeking help with, a description of the kinds of roles that they need to fill, or the explicit skills they are seeking. This description is used to create a set of team roles. These team roles constrain a search on the CCG; and the result of this search consists of suggested assignments of team roles to individuals retrieved from the CCG.

Figure 2:Structure of the Media Team application. Users interact through a variety of social media



The process of project-team creation is defined in Figure 2. A system administrator provides core information sources and constructs templates required to describe the roles and capabilities that a registered user (a team creator) of the system will use to define project team requirements. Information sources include task-specific blogs, online community forums, social networks, member profiles, and websites that directly describe the skills, work and interests of potential team members. For each class of data source document we have developed feature extraction processing pipelines that produce CCGs. To predict cohesiveness, we consider several factors among them: *communication style* (are the preferred communication modalities of team members complementary) and *trust reputation* (recommendations attesting to team member reliability). Multiple capability graphs are merged to produce a consolidated semantic network describing the complete span of the knowledge of the team builder of possible team members.

We cast team construction as determining a perfect match between the two graphs where all candidate team members are selected from union of all community capability graphs. This is bounded by O(V^2*log(V) + V*E) using Djikstra's algorithm (Fredman 1987), where vertices V correspond to members and roles and edges E correspond to assignments and weighted by scores computed by member evaluation functions. By categorizing the candidate team members by role and keeping a priority queue for each role class, running time can be log linear in V.

Preliminary Findings

We have evaluated the system using over 5000 profiles from the vimeo.com and imdb.com sites averaging milliseconds to provide a seed set consisting of tens of recommendations.

Next Steps

We are currently expanding the search breadth of the system and will launch the service shortly.

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