Trailblazer: Cooperative, Infrastructure-Independent Generation of Indoor Floor Maps using Handheld Android Mobile Devices

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Recent developments concerning indoor mapping and navigation have relied primarily on preexisting or manually developed floor plans, a condition precluding such improvement to locations where this is economically or technologically infeasible. In this paper we introduce Trailblazer, a cooperative, infrastructure-independent indoor mapping protocol requiring only an Android mobile device and a data connection. First, existing techniques like inertial navigation and the Global Positioning System are leveraged to perform indoor localization and collect positional user data on a front-end application. The information is then uploaded to a remote web server, where it is subsequently parsed and stored in a relational database. Finally, a server-side algorithm is implemented and applied to generating a rectilinear floor map representation of the pertinent interior space. The overall scheme allows for the manipulation of multiple parameters, several of which are varied in testing so as to analyze their effects on produced floor maps. The process is subsequently demonstrated at a local public library, through which the efficacy and relatively minor, production-level caveats of our algorithm are shown. Consequently, our results demonstrate the reality of indoor digital cartography where the present capacity to support such work may be lacking.

Awards Won:
Third Award of $1,000