A USER ENVIRONMENT FOR SYNDICATING AND AGGREGATING MAP-INTEGRATED AUDIO TOURS: MAPODWALK CASTER

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Abstract

In this paper, we focus on providing users new environment for syndicating and aggregating audio tours with animated maps over the Internet. Geotagged photos nowadays are getting popular as one of the spatial content on the Internet in the revolution of Where 2.0. However, this single media of photo often has some difficulty to represent users' sequential stories and their context. On the other hand, audio streams are able to contain sequential stories and their context effectively. But users have difficulty on syndicating place-related audio streams compared with geotagged photos because there is no user-friendly environment for sharing audio streams with geotags. We have implemented *maPodWalk Caster* to solve the problems of syndicating and aggregating geotagged audio tours. The platform provides a place-related aggregation by storing geotagged audio stream and new experiments on place-related audio stream sharing opportunities for geospatial communication.

1. Introduction

There are web-based broadcasting content called *Podcast*. It allows people to create and distribute various kinds of audio content for their interest such as ones for introducing a person's interest. The large number of free Podcast is increasing on the Internet for commercial and non-commercial purposes. Some Podcast is made for guiding and telling stories about the real world. This kind of Podcast is often called *PodWalk*. People can download PodWalk of the places where they are visiting through the Internet. Listeners have the way to carry and listen to their favorite PodWalk.

2. maPodWalk and maPodWalk Maker

PodWalk has problems for users' spatial cognition and movements with only audio stream (without any visual maps). To solve that users' spatial cognition, we design and implement *maPodWalk* as a new style of Podcast which has animated maps. It is a Maps-Integrated PodWalk which can be playable as a movie file on a mobile media player such as Apple Inc.'s iPhone and iPod touch.

Some non-professional users want to create place-related audio tours and distribute them. There are no appropriate software tools to support their purposes and activities. We designed and implemented a software tool named *maPodWalk Maker* for users to easily create maPodWalk, that is, geotagged audio tour. maPodWalk Maker provides users with opportunities to enjoy creating their own tours related to locations of the real world. We propose maPodWalk Maker for an evolution of user-generated audio tours authoring tools which provide animated maps on mobile media players. In our experiment, our subjects tried to create content of maPodWalk and let other users use them when they find synchronization of both the audio and the map by walking on the route.

Figure 1. maPodWalk Maker: An Authoring tool for map integrated audio tours
[Map data: ZENRIN Co. Ltd..]
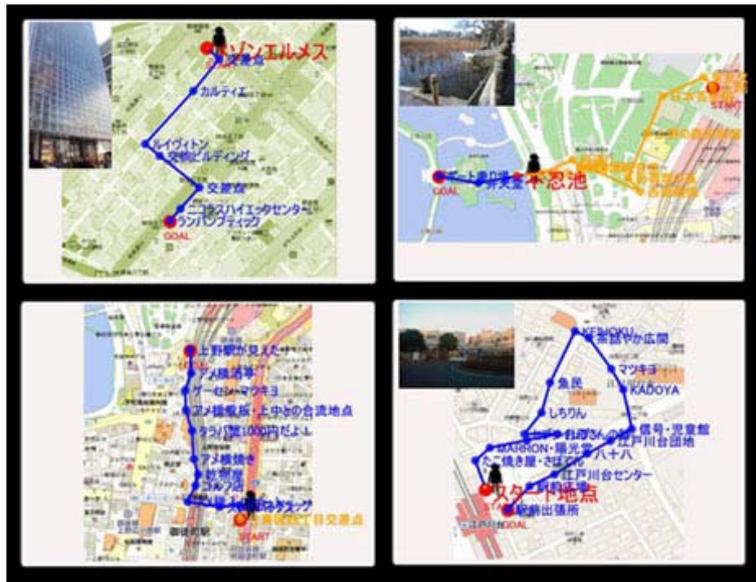
Figure 2.Samples of user-generated maPodWalk
(Places: Asakusa, Edogawadai, Ginza and Ueno in Japan)
[Map data: ZENRIN Co. Ltd..]

3. Problems for Distribution of Place-related Audio Content

maPodWalk is good solutions for on-site uses of audio tours on our experiments, however there are no ways for practical distribution of spatial audio content. It is difficult for users to syndicate and aggregate their intended audio tours. Listeners must manually access the website which uploaded maPodWalk and downloading their intended PodWalk with such as keywords of the web pages. It has limitations of the number to share maPodWalk between users.

4. maPodWalk Caster: Syndication and Aggregation Place-related Content

To solve the problems that difficulty of uploading downloading, and distributing user-generated audio tours, we integrate geotagged audio streams with web syndication format. Most popular web syndication format is RSS. RSS is for getting updated or users' intended web pages or blogs with tags such as title or updated time. We have implemented maPodWalk Caster which enables users to easily syndicate their created content of maPodWalk and maPodWalk of their interested by RSS and the spatial extent on a map. maPodWalk Caster can aggregate user generated maPodWalk with our proposed extended RSS called *maPodWalk RSS*. maPodWalk RSS can include not only title but also POI's temporal intervals, POI's spatial paths and extents and text streams for geospatial communication on the map. With maPodWalk Caster, geotagged RSS, that is, part of maPodWalk RSS, is automatically generated when users create maPodWalk. POI's spatial paths of RSS can be imported from GPS logs for supporting

geotagging to audio streams. Listeners must manually access the website which uploaded maPodWalk and downloading their intended PodWalk with such as keywords of the web pages.
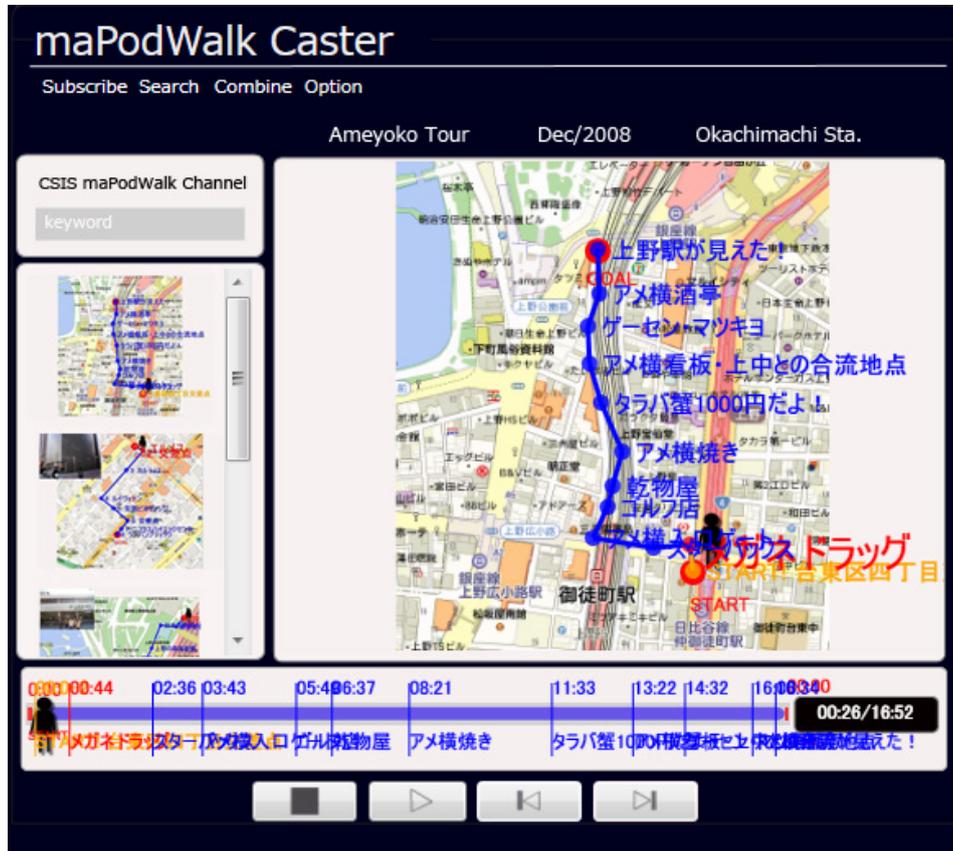
Figure 3. A Snapshot of maPodWalk Caster [Map data: ZENRIN Co. Ltd..]

5. "maPodWalk RSS": Geotagged files for broadcasting map-integrated audio tours

maPodWalk Maker and maPodWalk Caster can process maPodWalk RSS for managing and downloading maPodWalk. maPodWalk RSS includes names, time, position of places and some other elements for sharing maPodWalk between users.

a) Names of Places
maPodWalk RSS include names of points of interest by authors. Users share maPodWalk with keywords of authors and listeners interested places.

b) Date and Time of Creating and Distributing with maPodWalk

maPodWalk Caster also process time of creating and distributing maPodWalk. maPodWalk Caster provide environment of sharing maPodWalk which is distribute different time.

c) Spatial Position of Places

maPodWalk RSS has spatial positions of PodWalk. These are described longitude and latitude and altitude. Users can select and search maPodWalk by selecting positions of maPodWalk RSS and maps.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
-<rss version="2.0" xmlns:mpw="http://s-it.org/mapodwalk/mapodwalk.dtd">
-<channel>
    <title>maPodWalk Shibamata Content</title>
    <link>http://www.s-it.org/mapodwalk/shibamata/</link>
    <description>It introduces an old good Japanese town "Shibamata".</description>
    <language>JP</language>
    <managingEditor>mapodwalk@s-it.org</managingEditor>
    <copyright>Copyright 2007 maPodWalk</copyright>
    <webMaster>maPodWalk Lab.</webMaster>
    <pubDate>Mon, 16 Apr 2007 10:00:00 JST</pubDate>
    <lastBuildDate>Tue, 17 Apr 2007 22:01:00 JST</lastBuildDate>
    <generator>maPodWalk Maker v0.8</generator>
-<item>
    <title>maPodWalk tour from the memorial of late national movie star "Torasan" to
    Taisyaku temple</title>
    <link>http://s-it.org/mapodwalk/shibamata/torasan.mp4</link>
    <category>podcasts</category>
    <description>The route from Torasan memorial to Taisyaku temple.</description>
    <mpw:type>walk</mpw:type>
    <mpw:speed>normal</mpw:speed>
    <mpw:map_uri>http://s-it.org/mapodwalk/map/shibamata01.jpg</mpw:map_uri>
    <mpw:length>15:30</mpw:length>
    <mpw:map_height>120</mpw:map_height><mpw:map_width>90</mpw:map_width>
    <mpw:map_left>139.522916</mpw:map_left><mpw:map_up>35.453373</mpw:map_up>
    <mpw:start_lat>139.523254</mpw:start_lat><mpw:start_lon>35.452509</mpw:start_lon>
    <mpw:goal_lat>139.524068</mpw:goal_lat><mpw:goal_lon>35.453026</mpw:goal_lon>
    -<mpw:places>
        -<mpw:place>
            <mpw:place_num>1</mpw:place_num>
            <mpw:place_name>Torasan Memorial</mpw:place_name>
            <mpw:place_jname>寅さん像</mpw:place_jname>
            <mpw:place_category>POI</mpw:place_category>
            <mpw:place_comments>This is the memorial of late national movie star Torasan.
            The length of the series of his movie is longest in the
            world.</mpw:place_comments>
```

Figure 4. Example of maPodWalk RSS on maPodWalk Caster

6. Processes of Syndication and Aggregation on maPodWalk

The environment for Authoring, Syndicating and Aggregating maPodWalk has three

users' steps.

6.1.   Step1: Authors create maPodWalk

Authors record audio streams for audio tours in the real world and synchronize audio streams and maps with maPodWalk Maker. maPodWalk Maker can automatically generate maPodWalk RSS from contents of maPodWalk. Users also can edit maPodWalk RSS manually by editing keywords in text boxes of maPodWalk Maker. maPodWalk RSS includes authors' texts for searching maPodWalk.

6.2. Step 2: Authors upload maPodWalk and maPodWalk RSS

maPodWalk RSS is automatically uploaded to the Internet when authors upload their maPodWalk. maPodWalk RSS can be uploaded to both of users' online websites and official websites of maPodWalk.

6.3. Step 3: Listeners download maPodWalk

Listeners register keyword and subscribe (download) their intended maPodWalk.

maPodWalk: map-integrated audio tours

maPodWalk Maker for authoring   **maPodWalk Caster for syndication and aggregation**

Figure 5. Environment for web-based Broadcasting maPodWalk:

Relations of syndication and aggregation of maPodWalk.

7. Main features of maPodWalk Caster for Syndications and Aggregation

7.1. Web-based Broadcasting maPodWalk with maPodWalk RSS

maPodWalk Caster has functions of loading and processing maPodWalk RSS which is made with maPodWalk Maker. Users can easily share maPodWalk and maPodWalk RSS with maPodWalk Maker and maPodWalk Caster. We provides users the environment of broadcasting of spatial multimedia content with RSS which is content syndication technology

7.2. Automatically syndicating latest maPodWalk

maPodWalk Caster enables users to download users' intended latest maPodWalk. If users want to subscribe latest maPodWalk, users register their intended maPodWalk RSS to maPodWalk Caster over the Internet. This work is similar to easily downloading Podcast with RSS of Apple Inc.'s iTunes.

7.3. Aggregation of maPodWalk: Searching and Listing maPodWalk

maPodWalk RSS has keywords of audio tours for users' content search. maPodWalk RSS enables users to download their intended maPodWalk by registering spatial keywords on maPodWalk Caster. If listeners register the keyword in maPodWalk, maPodWalk related to the keyword is downloaded.

7.4. Combining with maPodWalk's routes by spatial positions of maPodWalk

Listeners can view maps of maPodWalk and operate audio current positions by selecting the points or areas on maps. maPodWalk Casters have function for combining with other users' maPodWalk or separate a maPodWalk into some tracks by RSS's temporal positions. Listeners also instantly combine with pieces of maPodWalk's routes by selecting other maPodWalk. Listener can change audio tours' route in movement dynamically.

Conclusions

The large number of free Podcast are shared on the Internet using RSS which is content syndication technology, however there are not appropriate software tools for easily

delivering map-integrated spatial audio content. With current RSS reader software tools, listeners must manually access the website which uploaded maPodWalk and downloading their intended PodWalk with such as keywords of the web pages. It has limitation with the number of sharing maPodWalk between users. maPodWalk Caster we proposed in this paper provides a novel environment for delivering spatial multimedia content with an extended RSS. The environment provides a place-related aggregation by storing geotagged audio stream and new experiments on place-related audio stream sharing opportunities for the geospatial communication. The emergence of PodWalk with maPodWalk RSS is expected to increase in number of user-generated audio tours in commercialism and conventions of societies. We propose maPodWalk Caster for the new environment for the web-based broadcasting environment.

Figure 6. Playing maPodWalk on Apple Inc.'s iPod touch
[Map data: ZENRIN Co. Ltd..]

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Biography

Ken'ichi Tsuruoka received the Bachelor degree of Environment and Information Study at Musashi Institute of Technology and the Master degree of Environmental Studies at the University of Tokyo. He is now a Ph.D. candidate at the University of Tokyo, from 2006. His research interest is digital spatial media, geospatial communication tools and software engineering.

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