# Uses of W3C's Geolocation API

Bojan Pejić, Aleksandar Pejić and Zlatko Čović
Subotica Tech/Department of Informatics, Subotica, Serbia
bpejic@vts.su.ac.rs, alex@vts.su.ac.rs, chole@vts.su.ac.rs

*Abstract*—**This paper presents World Wide Web Consortium's (W3C) Geolocation Application Program Interface (API), which is an interface to retrieve geographic location information of a client-side device. Currently Geolocation API is used as implementation in Web browsers, and new coming HTML5 standard. There are few methods how Geolocation API is determining location which are mentioned in this article, and some of them presented with geolocation examples on Google Maps services. Few words is also said about user privacy concern.**

**Keywords: geolocation, html5, w3c.**

## I. INTRODUCTION

With advent of mobile access to the Internet, location-based services (like Gowalla or Four Square) become a very popular part of the Web, from social network location-sharing, to driving directions or to finding an point of interest nearby.

Recently W3C's Geolocation API is that enables scripting code on a web page to access clients device location information. Web developers can write a simple scripting code and use this new web browser function, there is nothing needed to be updated from web infrastructure.

W3C's Geolocation API is an effort to standardize and define a high-level interface to location information associated only with the client device which is hosting the implementation.

Beside general description of Geolocation API, Section 2. covers Location Technologies, Web browser support, and a Google Gears implementation. Connection between HTML5 and Geolocation API is written in Section 3. Privacy with Geolocation API in Section 4., and finally some examples of it with Google Maps in Section 5.

## II. W3C GEOLOCATION API

### A. About Geolocation API

As mentioned in Introduction (I.), Geolocation API represents a high-level JavaScript API, defines a set of objects, and allows Web sites to request location information.

### B. Location Technologies

Two primary methods exists for detecting location, beyond that also are explained some pros and cons of each location technology.

#### 1) IP Geolocation
Pros:
- Widely available
- Detection happens server-side

Cons:
- Accuracy on country/city level

#### 2) Triangulation
GPS (accuracy level about 10m)
Pros:
- Accurate after it gets a fix
- Highly accurate in rural area

Cons:
- doesn't work indoors
- difficulty with urban canyons
- long time to first fix

Wi-Fi (20m)
Pros:
- Accurate
- Work indoors and urban areas
- quick time to first fix
- software-only, leverages existing Wi-Fi

Cons:
- Doesn't work well in rural areas

Cell Tower (1000m)
Pros:
- works where there is cell coverage (most areas)
- quick time to first fix
- software-only, leverages existing cellular radio

Cons:
- very inaccurate

### C. Web Browser Support for Geolocation API

TABLE I.
Browser Support for Geolocation API

| Browser | Support for Geolocation API |
|---|---|
| IE | No |
| Firefox 3.5+ | Yes |
| Chrome 5+ | Yes |
| Safari 5+ | Yes |
| Opera 10.6+ | Yes |
| Android 2+ | Yes |
| Iphone 3+ | Yes |

Table I. is showing current support of major web browsers on the market for Geolocation API. Every major web browser, beside Internet Explorer is supporting Geolocation API (maybe IE9 will have support finally).

### D. Google Gears

For those browsers which don't support Geolocation API, Google Gears might be the work around.

## III. HTML5 AND GEOLOCATION API

HTML5 represents the new coming HTML standard, like its predecessors, HTML 4.01, XHTML 1.1, HTML5 is a standard for structuring and representing content on Web. It's currently under development, but there are already web sites and applications which are implemented it and its new abilities. One of main futures of HTML5 is introduction of new elements and attributes that reflect typical usage on modern websites. In addition to specifying markup, HTML5 specifies scripting APIs, and some of new are added. In this group of new added APIs to HTML5 we found Geolocation API also.

## IV. PRIVACY

Privacy is obvious a concern when you are sharing your physical location with a remote web server. The Geolocation API explicitly states: "User Agents must not send location information to Web sites without the express permission of the user." In other words, sharing your location is always an option, if you don't want to, you don't have to. When a Web site wants to know you location, it usually appears an infobar on documents top with option to share or not to share your location.
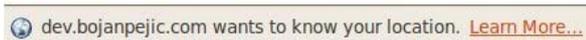

Figure 1. Part of infobar which tells which website wants to know your location, and provides a link with more infromation
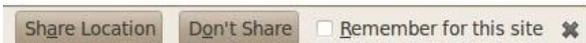

Figure 2. Part of infobar which allows client to share or not his location

Things that infobar tells are:
- a website wants to know your location,
- which website wants to know your location,
- find more details about location sharing following "Learn more..." link
- you can chose to share your location,
- you can chose not to share your location,
- you can tell browser to remember your choice for future requests of page, so the infobar doesn't appear again (if you change your mind, it's still possible to disable this).

All things that infobar tells are predefined by Geolocation API security and privacy considerations.

In this considerations beside all other things says that web browsers must acquire permission through a user interface, unless they have prearranged trust relationships with users; user interface must include the URI of document orign (shown on Figure 1), and permissions acquired are beyond the current browsing session must be revocable and web browsers must respect revoked permissions (Figure 2).

## V. EXAMPLES OF DETECTING LOCATIONS

As it is said before in Section 2. there are several methods which can be used for client geolocation detecting through Geolocation API. In this section will be presented an example with Geolocation API and Google Maps v3, Geolocation API and Google Maps service, and few words said about Google Gears.

### A. Geolocation API and Google Maps API v3

Google Maps API v3 is a free, open mapping service from Google. It made possible for developers to built own maps and present own data on them. This was just a short and harsh description of it, it contains many more things, but currently it's not the main subject.
Because the source code which contains XHTML and JavaScript is a little longer, we will just concetrante on few code snippets which is part of Geolocation API.
For first one here is detecting if web browser supports Geolocation API:

```
if (navigator.geolocation) {
        // if browser support do something
} else {
        // else if don't support do something
}
```

So, as you can see, with JavaScript expression navigator.geolocation developer can easily check if the clients web browser supports Geolocation API. If it supports it can do the detecting of geolocation, else it can try some other method which don't requires Geolocation API or just simple do something else.
After we know the clients web browser support Geolocation API, we should now detect the geolocaiton.

```
navigator.geolocation.getCurrentPosition(show_map,
        handle_error, {timeout: 60000});
```

Now we are calling the getCurrentPosition property of navigator.geolocaiton object. It has 3 parameters, first parameter which is a function, show_map is called to create a map, detect position of client and draw a marker on map. Second function which is called handle_error is used as a callback function if something goes wrong, like network down or what to do if client don't want to share location or response timeout or something other unexpected. In that case as second parameter we can give a callback function which will handle the similar problems. As the third parameter, which is optional we can define the timeout

time, precission parameter and how much time to remember our location. The name itself tells it's getting clients current position, but there are other possibilities, like to watch clients position which means it will be periodicly updated (and here is the real use of maximumAge parameter).
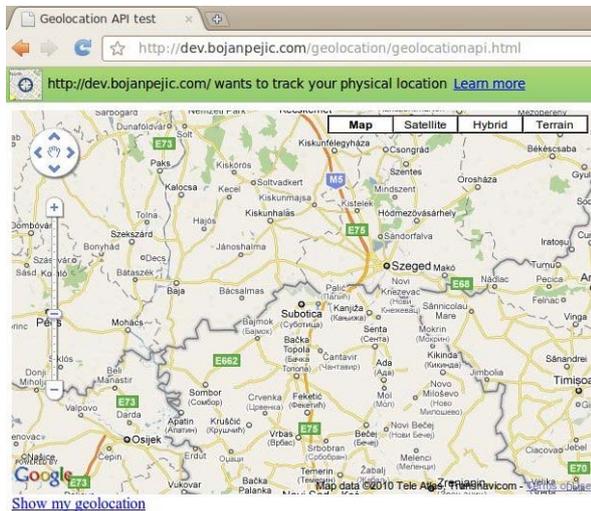


Figure 3. Web browser asks user to share his geolocation



Figure 4. After user shares his geolocation, it's represented with Google Maps API v3 through Geolocation API

### B.  Geolocation API and Google Maps service

To show how simple can be the whole Geolocation API process, here is an example which uses Google's Maps service (maps.google.com). This source code contains less lines, but also does the work.

```
<!DOCTYPE html>
<head>
<title>Quick Google Maps service example</title>
<script type="text/javascript">
```

```
if (navigator.geolocation) {
    navigator.geolocation.getCurrentPosition
            (function(position) {
    document.location.href =
    "http://maps.google.com/maps?q="
    + position.coords.latitude + ",+"
    + position.coords.longitude
    + "+(My%20location!)&iwloc=A&hl=en";
        });
}
        else {
                document.innerHTML = "Sorry, your
    browser don't support Geolocation API";
        }
</script>
</head>
<body> ··· </body>
</html>
```

This code makes a detection if client web browser supports Geolocation API, if does it simply redirect client to maps.google.com with clients position geographical data position.coords.latitude and position.coords.longitude which represents latitude and longitude. When the map is loaded clients location is showed by a marker. In case the the clients web browser doesn't support Geolocaiton API it will be shown a message which says "Sorry, your browser don't support Geolocation API". Also in this example there isn't defined a callback function, so if the client refuses do share location it will happen nothing.
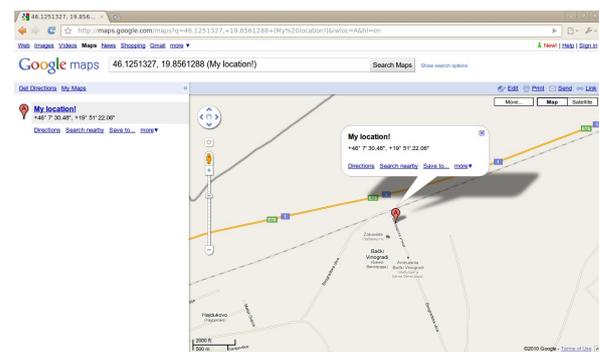


Figure 5. Quick example of geolocation detecting with Google Maps service

Examples presented in this Section are available right now  online for testing for an undefined time period. The URL is http://dev.bojanpejic.com/geolocation from which can be the examples accessed.

REFERENCES

[1]  Geolocation API specification
     http://www.w3.org/TR/geolocation-API/

[2]  http://diveintohtml5.com/geolocation.html

[3]  W3C Geolocation API – Making Websites Location-aware,
     http://www.slideshare.net/rsarver/w3c-geolocation-api-making-
     websites-locationaware