Internet of Things to promote Tourism: An insight into Smart Tourism

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Abstract— Since the commencement of web technology in the nineties, Tourism has been a major domain of application of the World Wide Web. It is also one of the most benefitted areas of Internet and its related progressive technologies. With the initiation of ideas like Internet of Things (IoT), Smart cities, Cloud computing, Big Data etc. there has been an increase in the avenues of their implementation. Smart cities can accomplish their targets well only when all its areas work smartly. Smart tourism is the necessity for such smart cities which possess heritage value or other tourist attractions. It requires bringing together the various stakeholders in the tourism industry through a common platform of technology and hence provides a mechanism for their cooperative functioning through information exchange and analysis. This paper aims to provide an insight into this concept and how it can be realized through the modern technology of IoT. It reviews the perspective of the service providers as well as the tourists and how their experiences can be enhanced through Smart tourism.

Keywords— Internet of Things (IoT), Smart cities, Smart Tourism, Information and Communication Technology (ICT), Cloud computing, Big Data

I. INTRODUCTION

Internet of Things (IoT) is a field where any device or object can be made smart and identifiable through radio frequency tags. These devices can communicate with many other smart devices through the network. The communication generates a large amount of data that can be stored and computed on the available Cloud services. Tools of Big Data analysis can be very useful in analyzing the trends and patterns in the data. With the initiation of Internet of Things (IoT) and Smart cities, a lot of focus has been laid on various sectors like tourism, healthcare etc. and they have already reaped the benefits of improving technology. The use of technology has helped both the tourism industry as well as the tourists. These days, it has become easier to book a holiday online. Likewise, it is very convenient for the hotels and airlines to operate their business online as it has a wider approach. Internet has radically changed the conventional business models and people are widely adapting to it.

II. THE SMART TOURISM IDEA

Smart Tourism will result as an amalgamation of the existing online business model with the modern Information and Communication Technology (ICT). It is an extension of the already existing online business model which functions through the websites and online bookings. It will provide services to its users along with up-to-date information during and before their tour.

The various technologies which interplay to provide Smart Tourism services will be the web, mobile, cloud computing, Internet of Things (IoT) and Big Data analysis. Simple devices like our mobile phones are equipped with camera, microphone, sensors to detect movements etc. The information collected by such smart phones can be processed on servers and hence used for smart living. Smart living requires smart houses and smart work conditions. That means all the services
used for living like healthcare, education, tourism etc should turn smart as well. Table 1 summarizes the ideas of Smart Tourism.

**Table 1: The ideas behind Smart Tourism**

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<tr>
<th>Smart Tourism Ideas</th>
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<tr>
<td>Use of sensors, cameras and smart phones</td>
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<td>Use of Big Data to analyze information</td>
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<td>Collaboration of web and mobile services</td>
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<td>Use of Cloud services and Internet of Things (IoT)</td>
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<td>Use of Touch screens for easy interaction</td>
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<td>Better assistance to tourists through mobile tours and apps</td>
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The area of concern for cities with potential to attract people from all over the world is Smart Tourism. The cities under consideration can be made smart and hence the tourism industry can play its part efficiently. The objects of interest in such cities will be the tourist destinations like the heritage and cultural places. Such destinations can be equipped with sensors, cameras and other smart devices like Touch screens etc. which can collect data about tourists visiting those places. Such vast amount of data can then be stored on Cloud servers using the wireless or wired network. This data can then be analyzed and put to efficient use by the various stakeholders in the tourism sector.

Chih-Kung Lee et al presented the use of latest technology to improve the quality of human life. Real-life examples of Taiwan’s ‘Smart Living Technology’ have been discussed. Smart devices and wireless networks have been used to foster intelligent and sustainable living in the residents. Smart tourism project named ‘In-Joy-Life Smart Tourism’ is the government’s initiative to effectively manage tourists during the peak season.

Travel cards are issued to the tourists based on their packages which can be used to access all the transport facilities, different shopping stores etc. Kiosks and interactive help desks are installed to help the tourists. Virtual tours are provided to the tourists on their mobile phones as well as touch screens installed at various locations [1]. The idea is demonstrated in Figure 1.
I. SMART TOURISM ECOSYSTEM

Gretzel et al present the working of Smart Tourism ecosystem and the various objects in it. The Tourist Consumers (TC) work closely with the Residential Consumers (RC) in order to act as a part of the local economy. Tourism Suppliers (TC) offer services to the tourists through technology and network. Other services (OC) like telecom operators; banks etc. also play a role in the system. They collaborate with each other and the TCs to provide best services to the tourists. Destination Marketing Organizations (DMO) performs marketing and information sharing through Internet and smart devices. The idea is presented in Figure 2.

The whole interaction occurs with the help of smart technology and devices. This is the rationale behind the smartness being introduced into the tourism sector which is predominantly based on online websites-based business model. Smart Tourism will require the use of Internet in a different way. The initial bookings may be done through websites but the actual experience of touring a place will all be managed by the smart coordination of the objects at that place which will enhance the overall experience of the tourist. For example, after the tourist arrives in a city and wishes to visit some popular site, the information regarding the site like the shortest route to reach there, traffic congestion in that route, alternate ways to reach the site etc. can be provided to the tourist in the hotel room itself [3]. Mobile tours can be provided to the tourists giving details of all tourist attractions, local restaurants etc. and assisting them throughout their trip.
IV. IMPLICATIONS OF SMART TOURISM

There are certain implications which need to be addressed in Smart tourism. The foremost matter is the privacy and security of customer’s data. Further, as huge amounts of data is produced during the stay of the tourist, the digital traces left behind shall not be used for purposes other than providing better tourism experience. The biggest concern is however, the deep dependence of the system on technology and network services. It is impossible to implement such a system without the use of smart phones and high-end infrastructure. For a business to adopt this idea, the whole business model needs to be revolutionized. Trained and knowledgeable staff is required to work in the new model. The whole idea is to collaborate with other businesses like telecom etc. and come up with a united picture of services [4].

Table 2: Implications of Smart Tourism

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<tr>
<th>Smart Tourism Implications</th>
<th>For a Tourist</th>
<th>For a Business</th>
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<td>Privacy concerns over data</td>
<td>Dependence on technology and network</td>
<td>New business model</td>
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<td>Consequences of digital traces</td>
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<td>Trained human resources</td>
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<td>Security and privacy of customer data</td>
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<td>Collaboration with other businesses</td>
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V. CONCLUSION

The idea of Smart cities and smart working in various sectors of such cities is bringing about a revolutionary change in the way the industry is working. The benefits of involving technology and Internet in conventional business models beyond the use of mere websites are manifold. Through Internet of Things (IoT) concept, a network of smart devices can be set up which can enhance the working of any business and its service providers. Smart tourism in cities based on the idea of intelligence and smartness is a naïve idea which is being adopted by countries world-wide. The results are apparent in terms of the improvements in tourist experiences. However, there are certain implications like concerns over privacy of personal data generated by smart devices, due to over-indulgence in technology. If measures are taken to answer all these concerns, the Smart tourism idea can bring huge benefits to its stakeholders as well as the tourists.

REFERENCES